

Ægis Questions

NIC-9 Conference, 2006-2007

Round 1

Tossup 1: Math (Geometry) -- Computational (30 Seconds)

The volume of a sphere is 36,000 pi cubic inches, and you want to find the circumference of the great circle. Remembering that the radius of the great circle is equal to the radius of the sphere, you can set the formula of a sphere equal to 36,000 pi and solve for r, then use this in the formula for circumference. What is the circumference of the sphere's great circle?

Answer: **900 pi inches**

Bonus 1: Social Studies (U.S. History) -- Three Parts

Given a "deal," name the president who used it.

A: New Deal

B: Fair Deal

C: Square Deal

Answers: A: **F(ranklin Delano) Roosevelt** (*prompt on Roosevelt; accept FDR*) B: **Harry S. Truman**

C: **Theodore Roosevelt** (*prompt on Roosevelt; accept Teddy Roosevelt*)

Tossup 2: Science (Biology)

Hydrolyzing its gamma group generates 12 kilocalories per mole, a highly exergonic reaction that is later reversed by the citric acid cycle. Taking the structure of a purine group attached to a ribose sugar and up to three phosphate groups, name this molecule, whose third phosphate group is removed to power cellular processes, known as the energy currency of all living cells.

Answer: **ATP** (*accept adenosine triphosphate*)

Bonus 2: Literature (Literature)

Identify the authors of the following trilogies:

A: The Fellowship of the Ring, The Two Towers, and The Return of the King, known as The Lord of the Rings trilogy

B: 1919, The 42nd Parallel, and The Big Money; known as the U.S.A. trilogy

C: Out of the Silent Planet, Perelandra, and That Hideous Strength, known as the Perelandra trilogy

D: Young Lonigan, The Young Manhood of Studs Lonigan, and Judgment Day, known as the Studs Lonigan trilogy

Answers: A: **J.R.R. Tolkien** (*Accept John Ronald Reuel Tolkien*) B: **John Dos Passos** C: **C.S.**

Lewis (*Accept Clive Staples Lewis*) D: **James T. Farrell**

Tossup 3: Miscellaneous (Other)

Made from the camellia sinensis plant, there are many varieties, some fried, boiled, or dried before use. Though the FDA has not approved any medical indications, there are claims that it can prevent heart disease, cancer, neurodegeneration, and lower cholesterol. Name this drink of which many Asians have about 1.2 liters of each day.

Answer: **Green tea**

Bonus 3: Fine Arts (Music) -- Five Parts

Identify each member of the Mighty Handful, also known as The Five, a group of nineteenth-century Russian composers.

A: More well-known today for starting the Mighty Handful as opposed to his music, he is known for "Islamey, an Oriental Fantasy." He was the only professional musician in the group.

B: This man was an army engineer, and was one of the co-founders, along with the man from answer one. His Bolero was originally a vocal work, but he also wrote an orchestral version.

C: The third member joined in 1857, a year after the first two first met. He is probably best known for works such as the opera Boris Godunov and the piano suite Pictures at an Exhibition.

D: This synesthete (*SIN-ehs-theat*) and composer of Scheherazade (*shuh-HARE-uh-zahd*) was the fourth to join the group. His work finishing some of the posthumous work of the answer to number 3 was once panned for altering the original intentions of the composer.

E: This chemist was the last to join the group. He called himself a "Sunday composer," as his work was the least prolific of the Mighty Handful. He is known for his work on benzene derivatives and for his composition In the Steppes of Central Asia.

Answers: A: **Mily Balakirev** B: **Cesar Cui** C: **Modest Mussorgsky** D: **Nikolai Rimsky-Korsakov** E: **Alexander Borodin**

Tossup 4: Literature (Literature)

He has adapted other author's works, including The Ballad of the Sad Café and Lolita, for the stage, but is best known for his own plays, which have won many Tony Awards and Pulitzer Prizes for Drama. Such plays, including 'Tiny Alice' and 'The Lady from Dubuque', have established him as a master of satirical social criticism and the Theater of the Absurd. Name this author of 'A Delicate Balance' and 'Who's Afraid of Virginia Woolf?'.

Answer: **Edward Albee**

Bonus 4: Math (General)

Calculate the following combinations in nCr form.

A: 3 C 2

B: 10 C 8

C: 6 C 3

D: 5 C 5

Answers: A: **3** B: **45** C: **20** D: **1**

Tossup 5: Social Studies (World History)

He is the narrator of the musical 'Evita', though this situation is entirely fictional; he never actually met Eva Perón. He dreamed of a united 'Ibero-America', without borders and bound together by a common mestizo culture. Born in Argentina, this Marxist revolutionary led guerrilla movements in Guatemala, Cuba, the Congo, and Bolivia, where he finally met his end. Identify this man, probably most famous for his Motorcycle Diaries and a contrast photo of him that is frequently used on T-shirts.

Answer: **Ernesto "Che" Guevara de la Serna**

Bonus 5: Science (Physics)

Answer the following questions about a particular electric circuit.

A: Two resistors of resistance 2 and 3 Ohms are placed in parallel. What is the resistance of the circuit?

B: If that circuit has a voltage of 3 volts, what is the current running through the circuit?

C: What is the electric power of that circuit?

D: If the voltage is doubled, what is the new electric power of the circuit?

Answers: (*prompt for units*) A: **1.2 Ohms** B: **2.5 amp(ere)s** C: **7.5 watts** D: **30 watts**

Tossup 6: Math (Algebra) -- Computational (30 Seconds)

Starting from the first term, how many terms does it take the arithmetic series beginning 1, 5, 9, 13, before the sum of those terms is greater than 100?

Answer: **8 terms**

Bonus 6: Social Studies (Other)

Name these studies of different fields, that all end in -logy.

A: The study of spiders

B: The study of knowledge

C: The study of wood

D: The study of China

Answers: A: **Arachnology** B: **Epistemology** C: **Xylology** D: **Sinology**

Tossup 7: Fine Arts (Visual Art)

The backdrop of this painting is said to symbolize the fallout from Krakatoa, which had erupted ten years previously in 1883, and caused spectacular sunsets in the following years. The central figure has no apparent hair, and its body seems to sway while it leans on the railing of the bridge. Name this work, the most famous by Edvard Munch (*MUNK*), which was recently recovered in Norway.

Answer: **The Scream** (accept *The Cry*)

Bonus 7: Miscellaneous (Technology)

Name these terms related to programming.

A: Before compiling a program, the compiler runs this, which prepares the program by following "define" and "include" directives.

B: This property of a programming language allows multiple functions to have the same name. The compiler decides which to call based on the function arguments.

C: As distinguished from compile-time, this phase of a program is controlled by the end user.

D: "Int" and "void" are common types of these. In some languages, every function must have one declared, to indicate what the function will pass back to the caller.

Answers: A: **Preprocessor** B: **Function overloading** C: **Runtime** D: **Return type**

Tossup 8: Science (Chemistry)

Its name is derived from the Greek for "stone," because it was first isolated from minerals. Though it oxidizes too quickly to exist in a pure form, it is used in many forms, including its stearate as a lubricant, and its deuteride to produce tritium in hydrogen bombs. Most common, however, is its use in batteries, producing 3 instead of 1.5 volts due to its high electrochemical potential. Name this element, the lightest member of the alkali metals with an atomic weight of 3.

Answer: **Lithium**

Bonus 8: Literature (Literature)

Given its first line, name the novel by F. Scott Fitzgerald.

A: Amory Blaine inherited every trait from his mother, except the stray inexpressible few, that made him worth while.

B: In my younger and more vulnerable years my father gave me some advice that I've been turning over in my mind ever since.

C: On the pleasant shore of the French Riviera, about half way between Marseilles and the Italian border, stands a large, proud, rose-colored hotel.

D: Though I haven't ever been on the screen I was brought up in pictures.

Answers: A: **This Side of Paradise** B: **The Great Gatsby** C: **Tender is the Night** D: **The Love of The Last Tycoon**

Tossup 9: Social Studies (Current Events)

The military postponed the upcoming elections, suspended the Constitution, dissolved Parliament, banned protests, suppressed and censored media outlets, declared martial law, and arrested Cabinet members. Some existing government policies still remained in place however, such as the retaining of King Bhumibol Adulyadej as head of state. Identify this country in which Caretaker Prime Minister Thaksin Shinawatra and his regime were overthrown in a bloodless coup d'état on September 19, 2006.

Answer: **Kingdom of Thailand**

Bonus 9: Math (Calculus)

Find the indefinite integrals of each of the following functions. Remember to include the constant of integration in your answer.

A: $12x^2 - 2$

B: $3 \sin x$

C: $24e^{3x}$

D: $\frac{120}{x^2}$. Do not use any negative exponents in your answer.

Answers: A: **$4x^3 - 2x + C$** B: **$-3 \cos x + C$** C: **$8e^{3x} + C$** D: **$-\frac{120}{x} + C$**

Tossup 10: Literature (Language Arts)

A nine-letter word ending in 'L,' fame is often said to have this quality, as summarized in Andy Warhol's famous "fifteen minutes" maxim. It can also describe the life of a mayfly or the presidency of William Henry Harrison. Identify the word meaning short-lived or momentary beginning with the letter 'E.'

Answer: **Ephemeral**

Bonus 10: Science (Earth Science)

A lot of minerals contain sulfur and oxygen. Other than sulfur and oxygen, what one chemical element do each of the following minerals contain?

A: Gypsum

B: Galena

C: Stibnite

D: Barite

Answers: A: **Calcium** B: **Lead** C: **Antimony** D: **Barium**

HALFTIME

Tossup 11: Social Studies (Geography)

Known as the "Land above the bridge," the economy of this area centers around logging and mining. To get to it, the first visiting Europeans had to cross the St. Marys River, which is on the eastern side of it. Lake Superior is to the north of it, while Lakes Huron and Michigan surround it to the south. Name this area, with inhabitants known as "Yoopers," which is the "second part" of Michigan.

Answer: **Upper Peninsula** (prompt on U.P.)

Bonus 11: Literature (Mythology)

Given an object from Norse mythology, name its owner.

A: The hammer Mjolnir (*MEEOHL-neer*), which can shatter mountains with a single blow.

B: Draupnir, a gold arm ring that spawns eight golden arm rings every nine days.

C: Skidbladnir, a ship that can fold up into a pocket.

D: Brisingamen, a necklace that grants its wearer irresistible charm.

Answers: A: **Thor** B: **Odin** (or *Wotan*) C: **Freyr** (or *Frey*; not *Freya*) D: **Freya** (not *Freyr/Frey*)

Tossup 12: Science (Physics)

The elastic type is equal to one half the spring constant times displacement squared. The electric type is Coulomb's constant times the product of the charges over their distance. The gravitational type is mass times gravitational acceleration times height. Name this type of energy that indicates how much energy is stored in an object, as opposed to kinetic energy.

Answer: **Potential energy**

Bonus 12: Fine Arts (Visual Art)

A stretch to the definitions of "fine" and "art"—let's answer some questions about twentieth century sculpture. Given the name of the "artwork," give the artist.

A: Bird in Space

B: Fountain

C: Love

D: Lobster Trap and Fish Tail

Answers: A: **Constantin Brancusi** B: **Marcel Duchamp** C: **Robert Indiana** D: **Alexander Calder**

Tossup 13: Math (Calculus)

Though he did solve the brachistochrone (*bruh-KIS-tuh-krone*) problem posed by his teacher, most of his other accomplishments were actually done by his teacher, who he paid 300 francs a year to be quiet about the matter. Devoting himself to mathematics after bad eyesight prevented a military career, name this French mathematician who gets credit for Johann Bernoulli's rule that the limit of an indeterminate quotient is the limit of the quotient of the derivatives.

Answer: **Marquis de l'Hôpital**

Bonus 13: Social Studies (Current Events)

Answer the following about recent violence in schools.

A: This state is where Platte Canyon High School is located, where a 56-year-old man walked into a school and took 6 hostages, killing one and then himself.

B: A ninth grade student at Weston High School shot and killed his principal with a shotgun after having his handgun wrestled away from him by a custodian in this state.

C: This state contains West Nickel Mines School, a one room Amish schoolhouse where a shooting was orchestrated by a milk-tanker driver.

D: This college in Montreal, Quebec saw Kimveer Gill open fire outside the school and then move into it, killing one and wounding 19.

Answers: A: **Colorado** B: **Wisconsin** C: **Pennsylvania** D: **Dawson College**

Tossup 14: Miscellaneous (Entertainment)

The song "Morning has Broken" is often erroneously attributed to this musician after its appearance on the popular album Teaser and the Firecat. In 1976, he endured a near-death experience while almost drowning. Shortly thereafter, he converted to Islam and changed his name to Yusef Islam. Identify this singer and songwriter of hits such as "Peace Train" and "Moonshadow."

Answer: **Cat Stevens (accept Stephen Demetre Georgiou or Yusef Islam before it is mentioned)**

Bonus 14: Math (Other)

Vector A is (4, 3, 5) and vector B is (4, 6, 1). Perform the following operations.

A: The magnitude of A

B: A dot B

C: A cross B

D: B cross A

Answers: A: **5 root 2** (accept 5 times the square root of 2) B: **39** C: **(-27, 16, 12)** D: **(27, -16, -12)**

Tossup 15: Literature (Literature)

Most of his works are sweeping historical epics dealing with many generations of people in a particular place. His most famous work, a collection of short stories, inspired a Rogers and Hammerstein musical. Name the author of Chesepeake, Alaska, Texas, Hawaii, and Caribbean who won the Pulitzer in 1948 for Tales of the South Pacific.

Answer: **James Michener**

Bonus 15: Science (Biology)

Of bilateral, radial, or neither, give the type of symmetry exhibited by all members of each of the following animal phyla.

A: Chordata (*kor-DAH-tuh*)

B: Porifera (*poor-IF-ur-uh*)

C: Platyhelminthes (*PLAT-ee-hel-MIN-theeze*)

D: Cnidaria (*ny-DAIR-ee-uh*)

Answers: A: **Bilateral** B: **Neither** (accept none) C: **Bilateral** D: **Radial**

Tossup 16: Social Studies (U.S. History)

In high school, he changed his middle name from Donald to Hubbs. Serving in the Air Force from 1943 to 1946, he then went to Stanford for an undergraduate degree. He took his penultimate title in 1972, the hundredth person to do so, by replacing John Harlan. The 102nd person appointed was the first woman in the post, who coincidentally graduated from Stanford Law School in his class. Name this man whose position was later upgraded from Associate to Chief Justice of the Supreme Court, serving until his death in September 2005.

Answer: **William Rehnquist**

Bonus 16: Miscellaneous (Interdisciplinary)

Use your knowledge of Mohs' scale of hardness to solve the following mathematical equations for x.

A: x equals topaz times calcite

B: x equals apatite to the fluorite power

C: x equals the quantity corundum minus talc, close quantity, times diamond, all divided by topaz

D: Log base diamond of x equals gypsum plus log base calcite of corundum

Answers: A: **24** B: **625** C: **10** D: **10000**

Tossup 17: Math (Algebra) -- Computational (30 Seconds)

Greg's allowance is tied to his performance on statistics tests at the end of the semester. His scores so far are 83, 91, 91, 90, 89, and 84. The upcoming final is weighed at four times the score of the previous tests. Greg earns \$50 for reaching 90%, and earns an extra \$10 for each integer percentage point above 90%. What is the maximum amount Greg can earn, if the maximum he can score on the final is 100?

Answer: **70 dollars**

Bonus 17: Literature (Literature)

Given a line of poetry, name the British poet who penned it.

A: "Had we but world enough and time, this coyness, lady, were no crime."

B: "I wandered lonely as a cloud, that floats on high o'er vales and hills."

C: "The sedge has withered from the lake, and no birds sing."

D: "If Winter comes, can Spring be far behind?"

Answers: A: **Andrew Marvell** (from 'To His Coy Mistress') B: **William Wordsworth** (from 'I Wandered Lonely as a Cloud') C: **John Keats** (from 'La Belle Dame Sans Merci') D: **Percy Bysshe Shelley** (from 'Ode to the West Wind')

Tossup 18: Science (Biology)

Discovered by Stanley Prusiner, they are resistant to breakdown by proteases, and even survive high-temperature sterilization. Though it is unclear how they function, they have a mutation that changes their shape and allows them to convert un-mutated molecules into their shape as well.

Name these infectious proteins responsible for scrapies and mad cow disease.

Answer: **Prion** (accept *proteinaceous infectious agents*)

Bonus 18: Social Studies (World History)

Given an ecumenical council, name the Pope who assembled it.

A: Council of Florence

B: Council of Constance

C: Council of Trent

D: First Vatican Council

Answers: A: **Martin V** (prompt on Martin) B: **Gregory XII** (prompt on Gregory; accept John XXIII) C: **Paul III** (prompt on Paul) D: **Pius IX** (prompt on Pius)

Tossup 19: Fine Arts (Music)

It opens with the solemn announcement of declaration of war, followed by a hymn praying for success played by the strings. The battle theme is performed by horns, and the ensuing retreat is shown by a diminuendo. Following the battle, the hymn is reprised, this time with full orchestra and bells signifying the victory over the French. Name this 1882 work in which bass drums are sometimes substituted for cannons in Tchaikovsky's original score.

Answer: **The 1812 Overture** (accept *Festival Overture*)

Bonus 19: Math (Geometry)

Find the distance between each of the following points.

A: (5, 6) and (4,0)

B: (3, 2, 10) and (1, 5, 4)

C: The polar coordinates (8, 45 degrees) and (8, 315 degrees)

D: (-10, 5, 4, 2) and (1, 10, 11, 5)

Answers: A: **$\sqrt{37}$ units** B: **7 units** C: **$8\sqrt{2}$ units** D: **$2\sqrt{51}$ units**

Tossup 20: Literature (Literature)

The title of this work is a reference to Chaucer, but the society examined by the novel is steeped in Biblical allusions. The main character's status is much like those of Zilpah and Bilha, who performed the title role for Jacob's wives Rachel and Leah. Women are subverted completely in this novel, set in the Republic of Gilead. Name this dystopian novel by Margaret Atwood.

Answer: **The Handmaid's Tale**

Bonus 20: Science (Chemistry)

Name these different ways that substances can pass through barriers.

A: In this process, particles pass through a hole small enough that only one goes through at a time.

B: In this similar-sounding process, particles naturally move from areas of high concentration to areas of lower concentration.

C: This process refers to water or other solvents passing through a semipermeable membrane to equalize solute concentration on either side.

D: This biological process is the opposite of the previous three, using energy to move chemicals across a membrane against the concentration gradient.

Answers: A: **Effusion** B: **Diffusion** C: **Osmosis** D: **Active transport**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Social Studies (Other)**

This 1976 Nobel prize winner advocated for monetarism in *A Monetary History of the United States*. He was involved with the show *Free to Choose*, and also wrote *Capitalism and Freedom*. Name this conservative American economist best known for his support of laissez-faire government policy.

Answer: **Milton Friedman**

Bonus 21: Science (Physics)

Identify the official SI unit for each of the following quantities.

A: Pressure

B: Electrical potential

C: Radioactivity

D: Catalytic activity

Answers: A: **Pascal** B: **Volt** C: **Becquerel** D: **Katal**

Tossup 22: Science (Biology) -- Computational (30 Seconds)

If a certain section of normal double-stranded DNA is analyzed and it is found that 15% of the bases are cytosine, what percent of the bases are adenine? Remember that the number of adenine and thymine are the same, as well as the number of cytosine and guanine.

Answer: **35%**

Bonus 22: Social Studies (Geography)

Scholastic Bowl players are often faced with the question of how to refer to the two-island archipelago north of France that has produced the Beatles and Van Morrison. Given a political or geographic description, give their collective most specific official title. Note that, as "Britain" is an informal term, it will be incorrect.

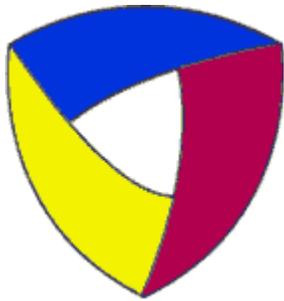
A: Consists of Northern Ireland, Wales, Scotland, and England.

B: Consists of Wales, Scotland, and England.

C: The controversial geographic term for the two islands and several smaller adjacent ones such as the Isle of Man.

D: The geographic term for the smaller of the two major islands.

Answers: A: **United Kingdom of Great Britain and Northern Ireland** B: **Great Britain** C: **British Isles** D: **Ireland**



Aegis Questions

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Round 2

Tossup 1: Fine Arts (Music)

This composer helped develop the baroque concerto, which influenced Johann Sebastian Bach and other symphony composers. He wrote most of his works for the violin, but also composed operas, oratorios, cantatas, and sonatas. Name this Italian composer, best known for his four violin concertos known as The Four Seasons.

Answer: **Antonio Vivaldi**

Bonus 1: Social Studies (U.S. History)

Given the maiden name, identify the U.S. president they were married to.

A: Bess Wallace

B: Patricia Ryan

C: Nancy Davis

D: Elizabeth Bloomer

Answers: A: **Harry S. Truman** B: **Richard Milhous Nixon** C: **Ronald Wilson Reagan** D: **Gerald Rudolph Ford Jr.**

Tossup 2: Math (Algebra) -- Computational (30 Seconds)

Fully simplify the product of the following three log expressions. The log base two of five, times the log base three of eight, times the log base twenty-five of nine.

Answer: **1/3**

Bonus 2: Miscellaneous (Other)

Answer these questions about humorous laws of the universe.

A: According to this famous law, what can go wrong will go wrong.

B: According to Godwin's Law, the longer an online discussion continues, the probability that somebody will be compared to this man, approaches one.

C: Hanlon's Razor states that one should never attribute to malice that which can be adequately explained by this phenomenon instead.

D: This fictional man's principle states that the most ineffective workers are moved to management, where they can do the least damage.

Answers: A: **Murphy's Law** B: **Adolf Hitler** C: **Stupidity** (*accept similar answers*) D: **Dilbert('s) Principle**

Tossup 3: Science (Biology)

Also known as icterus, it is caused by high concentrations of bilirubin, which forms from the breakdown of hemoglobin. Accordingly, the pre-hepatic form can be caused by sickle cell anemia, malaria, and any other diseases that increase hemolysis rates. It also exists in a hepatic form, when bilirubin is not properly excreted by the liver, and a post-hepatic form, when it is not properly drained. Sometimes occurring harmlessly in infants for the first one or two weeks after birth, name this disease whose name comes from the French for "yellow," a yellowing of the skin and eyes.

Answer: **Jaundice**

Bonus 3: Math (Calculus)

Find the derivatives of the following functions.

A: $10x$ to the fourth minus $4x$ squared plus 35.

B: The quantity $3x$ minus 5, close quantity, divided by $2x$ squared.

C: Sine squared of x minus cosine squared of x . Simplify your answer so that only one trigonometric function remains.

D: $10x$ squared plus $11e$ to the power of x plus 2.

Answers: A: **40x cubed minus 8x** B: **The quantity -3x plus 10 close quantity, all over 2x cubed**

C: **2 sine of 2x** D: **20x plus 11e to the power of x plus 2**

Tossup 4: Literature (Literature)

The first American to win the Nobel Prize, this writer was born in a small, Midwestern town, which provided the inspiration for Zenith, Winnemac and the line, "This is America - a town of a few thousand, in a region of wheat and corn and dairies and little groves. The town is, in our tale, called 'Gopher Prairie, Minnesota.' But its Main Street is the continuation of Main Streets everywhere."

Identify the author of Main Street.

Answer: **Sinclair Lewis**

Bonus 4: Science (Chemistry)

Name these types of optical isomers.

A: Stereoisomers rotated about only one stereocenter are mirror images of each other, and are called this.

B: Stereoisomers rotated about more than a single stereocenter are not mirror images, and are instead called this.

C: If a molecule in solution causes plane-polarized light to rotate to the right, it is called this, abbreviated "d."

D: If, on the other hand, it causes light to rotate left, it goes by this name instead, abbreviated "l."

Answers: A: **Enantiomers** B: **Diastereomers** C: **Dextrorotatory** D: **Levorotatory**

Tossup 5: Social Studies (Current Events)

Though it has been long speculated that he is gay, this was only confirmed by his lawyer in early October 2006, along with the fact that he was sexually abused by a clergyman in his early teenage years. These facts surfaced after he resigned from his position because some of his explicit instant message conversations with male Congressional pages were made public, and ironically, he might get charged under some of the new laws he helped pass. Name this former U.S. Representative from Florida, who resigned on September 29, 2006.

Answer: **Mark Foley**

Bonus 5: Literature (Literature) -- Five Parts

Many countries have national epics. Given the name of an epic, identify its country of origin.

A: Beowulf

B: The Kalevala

C: El Cantar de Mio Cid (*SID*)

D: The Song of Roland

E: Nibelungenlied (*nib-ell-OONG-en-lead*)

Answers: A: **England** (*Accept Great Britain or United Kingdom*) B: **Finland** C: **Spain** D: **France** E: **Germany**

Tossup 6: Miscellaneous (Sports)

Max Winter announced that his Minnesota team would accept a bid from the NFL as an expansion team, allowing this team to join the AFL in 1960. When AFL commissioner Joe Foss resigned in 1966, Al Davis took over the position, but when plans for a merger between the two leagues were announced, he returned to his original post as a manager of this team, a team he now owns. Name this NFL team which relocated to Los Angeles in 1982 and back to its original city in 1995.

Answer: **Oakland Raiders** (accept either half of name; do not accept Los Angeles Raiders)

Bonus 6: Social Studies (World History)

Given a description, name the ancient American civilization.

A: This group that dominated south-central Mexico lived from about 1200 BC to 400 BC.

B: This group built their namesake "lines" in Peru, and lasted from about 300 BC to 800 AD.

C: With their capital at Cuzco (*COOS-co*), this group dominated Peru and beyond for over 300 years.

D: For nearly 300 years this group ruled over what is now Mexico. Their capital was at Tenochtitlan (*tay-NOAK-teet-lan*)

Answers: A: **Olmec** B: **Nazca** C: **Inca Empire** (accept *Incan*) D: **Aztec Empire** (accept *Aztecs*)

Tossup 7: Math (Other) -- Computational (30 Seconds)

Find the probability that when flipping 9 fair coins, 6 will come up heads. It may help you to know that 2 to the ninth power equals 512.

Answer: **21/128**

Bonus 7: Fine Arts (Visual Art)

Identify the following art movements from a few works exemplifying them.

A: Pilgrimage to Cythera (*SITH-er-uh*), The Swing, and Portraits of Madame de Pompadour

B: L.H.O.O.Q. and Fountain

C: Dance at Le Moulin de la Galette and The Haystacks series

D: Woman with a guitar, Les Demoiselles d'Avignon, and Still life with chair caning

Answers: A: **Rococo** B: **Dadaism** C: **Impressionism** D: **Cubism** (these 3 painting encompass the whole of cubism, so synthetic or analytic cubism are both too specific)

Tossup 8: Science (Chemistry)

If they occur in larger molecules, they are called zwitterions. If they have a hydroxide ion, they are called basic, and if they have a hydrogen ion, are called acid. They must be neutral, and contain at least two atoms, though sometimes they may contain many more. Usually crystalline, what is this term from chemistry referring to a neutral ionic compound, a term that more commonly refers to only sodium chloride?

Answer: **Salt**

Bonus 8: Math (Geometry)

Find the area of the following triangles.

A: An equilateral triangle with side length 6.

B: An isosceles triangle with base 4 and other sides 5.

C: A triangle with sides 5, 9, and 10.

D: A triangle on the Cartesian plane with vertices at (1, 2), (3, 4), and (7, 9).

Answers: A: **9 root 3** B: **2 root 21** C: **6 root 14** D: **1**

Tossup 9: Literature (Mythology)

The son of Odin and Frigg, he had a wife named Nanna and a son called Forseti. In Beowulf, he appears as a prince named Herebeald (*HARE-a-bee-ald*). He built the largest ship ever, Hringhorni, as well as a hall named Breidablik. Name this Norse god of peace and innocence who was killed by a sprig of mistletoe.

Answer: **Balder**

Bonus 9: Science (Biology)

Identify these biology terms beginning with the letter O.

A: This type of animal eats both animals and plants.

B: This disease results in a lowered bone mineral density.

C: Named after an Italian anatomist, this organ in the inner ear has hair cells to detect sound.

D: This superclass of fish contains the bony fish.

Answers: A: **Omnivore** B: **Osteoporosis** C: **Organ of Corti** D: **Osteichthyes**

Tossup 10: Social Studies (Other)

The first recorded use of the term was in 1937, referring to the bombing of Guernica, Spain, though this usage would be overshadowed in under a decade, when the Atomic Energy Commission applied it to atomic weapons. In 1972, it was expanded to include biological and chemical weapons. The term came back into vogue in the early 21st century, leading to its nomination as the American Dialect Society's "word of the year" in 2002. Name this phrase referring to highly potent nuclear, biological, and chemical weapons, a cornerstone of the United States' justification for invading Iraq in 2003.

Answer: **Weapon(s) of Mass Destruction** (*accept WMDs*)

Bonus 10: Literature (Literature)

Given a literary location, name the author in whose work you would find the location.

A: Cross Creek, Florida

B: Yoknapatawpha County

C: Devon School

D: Lowood School

Answers: A: **Marjorie Kinnan Rawlings** B: **William Faulkner** C: **John Knowles** D: **Charlotte Bronte**

HALFTIME

Tossup 11: Miscellaneous (Technology)

This wireless handheld device was introduced in 1999 and was developed and manufactured by the Canadian company Research In Motion. They are sold by cell phone companies around the world, and support email, text messaging and web browsing. Name this device that fits into the palm of a hand, and were named after the fact that the buttons on it look like seeds on a strawberry.

Answer: **BlackBerry**

Bonus 11: Science (Astronomy)

Given the nomenclature of a planet's moons, name the planet.

A: This planet has two moons, which were both named by Asaph Hall after two sons of Ares and Aphrodite.

B: This planet has three moons, Hydra, Nix, and the largest one, named after the ferryman of Styx.

C: This planet's moons are named after Greek sea deities.

D: This planet's moons are named after characters from Shakespeare and Pope.

Answers: A: **Mars** B: **Pluto** C: **Neptune** D: **Uranus**

Tossup 12: Math (Geometry) -- Computational (30 Seconds)

Find the area of a regular hexagon whose circumscribed circle has an area of 144π square inches. It may help you to know that the two adjacent radii of a regular hexagon are the sides of an equilateral triangle that also includes the included side of the hexagon.

Answer: **$216\sqrt{3}$ square inches**

Bonus 12: Miscellaneous (Entertainment)

Answer the following questions about radio show heroes from the given clues.

A: This man saw all his coworkers killed by the infamous Cavendish Gang. His gun had non-lethal silver bullets so as to let the American justice system run its course.

B: Publicly known as Britt Reid, a successful newspaper editor, this hero carried a gun that fired only a non-lethal gas.

C: Knowing "what evil lurks in the hearts of men," this was the alter ego of handsome man-about-town Lamont Cranston.

D: Featuring Sergeant Joe Friday, what show is famous for its theme music and opening warning: "Ladies and gentlemen. The story you're about to hear is true. Only the names have been changed to protect the innocent."

Answers: A: **The Lone Ranger** B: **The Green Hornet** C: **The Shadow** D: **Dragnet**

Tossup 13: Literature (Literature)

He has a heart to heart talk with his father where he is given advice such as, "Neither a borrower nor a lender be". He then returns to Paris, but his father doesn't trust him and sends Reynaldo after him. When his father is murdered, he returns to demand revenge and is killed by the Prince of Denmark. Name the son of Polonius who, after being fatally poisoned, regrets providing the same fate for Hamlet.

Answer: **Laertes**

Bonus 13: Math (General)

Answer the following questions about numbers in the Fibonacci sequence. For numbering purposes of this question, its first and second terms are one, and its third term is two.

A: What is the only perfect square in the sequence before the thirtieth term?

B: What is the largest number in the Fibonacci sequence less than 1,000?

C: Name all the perfect cubes in the first 20 terms of the sequence.

D: What is the tenth term?

Answers: A: **144** B: **987** C: **8** (do not accept additional answers) D: **55**

Tossup 14: Social Studies (World History)

Believed to have originated in China in the 5th century BC, this siege weapon uses a counterweight to fire projectiles on a high arc. It would be used against fortifications for more than two thousand years after its invention. Its last use is believed to have been by Cortes in the siege of Tenochtitlan. Eventually displaced by the cannon with the advent of gunpowder, identify this siege weapon that is NOT a catapult.

Answer: **Trebuchet**

Bonus 14: Literature (Language Arts)

State what the following people collect:

A: A numismatist

B: A lepidopterist

C: A philatelist

D: A deltiologist

Answers: A: **Coins** B: **Butterflies or Moths** C: **Postal stamps** D: **Postcards**

Tossup 15: Science (Earth Science)

It is said to either surge, fall, or flow. Coming from the Greek words for "fire" and "broken," it includes lapilli, tuff, and volcanic ash. Also known as tephra, it is created through the process of lithification. Name this term for material deposited by volcanic eruptions.

Answer: **Pyroclastic rock**

Bonus 15: Social Studies (U.S. History)

Name these Supreme Court cases dealing with students' rights in public schools.

A: This 1962 case ruled that state-led prayer in schools was illegal.

B: This 1969 case ruled that students had free speech in schools, allowing them to wear black armbands in protest of Vietnam.

C: This 1972 case ruled that Amish children could leave public school after 8th grade.

D: This 1984 case ruled that public school officials were allowed to conduct reasonable searches of personal belongings without warrants.

Answers: A: **Engel v. Vitale** B: **Wisconsin v. Yoder** C: **Tinker v. Des Moines Independent Community School District** D: **New Jersey v. T.L.O.**

Tossup 16: Fine Arts (Visual Art)

This talented sculptor was denied admission to the Beaux Arts academy, so he instead attended a trade school for decorative sculpture. After the completion of The Age of Bronze, one of his earliest statues, he was accused of using molds from the live model because of its perfect resemblance. But after clearing his name, many of his best works were completed as part of his sculptural group, The Gates of Hell, depicting scenes from Dante's Inferno. Name this French sculptor most famous for the Three Shades, The Kiss, and The Thinker.

Answer: **Auguste Rodin**

Bonus 16: Science (Chemistry)

Name the following polyatomic ions.

A: C₂O₄

B: PO₃

C: N₃

D: ClO₄

Answers: A: **Oxalate** B: **Phosphite** (*do not accept phosphate*) C: **Azide** D: **Perchlorate**

Tossup 17: Math (Calculus) -- Computational (30 Seconds)

Find the coordinates of the inflection point of the function y equals x cubed minus $9x$ squared plus x minus 20 . Remember that the inflection point, or the point where concavity switches, can be found at the extrema of a first-order derivative function or the x intercepts of a second-order derivative function.

Answer: **(3, -71)** (do not accept or prompt on partial answer)

Bonus 17: Fine Arts (Music)

Given a description of a work and its instrumentation, name the work itself.

A: This George Gershwin piece opens with a complex clarinet solo. It includes a glissando, a technique usually only performed on trombones.

B: This work originally called for a soprano (*sohp-ra-nee-noh*) saxophone in F. Today's versions are in E flat, and it isn't known if they had been constructed in F at the time Maurice Ravel wrote the work.

C: Maurice Ravel's orchestration of this piano work by Modest Mussorgsky omits the fifth Promenade. The Promenade theme appears in the famous "Great Gate of Kiev" movement.

D: This Benjamin Britten work features thirteen variations and a fugue on a theme by Henry Purcell. Each of the variations features a different section of the orchestra.

Answers: A: **Rhapsody in Blue** B: **Bolero** C: **Pictures at an Exhibition** D: **The Young Person's Guide to the Orchestra**

Tossup 18: Literature (Literature)

The children's game named in the title can be seen as a symbol of the connections between people described by the narrator's religion, Bokononism. At the end of the book, the religion's creator watches as the world comes to an end due to the release of the powerful substance, ice-nine. Name this apocalyptic satire by Kurt Vonnegut.

Answer: **Cat's Cradle**

Bonus 18: Math (Algebra)

Find the sum of the vertical shift and period of the following periodic functions.

A: Y equals 2 sine of the quantity $4\pi x$, close quantity.

B: Y equals -4 sine of the quantity $9\pi x$ plus 2π , close quantity, plus 3 .

C: Y equals 3 tangent of the quantity πx over 16 , minus 1 , close quantity, plus 2 .

D: Y equals 3 cosine of the quantity $2x$ minus 2 , close quantity, plus 10 .

Answers: A: **0.5** B: **3 and two-ninths** (accept 29/9) C: **18** D: **10 plus pi**

Tossup 19: Social Studies (U.S. History)

Robert Ross's victory at the Battle of Bladensburg allowed his armies to proceed to this city. The city, only a minor port of about 8,000 people, was largely evacuated, so Ross's advance army encountered little resistance as they proceeded through the town. A tornado struck the city during the 26 hour occupation, and the British invaders were then dispatched to their next mission. Name this city, whose burning rallied thousands to defend Baltimore three weeks later.

Answer: **Washington, D.C.** (accept partial answers)

Bonus 19: Literature (Literature)

Illinois has been home to a number of celebrated writers, past and present. Given the name of a work, identify its Illinois author.

A: We Real Cool

B: The Adventures of Augie March

C: The House on Mango Street

D: Death in the Afternoon

Answers: A: **Gwendolyn Brooks** B: **Saul Bellow** C: **Sandra Cisneros** D: **Ernest Hemingway**

Tossup 20: Science (Physics)

When referring to the planets, it is either nodal or apsidal. When referring to the equinoxes, it is a cycle that takes almost 26,000 years to complete. The gyroscopic kind, however, is induced by adding a torque. Name this phenomenon, the change of direction of the axis of a moving object, that causes spinning objects to wobble.

Answer: **Precession**

Bonus 20: Social Studies (Current Events)

Name the current heads of state of the following countries.

A: Prime Minister of Canada

B: President of Ukraine

C: Prime Minister of Japan

D: Chancellor of Germany

Answers: A: **Stephen Harper** B: **Viktor Yushchenko** C: **Shinzo Abe** (*accept Abe Shinzo, prompt Shinzo*) D: **Angela Merkel**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Science (Chemistry)**

Its emission spectra can be described by special cases of the Rydberg equation called the Lyman, Balmer, and Paschen series. Three natural isotopes exist, the lightest being by far the most common, sometimes called "protium" to distinguish it from the other isotopes. Most economically produced by reacting methane and water to make it and carbon monoxide, name this element, the namesake anode of energy fuel cells, the lightest element with symbol H.

Answer: **Hydrogen**

Bonus 21: Social Studies (Geography)

Given a world capital, name the country.

A: Tegucigalpa

B: Lilongwe

C: Bandar Seri Begawan

D: Port Moresby

Answers: A: **Honduras** B: **Malawi** C: **Brunei** D: **Papua New Guinea**

Tossup 22: Social Studies (U.S. History)

The eponymous time of this man still means punctuality on Capitol Hill. Really meaning five minutes fast, this Fifth Supreme Court Justice despised tardiness. He conducted court inside the old Supreme Court room inside the Capitol building from 1836 to 1864, there handing down the 1857 Dred Scott v. Sanford decision.

Answer: **Roger Brooke Taney** (*Pronounced TAW-nee*)

Bonus 22: Science (Physics)

Given resistors of 10 ohms, 20 ohms, and 40 ohms, answer the following questions. Give your answers with 2 significant digits.

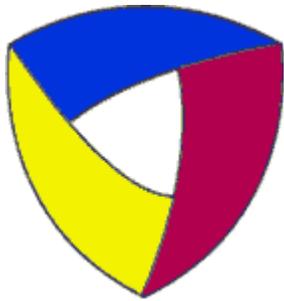
A: What is the maximum total resistance, using all three resistors?

B: What is the minimum total resistance, using all three resistors?

C: What is the total resistance when the 20 and 40 ohm resistors are connected in parallel, then connected in series with the 10 ohm resistor?

D: What is the total resistance when the 10 and 20 ohm resistors are connected in series, then connected in parallel with the 40 ohm resistor?

Answers: A: **70. ohms** B: **5.7 ohms** C: **23. ohms** D: **17. ohms**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 3

Tossup 1: Literature (Literature)

This author skipped his high school graduation to sit in the sun and read Whitman's Leaves of Grass. His most famous work was composed with the help of benzedrine and caffeine over the course of three weeks. He also pioneered his characteristic "spontaneous prose" style with this work. Identify this man, a contemporary of William S. Burroughs and Allen Ginsberg, who, despite disavowing them, is sometimes called the "King of the Beatniks".

Answer: **Jack Kerouac** (also accept: *Jean-Louis Lebris de Kerouac*)

Bonus 1: Social Studies (Geography) -- Five Parts

Identify the five national parks that had most visitors in 2005 from the number of visitors and its location.

A: 9 million; Tennessee and North Carolina

B: 4.4 million; Arizona

C: 3.3 million; California

D: 3.1 million; Washington

E: 2.8 million; Idaho, Montana, and Wyoming

Answers: A: **Great Smoky Mountains National Park** B: **Grand Canyon National Park** C: **Yosemite National Park** D: **Olympic National Park** E: **Yellowstone National Park**

Tossup 2: Math (General) -- Computational (30 Seconds)

Convert the octal number (*spell out*) 6 1 2 0 into hexadecimal. It may help you to remember that eight to the third power is 256 and that sixteen to the third power is 4,096.

Answer: **C50** (*c five zero*)

Bonus 2: Miscellaneous (Technology)

Given the file suffix of a computer program, name the programming language it must have been written in. (*spell out*)

A: BAS

B: PL

C: PY

D: JAR

Answers: A: **BASIC** (*accept more specific answers*) B: **Perl** C: **Python** D: **Java**

Tossup 3: Social Studies (U.S. History)

Containing names and wreaths for each of the then-48 states, the Philippines, Hawaii, Alaska, Puerto Rico, Guam, American Samoa, District of Columbia, and the US Virgin Islands, this Washington DC structure rings a massive fountain between two arches labeled for the ocean fronts. A "Kilroy was here" engraving and four thousand and forty-eight gold stars line one wall for approximately each 100 American dead are some of the impressive details on this commemorative piece of art between the Washington and Lincoln Memorials.

Answer: **National World War II Memorial**

Bonus 3: Science (Biology)

Answer these questions about DNA replication.

A: The two ends of a DNA fragment are typically referred to by the numbers of the carbon atoms on this five-carbon sugar, the namesake of DNA.

B: DNA replication can only proceed in one direction. Using that nomenclature, it starts from the five-prime end, and replicates toward this end.

C: Because the two strands are oriented in opposite directions, the lagging strand is duplicated as these short fragments of DNA named after a Japanese scientist.

D: In the process of transcription, some DNA is copied onto RNA, in which this namesake sugar can be found instead.

Answers: A: **Deoxyribose** (*do not accept other endings*) B: **3-prime end** C: **Okazaki fragment** D: **Ribose** (*do not accept other endings*)

Tossup 4: Fine Arts (Music)

Inspired by a 1797 German poem, its subtitle is accordingly "Scherzo after a ballad by Goethe (*GER-ta*)." Already famous, this 1897 symphonic poem gained even more notoriety after its movie performance by Leopold Stokowski. Name this piece by Paul Dukas, whose titular character is played in the film Fantasia by Mickey Mouse.

Answer: **The Sorcerer's Apprentice** (*accept L'apprenti Sorcier*)

Bonus 4: Math (Algebra)

Algebraic groups need to satisfy all of these properties.

A: This property states that A times the quantity B times C, is the same as the quantity A times B, close quantity, times C.

B: This property states that the product of any two numbers in the group is also in the group.

C: There must be a number E, called this, such that A times E equals E times A, equals A.

D: Each number needs to have X, one of these, so that X times A equals A times X, equals E, the answer to the previous part.

Answers: A: **Associative multiplication** B: **Multiplicative closure** C: **Multiplicative identity element** (*accept neutral element*) D: **Multiplicative inverse element**

Tossup 5: Science (Chemistry)

It uses a platinum and rhodium catalyst, and needs to be performed at over 4 atmospheres and 700 degrees Celsius. First patented in 1838 by Kuhlmann, it only gained significance after it was patented by its namesake in 1902, because another process was about to be invented that cheaply provided the raw materials for this process. Name this chemical process that converts ammonia into nitric acid.

Answer: **Ostwald process** (*not the Haber process*)

Bonus 5: Literature (Mythology) -- Five Parts

Given an art, identify the muse that was in charge of it.

A: Comedy

B: Dance

C: History

D: Astronomy

E: Sacred poetry

Answers: A: Thalia B: Terpsichore C: Clio D: Urania E: Polyhymnia

Tossup 6: Math (Geometry) -- Computational (30 Seconds)

Given isosceles trapezoid ABCD, where AD and BC are parallel, and E is a point on AD such that AEB is a right angle, AB measures 13 inches, BC measures 20 inches, and AE measures 5 inches. Find the area of the trapezoid.

Answer: 300 square inches

Bonus 6: Fine Arts (Visual Art)

Answer the following about the group of artists called 'Der Blaue Reiter' (*BLAU-ay RY-ter*).

A: This is the name of the artist who originally painted the work that gave the group its name.

B: The group, along with Die Brücke, were the two principal groups of painters involved in this art movement.

C: He, along with the artist in number one, formed the center of the group along which the group modeled its aesthetic.

D: This artist and the man described in number three were both killed during World War I, contributing greatly to the dissolution of Der Blaue Reiter.

Answers: A: Wassily Kandinsky B: German Expressionism (*do not accept Abstract Expressionism*) C: Franz Marc D: August Macke

Tossup 7: Literature (Literature)

The titular character of this work stays locked in his workroom for a week, which prompts his butler to suspect foul play and send for the protagonist, Gabriel John Utterson. Together, they break down the door and discover that the title character has committed suicide in his alternate form. Name this work by Robert Louis Stevenson, in which a doctor drinks a potion and transforms into a form of pure evil.

Answer: The Strange Case of Dr. Jekyll and Mr. Hyde (*Accept Jekyll and Hyde*)

Bonus 7: Social Studies (U.S. History)

Given an American Civil War battle, name what state it was fought in.

A: The Battle of Shiloh

B: The Battle of Vicksburg

C: First Battle of Bull Run

D: Battle of Chickamauga

Answers: A: Tennessee B: Mississippi C: Virginia D: Georgia

Tossup 8: Miscellaneous (Entertainment)

Leo Gorcey is not present on it because he demanded payment. Mohandas Gandhi is not present because EMI feared that they would catch offense in India. Stephen Crane is present, but is obscured by Issy Bonn's hand, which waves over Paul McCartney's head. Adolf Hitler and Jesus Christ were rejected to appear on the cover of what 1967 album released by The Beatles?

Answer: The album cover of Sergeant Pepper's Lonely Hearts Club Band (*prompt on Sergeant Pepper*)

Bonus 8: Science (Chemistry)

Give the orbital hybridization of the central atom or atoms in each of the following molecules.

A: Methane

B: Ethene

C: Beryllium chloride

D: Sulfur hexafluoride

Answers: A: sp³ B: sp² C: sp D: sp³d²

Tossup 9: Social Studies (World History)

He was wounded at the Battle of Verdun and left for dead, but was captured by the Germans. In World War II, he was the only French commanding officer to force a German retreat during the invasion of France. The Vichy (*vih-shee*) French government sentenced him to death in 1940, while Churchill considered him to be the leader of Free France. Name this French leader and statesman who became leader of France following World War II and returned as President in 1958.

Answer: **Charles de Gaulle**

Bonus 9: Literature (Literature)

Identify the authors of these books with "colorful" titles:

A: White Fang

B: A Clockwork Orange

C: The Red and the Black

D: Chrome Yellow

Answers: A: **Jack London** B: **Anthony Burgess** C: **Stendhal** (Accept Marie-Henri Beyle) D:

Aldous Huxley

Tossup 10: Science (Physics) -- Computational (30 Seconds)

A 10-Newton mass is swung around on a two-meter string in a horizontal circle. If it is traveling with a linear speed of three meters per second, what is the tension on the string, in Newtons?

Answer: **45 Newtons**

Bonus 10: Math (Calculus)

Evaluate the following limits.

A: The limit, as x approaches 2, of the quantity x plus 2, close quantity, divided by the quantity x minus 2.

B: The limit, as x approaches one, of the quantity $3x$ squared minus 2 divided by the quantity x plus 1.

C: The limit, as x approaches infinity, of 3 plus $4x$ to the fifth power divided by $3x$ to the fifth power.

D: The limit, as x approaches negative two, of the quantity x squared minus 4, close quantity, divided by the quantity x plus two.

Answers: A: **The limit does not exist** (do not accept zero or infinity) B: **1/2** or **0.5** C: **4/3** D: **-4**

HALFTIME

Tossup 11: Social Studies (Geography)

Recently, the definite article in its name has increasingly been dropped from common usage. It has been plagued by internal conflict within its western region, and stemming from this problem is more conflict with its western neighbor. This country's capital is located at the point where the Blue Nile, flowing west from Ethiopia meets the White Nile, flowing north from Uganda. Name this tenth largest country in the world, bordered on the west by Chad, home to the Darfur region and which has its capital at Khartoum.

Answer: **Republic of the Sudan**

Bonus 11: Fine Arts (Music)

Name the composers of the following twentieth-century operas.

A: Madama Butterfly

B: Lady Macbeth of the Mtsensk District

C: Dialogues of the Carmelites

D: Nixon in China

Answers: A: **Giacomo Puccini** B: **Dmitri Shostakovich** C: **Francis Poulenc** D: **John Adams**

Tossup 12: Miscellaneous (Interdisciplinary) -- Computational (30 Seconds)

Find the area under the curve y equals negative x squared plus $11x$ minus 10 , from x equals the number of Fates in Greek myth to x equals the number of Muses in Greek myth. It may help you to know that the upper limit of integration is equal to the square of the lower limit.

Answer: **102 square units**

Bonus 12: Literature (Literature)

Though J.K. Rowling's style is simple enough for her kiddy audience, the Harry Potter series is replete with mythological and literary allusions, particularly in her naming of characters. From the explanation of a character's name, give their full name – first and last.

A: He shares his first name with a cruel Athenian lawmaker, and his last name is old French for "bad faith."

B: Her first name alludes to the Roman goddess of wisdom, and she shares her last name with the man generally regarded as the worst poet in English history.

C: His first name alludes to a mythical Greek demon associated with avenging blood feuds before being slain by Heracles. His last name means temperamental.

D: He shares his first name with an ancient co-founder who was raised by wolves. His last name is French for wolf-like.

Answers: A: **Draco Malfoy** B: **Minerva McGonagall** C: **Alastor Moody** (accept "**Mad-Eye Moody**" **begudgingly**) D: **Remus Lupin**

Tossup 13: Science (Astronomy)

It stretches from 30 to 50 astronomical units from the sun, because nearer objects were ejected or swept up. Objects in it have an orbital resonance with Neptune, and depending on the strength of that resonance, are called cubewanos, plutinos, or twotinos. Over 800 member objects have been discovered, most notably Ceres, Quaoar, Eris, Charon, and Pluto. Name this belt of trans-Neptunian objects in our solar system.

Answer: **Kuiper belt**

Bonus 13: Social Studies (Other)

Name the authors of the following landmark works in economics.

A: An Inquiry into the Nature and Causes of the Wealth of Nations , which decreed that an "invisible hand" controlled the marketplace.

B: The General Theory of Employment, Interest, and Money, which created much of the basis and terminology of macroeconomics.

C: Capitalism and Freedom, published in 1962, when the economic freedom it championed was under attack from Communism.

D: The Theory of the Leisure Class, which argued that the wealthy waste money on unnecessary items simply to give off the appearance of wealth.

Answers: A: **Adam Smith** B: **John Maynard Keynes** C: **Milton Friedman** D: **Thorstein Veblen**

Tossup 14: Literature (Language Arts)

Though it is unclear who created it, it is derived from the Glagolitic alphabet of St. Methodius and St. Cyril. Used in many languages, its lowercase letters are mostly just smaller versions of the uppercase ones. Name this alphabet used in Mongolia, Bulgaria, Serbia, the Ukraine, and Russia.

Answer: **Cyrillic alphabet**

Bonus 14: Math (Geometry)

Find the volumes of the following solids. Leave answers in terms of pi when applicable.

A: A right cylinder with diameter 10 centimeters and height 12 centimeters.

B: A prism with height 10 inches and triangular base with sides of 13 inches, 13 inches, and 24 inches.

C: A cube with a face diagonal of 10 inches.

D: A cube that is 4 centimeters on a side with a circular hole through the middle 2 centimeters in diameter.

Answers: A: **300 π cubic centimeters** B: **600 π cubic inches** C: **250√2 cubic inches** D: **64 - 4π cubic centimeters**

Tossup 15: Math (Calculus) -- Computational (30 Seconds)

Find the area swept out by the polar curve r equals θ , from θ equals zero to θ equals two. It may help you to recall the formula for the area under a polar curve, one half times the integral of r squared, $d\theta$.

Answer: **4/3**

Bonus 15: Science (Biology)

Answer these questions about blood antigens.

A: Give two answers. In the most common blood typing system, zero, one, or both of these antigens can be present on blood cells. Both are derived from the H antigen.

B: While some people have neither of those two antigens, very few people lack the H antigen, having this phenotype named after the city in which it was discovered.

C: The plus and minus designation with blood types refers to the presence or absence of the D antigen of this type of factor named after a monkey.

D: This immunoglobulin is the only antibody that can cross the placenta, and protects fetuses before their immune systems develop.

Answers: A: **A and B** (need both answers, do not accept AB or O) B: **Bombay phenotype** C: **Rhesus factor** (accept Rh factor) D: **IgG** (accept "G" or "immunoglobulin G")

Tossup 16: Fine Arts (Visual Art)

The subjects are survivors of a disaster off the coast of Africa desperately seeking to be rescued. To achieve authenticity in portraying this event, the artist interviewed the actual survivors, studied corpses at the morgue, and even had a model of the makeshift lifeboat built. The results were a grotesque, yet dynamic masterpiece and a new movement of art, Romanticism. Identify this sixteen by twenty three foot painting by Theodore Gericault (*Jehr-i-ko*).

Answer: **The Raft of the Medusa**

Bonus 16: Miscellaneous (Sports) -- Five Parts

Before the New York Mets and Los Angeles Dodgers had even played the first game of their first round playoff series, five MLB managers lost their jobs. Name them from their descriptions.

A: This manager of the Cubs was let go after four years, including the first Cubs playoff series win since 1908.

B: This manager of the Marlins had disagreements with upper management, even though he led a team with a 15 million dollar payroll to a surprising 78-84 record.

C: This manager of the Giants was almost twice as old as his players, including his son, 40-year-old Moises. San Francisco decided to go in a younger direction. First name is required for this answer.

D: This manager of the Washington Nationals broke the color barrier for managers in 1975 after hitting 586 home runs as a player. His 51-year career in baseball is likely over.

E: This manager of the Texas Rangers was the last of these five to be fired. Each of the past two times he has been fired, by the Yankees and the Diamondbacks, those teams won the World Series the following year.

Answers: A: **Dusty Baker** B: **Joe Girardi** C: **Felipe Alou** D: **Frank Robinson** E: **Buck Showalter**

Tossup 17: Social Studies (U.S. History)

This man, whose birth name meant "Thunder Rolling Over the Mountains," grew up while his father had to deal with constant demands to give up his tribe's lands. In 1871 he took over as Chief, six years before his famous proclamation. Name this Nez Perce indian Chief, who "died of a broken heart" in 1904, and in 1877 promised to "fight no more forever."

Answer: **Chief Joseph** (*accept Hin-mah-too-yah-lat-kekt and Hinmaton-Yalaktit*)

Bonus 17: Literature (Literature)

Given the plot, identify the novel:

A: A son of Cedric the Saxon woos and wins the gentle Rowena in spite of his father's wishes to the contrary.

B: A teenage boy runs away from his prep school and spends two wryly humorous and adventuresome days in New York.

C: Napoleon invades Russia and disrupts the lives of the more than 500 characters who are skillfully drawn in this novel.

D: A bombardier during World War II tries to survive the war by pretending insanity. He encounters, in his compatriots, the worst traits of human nature.

Answers: A: **Ivanhoe** B: **Catcher in the Rye** C: **War and Peace** D: **Catch-22**

Tossup 18: Science (Biology)

The only parazoans still in existence, these sessile animals act very much like colonies of choanoflagellates (*koh-ANN-oh-FLAJ-uh-LITS*), from which they probably evolved. They produce a chemical called vidabarine, which might be useful against AIDS, but contrary to popular belief, they are not used as loofahs (*LOO-fahz*). Name this animal phylum that doesn't have true tissues, the simplest living animals, whose use for humans has been largely supplanted by cellulose alternatives.

Answer: **Porifera** (*accept sponges*)

Bonus 18: Social Studies (World History)

Most successful revolutions are given a name of a flower or a color, but not all. Identify these revolutions, which exemplify both.

A: This bloodless revolution saw Vaclav Havel installed as the President of Czechoslovakia on December 29, 1989.

B: This 2005 revolution involved the overthrow of President Askar Akayev and his government in Kyrgyzstan. It was given its name by Akayev himself in a speech condemning the uprising.

C: This 2004 revolution saw leader of the opposition Viktor Yushchenko declared president after the annulment and repeat of disputed elections.

D: In 2000, this revolution led to the ousting of Slobodan Milošević in Yugoslavia. Also called the October 5th Overthrow, it is named for the vehicle that one protester drove into the Serbian Broadcasting Corporation's headquarters.

Answers: A: **Velvet Revolution** B: **Tulip Revolution** C: **Orange Revolution** D: **Bulldozer Revolution**

Tossup 19: Math (Algebra) -- Computational (30 Seconds)

Find the determinant of this three-by-three matrix, given from left to right, then top to bottom. 1, 3, 4; 2, 3, 4; 5, 4, 3.

Answer: 7

Bonus 19: Science (Physics)

Identify these "effects" from physics.

A: In this effect, sound and light waves are perceived at a different frequency if their source is moving with respect to the observer.

B: In this effect, shining light on a metal surface causes a current on the metal.

C: In this effect, colloids scatter light, often demonstrated by shining a laser through diluted milk.

D: In this effect, an object carrying an electric current forms a potential difference if placed in a perpendicular magnetic field.

Answers: A: **Doppler effect** B: **Photoelectric effect** C: **Tyndall effect** D: **Hall effect**

Tossup 20: Literature (Literature)

This 20th century author was mainly an essay writer but also wrote poetry and children's books. He won a Pulitzer Prize special citation in 1978 for his writings in the New Yorker. Name this American author who is most famous for writing the essay "Once More to the Lake" and the children's books The Trumpet of the Swan, Stuart Little, and Charlotte's Web.

Answer: **E(lwyn) B(rooks) White**

Bonus 20: Math (General)

Consider the following set of seven numbers, not in increasing order: 9, 6, 14, 11, 9, 5, and 19.

A: What is the mean of the set?

B: What is the mode of the set?

C: What is the range of the set?

D: What is the median of the set?

Answers: A: **73/7** (accept 10 and three-sevenths) B: **9** C: **14** D: **9**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Social Studies (Geography)**

Its eruption circa 4860 B.C. is estimated to be 42 times more powerful than the eruption of Mount St. Helens in 1980. It went from an approximate height of eleven thousand feet before the blast to a top height of 8,151 feet at Hillman Peak. The eruption caused the weight of the mountain to collapse, forming a caldera that exists today. Name this mountain in Oregon, whose destruction formed Crater Lake.

Answer: **Mount Mazama**

Bonus 21: Science (Biology)

Answer the following questions about ecology.

A: Defined as the role a species plays in its environment, this term includes the range of conditions that the species can tolerate.

B: What is defined as all of the interacting living organisms in an area? It is one level of complexity below an ecosystem, which also contains nonliving material.

C: What environmental factors, including temperature, amount of sunlight, and precipitation, are non-living?

D: Clumped in fish and even in birds, this term refers to the spatial distribution of individuals within a population.

Answers: A: **Fundamental niche** B: **Community** C: **Abiotic factors** D: **Dispersion**

Tossup 22: Science (Physics)

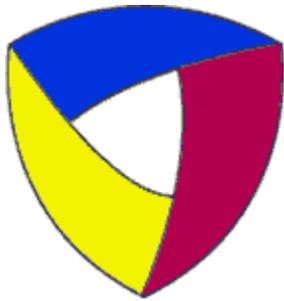
Each material has a threshold frequency below which this will not occur. First observed by Becquerel, it was not well understood until a famous 1905 paper described a mathematical model for it. It is caused by electromagnetic radiation knocking an electron loose from an atom, creating a current on the surface. Name this effect that causes metals to eject electrons when light is shone on them.

Answer: **Photoelectric effect**

Bonus 22: Social Studies (Other)

In any order, name the four principles of the Knights of Columbus.

Answers: *(In any order)* A: **Charity** B: **Fraternity** C: **Patriotism** D: **Unity**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 4

Tossup 1: Math (Other) -- Computational (30 Seconds)

What is the probability of rolling five of the same number with five six-sided dice? This can be found by assigning a probability of one to the first roll to indicate that the first number's identity does not matter, or by multiplying the probability of rolling five of a certain number by six to account for six different possibilities, but not both. Using these or any other method, find the probability of rolling five of a kind using five dice.

Answer: 1/1296

Bonus 1: Social Studies (World History)

Given a war, name the treaty that ended it.

A: Russo-Japanese War

B: First Sino-Japanese War

C: Franco-Prussian War

D: War of the Spanish Succession

Answers: A: **Treaty of Portsmouth** B: **Treaty of Shimonoseki** C: **Treaty of Frankfurt** D: **Treaty of Utrecht**

Tossup 2: Literature (Mythology)

She was the daughter of King Cephus and Queen Cassiopeia of Joppa. After her mother angered Poseidon by boasting about her beauty, a sea monster was sent to ravage her homeland, causing her father to make preparations to sacrifice her in an attempt to drive the monster away. Name this mythical figure who was rescued by Perseus.

Answer: Andromeda

Bonus 2: Math (General)

Given the eccentricity of a conic section, name the type of conic section it is.

A: 5

B: 1

C: 0.2

D: 3

Answers: A: Hyperbola B: Parabola C: Ellipse D: Hyperbola

Tossup 3: Miscellaneous (Interdisciplinary)

The last name's the same. Larry is a fan who caught Barry Bonds' 660th and 661st home runs. A different Larry was the richest man in the world for a period of time in 2000; most of his wealth stems from his ownership of the database company Oracle. Ralph became a fiction writer at Richard Wright's urging, and is famous for the novel portraying a man that people refuse to see. Give this last name shared by all three of those men.

Answer: Ellison (*accept Larry Ellison before Ralph is mentioned*)

Bonus 3: Science (Chemistry)

Of paraffin, olefin, or acetylene, into which category do each of the following hydrocarbons belong?

A: Methane (*meth-AYN*)

B: Ethylene (*eth-ul-EEN*)

C: Butene (*BYOO-teen*)

D: Propyne (*PRO-pine*)

Answers: A: Paraffin B: Olefin C: Olefin D: Acetylene

Tossup 4: Social Studies (U.S. History)

Born in Detroit, Michigan in 1873, he worked at a steel and wire company starting at the age of ten. After listening to the speeches of Emma Goldman, his views shifted towards anarchy, and after reading the account of the assassination of Umberto the First of Italy, he found a hero in the assassin. Name this man who moved to Buffalo, New York seven days before taking a newspaper clipping of Umberto's assassination and a pistol to the Pan American Exposition to kill William McKinley.

Answer: **Leon Czolgosz** (*CHOL-gotz; be lenient with pronunciation*)

Bonus 4: Literature (Literature)

Given a character from a novel by Toni Morrison, name the novel.

A: Pecola Breedlove

B: Sethe

C: Milkman

D: Joe Trace

Answers: A: **The Bluest Eye** B: **Beloved** C: **Song of Solomon** D: **Jazz**

Tossup 5: Science (Biology)

Adolf Mayer discovered it could be transmitted between plants, but Martinus Beijerinck showed it was not a bacterium. Rosalind Franklin correctly realized that it assumed the shape of a hollow rod, and that its RNA was single-stranded. Name this virus, the first virus to be discovered, which causes its namesake mottling on the leaves of tobacco and other plants.

Answer: **Tobacco mosaic virus**

Bonus 5: Fine Arts (Music)

Given a description of the titular character or object in an opera, name the opera.

A: This Mozart opera is named after the musical instrument given to Tamino, who seeks to free Pamina from Sarastro.

B: This Strauss opera is named after Octavian, who bears a particular flower to Sophie von Faninal.

C: This Puccini opera is named after Cio-Cio-San, a young Japanese geisha girl.

D: This Mozart opera is named after an event in the palace of Count Almaviva, concerning his title valet.

Answers: A: **The Magic Flute** (*accept Die Zauberflöte*) B: **Der Rosenkavalier** (*accept The Knight of the Rose*) C: **Madama Butterfly** D: **The Marriage of Figaro** (*accept Le Nozze di Figaro*)

Tossup 6: Literature (Literature)

War is peace. Freedom is slavery. Ignorance is strength. Though Emmanuel Goldstein disagrees with the Party's slogans, his opinions are only heard during the "two minutes hate," when the citizens of Oceania boo the Party's enemies. Working in the Ministry of Truth, the protagonist helps silence opposition by rewriting history, though he later has second thoughts about Big Brother. Name this book that begins as the clocks strike thirteen, written by George Orwell.

Answer: **1984**

Bonus 6: Math (Calculus)

Find the derivatives of the following functions.

A: $14x^2 - 11x + 5$

B: The quantity $9x - 5$, close quantity, times the quantity $4x + 5$.

C: The quantity $x^2 - 4$, quantity raised to the fourth power. Your answer should be fully factored.

D: $4 \sin x \cos x$. Simplify your answer so that only the sine function remains.

Answers: A: **28x minus 11** B: **72x plus 25** C: **8x times the quantity x squared minus four, quantity cubed** D: **4 minus 8 sine squared of x**

Tossup 7: Fine Arts (Visual Art)

This portrait reflects the influences of Manet's flat areas and Degas's austerity. Best known by its colloquial name, one story is that the subject was chosen by default after intended model didn't show. Another story is that the subject was meant to be standing, but the aging model was not comfortable standing for that long and elected to sit. There is no story, however, that, upon completion of the painting, the model turned to the artist and asked "Now will you clean your room?"

Answer: **Arrangement in Black and Gray** (accept "Whistler's Mother" or "The Artist's Mother" and any mention of No. 1)

Bonus 7: Social Studies (U.S. History)

Given the year and the subtitle for a World's Fair, name the American city that hosted it.

A: 1898; Trans-Mississippi Exposition

B: 1915; Panama-California Exposition

C: 1893; World's Columbian Exposition

D: 1876; Centennial Exposition

Answers: A: **Omaha, Nebraska** B: **San Diego, California** C: **Chicago, Illinois** D: **Philadelphia, Pennsylvania**

Tossup 8: Math (Geometry) -- Computational (30 Seconds)

Convert the polar coordinate (10, 135 degrees) into Cartesian rectangular form. It may help you to know that 135 degrees is in the second quadrant, and therefore cosine is negative while sine is positive.

Answer: **(-5√2, 5√2)**

Bonus 8: Literature (Literature)

Given a title, identify its African-American author.

A: Invisible Man

B: Native Son

C: The Temple of my Familiar

D: I Know Why the Caged Bird Sings

Answers: A: **Ralph Ellison** B: **Richard Wright** C: **Alice Walker** D: **Maya Angelou**

Tossup 9: Science (Astronomy)

It is considered a planet because it has one twelfth the mass necessary to burn deuterium, though it is still so massive that its barycenter with the sun is only slightly above the sun's surface. With a small rock core, it is composed mostly of metallic, liquid, and gaseous hydrogen. Name this largest planet that has a large storm called Great Red Spot.

Answer: **Jupiter**

Bonus 9: Miscellaneous (Other)

Name the businesses associated with the following slogans.

A: Great food and unbelievable pie.

B: Gather 'round the good stuff.

C: Have it your way.

D: When you're here, you're family.

Answers: A: **Bakers Square** B: **Pizza Hut** C: **Burger King** D: **Olive Garden**

Tossup 10: Social Studies (World History)

Though he took part in the Ninth Crusade, his exploits in Britain are much more well known. He sought to unite the kingdoms of Britain under one crown, and brought the Welsh under the monarchy. The inscription on his tomb describes him as the "Hammer of the Scots". Identify this English King, who is buried in a lead casket in Westminster Abbey and who moviegoers today will probably recognize as the man who fought William Wallace.

Answer: **Edward I** (accept also *Edward Longshanks*)

Bonus 10: Science (Physics)

Given an equation, name each famous law from physics.

A: $F = ma$

B: $V = IR$

C: $n \sin \theta_1 = n_2 \sin \theta_2$

D: $F = -kx$

Answers: A: **Newton's Second Law of Motion** (prompt on *Newton's Law of Motion*) B: **Ohm's Law**

C: **Snell's Law** D: **Hooke's Law**

HALFTIME

Tossup 11: Miscellaneous (Technology)

Developed by Netscape, it is an integral part of SPA and DHTML. Most commonly used to alter the Domain Object Model of websites after they are loaded, variants can be found in programs like Adobe Photoshop, Flash, and even Reader software. The most famous dialect of ECMAScript (*ECK-muh-script*), it is responsible for Cross Site Scripting and many other modern website vulnerabilities. Name this programming language, which, though a registered trademark of Sun Microsystems, is unrelated to a similarly-named product of Sun.

Answer: **JavaScript** (do not accept or prompt Java)

Bonus 11: Literature (Language Arts)

Correctly spell the following words.

A: Tintinnabulation

B: Perigee (*PAIR-uh-jee*)

C: Myrmidon (*MURR-ma-don*)

D: Reptilian

Answers: A: **TINTINNABULATION** B: **PERIGEE** C: **MYRMIDON** D: **REPTILIAN**

Tossup 12: Social Studies (Other)

Also known as the "lex parsimoniae" or law of succinctness, it has been parodied many times, as by Crabtree's bludgeon, the humorous principle that the human mind can always come up with an explanation complicated enough to explain any set of inconsistent observations. Name this sharp principle named a 14th-century English friar, which states that the simplest explanation for something is usually the best.

Answer: **Occam's razor**

Bonus 12: Fine Arts (Visual Art)

Given a Surrealist work of art, name its creator.

A: The Son of Man

B: Twittering Machine

C: Soft Construction With Boiled Beans

D: Le violon de Ingres

Answers: A: **Rene Magritte** B: **Paul Klee** C: **Salvador Dali** D: **Man Ray**

Tossup 13: Math (Algebra) -- Computational (30 Seconds)

Find the sum of the infinite geometric series whose first three terms are 24, 16, and 10 and two-thirds. It may help you to know that the ratio between terms is needed to find the answer.

Answer: **72**

Bonus 13: Science (Earth Science)

Of Quaternary, Triassic, Cretaceous, or Jurassic, identify which geologic period fits the description. Each one is only used once.

A: The period we are currently living in.

B: The last period in which dinosaurs lived.

C: Began with the Permian extinction, and ended with another major extinction.

D: The supercontinent Pangaea breaks apart.

Answers: A: **Quaternary** B: **Cretaceous** C: **Triassic** D: **Jurassic**

Tossup 14: Literature (Literature)

The protagonist of this work enjoys brandy a bit too much, considering that it is illegal, as is his job. While chased by the Red Shirts and a zealous police lieutenant, he meets a mestizo (*mess-TEE-zo*) who tells him he can lead him to the city of Carmen, but really the mestizo just wants to turn him in for the 700-peso reward. Name this novel whose protagonist is a nameless whisky priest, the last free priest in his state of Mexico, written by Graham Greene.

Answer: **The Power and the Glory**

Bonus 14: Math (Other)

You are rolling two fair six sided dice. Find the probability that the following events occur. Express your answers as fully reduced fractions.

A: The sum of the two dice is prime.

B: The sum of the two dice is less than or equal to nine.

C: You roll doubles; that is, the two dice are equal.

D: The sum of the two dice is either four or five.

Answers: A: **15/36** B: **7/9** C: **1/6** D: **7/36**

Tossup 15: Science (Physics)

Under this theory, there might be 10, 11, or even 26 dimensions. Thought to be a special case of M-theory, it can describe all of particle physics without using any particles. Rather, it describes the universe as consisting of high-dimensional branes with its namesake vibrating one-dimensional units, which can form closed or open loops. Name this theory of quantum mechanics named after tiny objects resembling twine.

Answer: **String theory**

Bonus 15: Social Studies (U.S. History)

Given the year and a candidate, name the man who defeated him to be elected U.S. president.

A: 1816; Rufus King

B: 1852; Winfield Scott

C: 1896; William Jennings Bryan

D: 1916; Charles Evans Hughes

Answers: A: **James Monroe** B: **Franklin Pierce** C: **William McKinley** D: **Woodrow Wilson**

Tossup 16: Fine Arts (Music)

Upon arriving at Paris, he adopted the French name by which he is now most commonly known. Though he died of tuberculosis at age 39, he wrote many popular pieces, such as the Piano Sonata Number 2, named after its third Lento movement, as well as 27 etudes (*A-tudes*), 27 preludes, 21 nocturnes, 20 waltzes, and 57 mazurkas (*muh-ZUR-kuz*). Name this Polish composer of the Funeral March and Minute Waltz.

Answer: **Frederic Chopin**

Bonus 16: Miscellaneous (Entertainment)

Given the abbreviation of a rock 'n roll band, give the band's full name.

A: CCR

B: O.A.R

C: ELO

D: BTO

Answers: A: **Credence Clearwater Revival** B: **Of A Revolution** C: **Electric Light Orchestra** D: **Bachman-Turner Overdrive**

Tossup 17: Math (Calculus) -- Computational (30 Seconds)

A particle's position is determined by the function s of t equals $3x^3$ minus $4x^2$ plus $5x$ minus 2 . Find the acceleration of that particle at t equals two seconds. It may help you to know that the first derivative of a position function provides the velocity of the particle.

Answer: **28 units per second squared**

Bonus 17: Literature (Literature)

Name the following characters from Hamlet.

A: This other prince becomes ruler of Denmark after the deaths of seemingly everyone else in Denmark.

B: This jester's skull is admired in Act V, Scene I; the most quoted line referring to this character is also often misquoted, as apparently Hamlet didn't know him that well.

C: Polonius charges this servant to follow Laertes to France; he is told to spread weak lies about Laertes to gather the true facts of his behavior.

D: He appears only in Act V, inviting Hamlet to duel with Laertes. He is then a judge of the duel.

Answers: A: **Fortinbras** B: **Yorick** C: **Reynaldo** D: **Osric**

Tossup 18: Social Studies (U.S. History)

Prompting this case, shortly before his term ended, President John Adams passed a number of "midnight appointments" for new federal justices, though the next president, Thomas Jefferson, had one of his cabinet members refuse acknowledging some of them. In this Supreme Court case, one of the men who was disallowed an appointment brought suit against the new Secretary of State, claiming that he had a right to his appointment as a judge. Name this 1803 landmark Supreme Court case in which Chief Justice John Marshall affirmed the practice of judicial review.

Answer: **Marbury v. Madison** (*Prompt on just Marbury or Madison*)

Bonus 18: Science (Biology)

Give the taxonomic orders to which each of the following mammals belong.

A: Cats

B: Rabbits

C: Hedgehogs and moles

D: Beavers and mice

Answers: (*accept Anglicized versions*) A: **Carnivora** B: **Lagomorpha** C: **Insectivora** D: **Rodentia**

Tossup 19: Literature (Literature)

Chapters 1 through 44 deal with the title character, and chapters 45 to 53, the so-called Uji chapters, are about his descendants. Chapter 54, titled "The Floating Bridge of Dreams," ends in mid-sentence and might not be complete. Name this Japanese epic attributed to an unknown author called Murasaki Shikibu.

Answer: **The Tale of Genji** (*accept Genji Monogatari*)

Bonus 19: Social Studies (Geography)

Identify these Asian countries ending with "-stan."

A: It is involved in a territorial dispute over Kashmir.

B: Named for the Cossacks, it is the home of fictional character Borat.

C: Its capital city is Bishkek, and it shares a border with China.

D: Home to Samarkand, it was the seat of Tamerlane's empire.

Answers: A: **Pakistan** B: **Kazakhstan** C: **Kyrgyzstan** D: **Uzbekistan**

Tossup 20: Science (Chemistry)

This equation factors in "b," the volume of a mole of particles, and "a," a measure of attraction between particles, to describe the behavior of real fluids more accurately than the ideal gas law. It shares its name with a class of intermolecular forces. Name this gas equation or type of force, both named after a nineteenth-century Dutch chemist.

Answer: **Van der Waals equation/forces**

Bonus 20: Math (Algebra)

Given a matrix with top row 3, 4, and bottom row 2, 1, find the following quantities.

A: Find the determinant of the matrix.

B: Find the trace of the matrix.

C: Find the transpose of the matrix.

D: Find the inverse of the matrix.

Answers: A: **-5** B: **4** C: **Top row 3, 2; bottom row 4, 1** (*accept equivalent, but numbers must be in correct places!*) D: **Top row -1/5, 4/5; bottom row 2/5, -3/5** (*accept equivalent, accept decimals instead of fractions*)

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Science (Chemistry)**

Called a residue after a water molecule is removed, this type of molecule is defined only by having two particular functional groups, though typically they are both attached to a central alpha-carbon. Though over a hundred exist in nature, only twenty are encoded by DNA, and only a few of these are so-called "essential" ones. Name this type of biochemical molecule, the monomer building block of proteins.

Answer: **Amino acid**

Bonus 21: Social Studies (Geography)

Identify these countries.

A: The Andes mountains pass through this country whose capital is Lima.

B: This country's capital is Wellington and it's made up of 2 main islands in the Pacific.

C: This country's capital is Brussels and official languages are Dutch and French

D: This country is located in northeastern Africa, and its capital is Addis Ababa. Its name means "burned faces."

Answers: A: **Peru** B: **New Zealand** C: **Belgium** D: **Ethiopia**

Tossup 22: Social Studies (U.S. History)

His former Society of the Army of Cumberland men contributed to his grand statue down the hill from the Capitol. This ambidextrous president of the "Half Breed" persuasion for civil service reform defeated Winfield Hancock in election before being assassinated at the hand of Charles Guiteau.

Answer: **James A Garfield**

Bonus 22: Science (Biology)

Answer these questions about the small intestine.

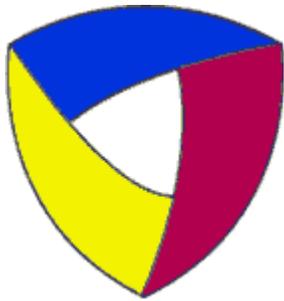
A: The first part of the small intestine is this, named after the Latin for "twelve," as in, "twelve inches long."

B: The middle section of the small intestine is this, named after the Old English for "hungry."

C: The final section of the small intestine, this leads into the cecum of the large intestine.

D: The small intestine absorbs nutrients through small fingerlike projections called villi, into this dense network of blood vessels surrounding the intestine.

Answers: A: **Duodenum** B: **Jejunum** C: **Ileum** D: **Mesentery**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 5

Tossup 1: Literature (Literature)

First appearing in a novel that would have twenty-three mass-produced sequels, this character's name is in the title of eighty-eight movies from 1918 to 1999. When the love of his life leaves for America, he leaves his home to find her. He wins her, but he grows discontent with urban life, as it is drastically different from what he is used to. Identify the Edgar Rice Burroughs character who, with his son Jack and wife Jane, returns to Africa.

Answer: **Tarzan** (accept John Clayton, Lord Greystoke)

Bonus 1: Science (Astronomy)

Given a planet or moon, name who discovered it.

A: Uranus

B: Io

C: Pluto

D: Charon

Answers: A: **William Herschel** (Accept John Flamsteed) B: **Galileo Galilei** (Prompt on Galilei) C: **Clyde W. Tombaugh** D: **James W. Christy**

Tossup 2: Math (Algebra) -- Computational (30 Seconds)

What is the sum of the coefficients of the expansion of the quantity $3x$ plus $2y$ minus z , raised to the second power? It may help you to know that subtracting the z does cause negative signs to be part of the coefficients in the expansion.

Answer: **16**

Bonus 2: Literature (Literature)

Answer the following questions about the novel *The Great Gatsby*.

A: Which character narrates the story? Give first and last name.

B: In what decade does the novel take place?

C: That decade has a number of nicknames. Which one is often used in conjunction with this novel, a term that Fitzgerald also used in the title of a collection of his short stories?

D: What was Gatsby's original name? Give first and last name.

Answers: A: **Nick Carraway** B: **1920s** C: **The Jazz Age** D: **James Gatz**

Tossup 3: Social Studies (U.S. History)

Though it is only 26.6 seconds long, it is located in the National Film Registry because of its cultural significance. Its owner originally sold it to Life Magazine for \$150,000, donating \$25,000 of it to the family of J. D. Tippit. Though at least seven other films exist of the same moment, its elevated position on a concrete pedestal next to a grassy knoll made it critical evidence in the Warren Commission. Name this home video filmed at Dealey Plaza in Dallas, Texas, on November 22, 1963.

Answer: **Zapruder film**

Bonus 3: Math (Calculus)

Find the second derivatives of the following functions.

A: $5x^2 - 12$

B: The quantity $3x - 2$, close quantity, times the quantity $9x^2 + 6x + 4$.

C: $\sin x$

D: $\frac{1}{x^2}$

Answers: A: **10** B: **162x** C: **negative sine of x** D: **6 over x to the fourth**

Tossup 4: Science (Chemistry)

One way of determining whether a compound is one of these is whether there is an even number of pi electrons that is not a multiple of four. However, this method, called Huckel's rule, does not work when there are more than three rings fused in one place. Being one of these requires a conjugated ring, resulting in a planar arrangement of carbon atoms and delocalized pi bonds stronger than would be otherwise expected. Toluene (*TAHL-you-een*), naphthalene (*NAF-tha-leen*), and benzene are, though cyclohexane is not, what type of resonating cyclic hydrocarbon, that sounds like it would have a strong odor?

Answer: **Aromatic hydrocarbons**

Bonus 4: Fine Arts (Visual Art)

Identify the following works of art.

A: One of the timepieces has a fly on it, while another is being devoured by ants. In the center of the painting is a distorted human face in profile.

B: This painting depicts the daughter of King Philip IV of Spain and her ladies-in-waiting, along with her mastiff and a dwarf.

C: The fighters are from a variety of classes, including a man in a top hat, and a boy brandishing two pistols. The central figure is a barefooted woman carrying a bayoneted musket in one hand and raising a flag in the other.

D: Its proper name is 'The Company of Frans Banning Cocq and Willem van Ruytenburch'.

Answers: A: **The Persistence of Memory** B: **Las Meninas** (accept *The Maids of Honor*) C: **Liberty Leading the People** (accept *La Liberté guidant le peuple*) D: **The Night Watch**

Tossup 5: Miscellaneous (Technology)

The newest version supports features like PNG (*ping*) transparency, RSS and Atom feeds, protected mode, anti-phishing (*fishing*) features, optional ActiveX controls, better standards support, and tabs. In 1998 it was subject to lawsuits because of its integration with its operating system. Though it reached a market share of over 95% in 2002, it now only has about 85%, thanks to its new competitor, Mozilla Firefox. Name this Microsoft web browser whose version 7 was released in October 2006.

Answer: **Microsoft Internet Explorer** (accept *IE, MSIE*)

Bonus 5: Social Studies (World History)

Let's see how much you know about 15th and 16th century Spain.

A: The monarchs Ferdinand and Isabella were from these respective territories. Both answers are required for a correct answer.

B: Ferdinand and Isabella instigated this movement in Spain, which banished all Jews and Moors, among others, from the country.

C: This "invincible fleet" was defeated by the English in the late 1500s.

D: This king who sent out that fleet was married to England's Queen Mary.

Answers: A: **Aragon and Castille** (*F and I respectively; accept Arago and Castilla*) B: **Spanish Inquisition** (accept *Reconquista*) C: **Spanish Armada** (accept *Armada Catolica*) D: **Philip II of Spain** (prompt on *Philip*)

Tossup 6: Math (Calculus) -- Computational (30 Seconds)

Find the area between the curve y equals negative x squared and the line y equals negative 16. It may help you to know that there is no difference in final answers between this scenario and a similar scenario shifted up 16 units.

Answer: **85 and one-third** (accept *256/3*)

Bonus 6: Literature (Literature)

Identify the author of these works of medieval literature.

A: The Parliament of Fowls

B: Le Morte d'Arthur

C: The Rubaiyat

D: The Faerie Queen

Answers: A: **Geoffrey Chaucer** B: **Sir Thomas Malory** C: **Omar Khayyam** D: **Edmund Spenser**

Tossup 7: Social Studies (Geography)

Its flag features a red background with a triskelion in the center. That is, it has three legs bent at a ninety degree angle arranged in rotational symmetry. At its highest point, Snaefell, it is said that one can see five kingdoms other than the one being stood on, those of Scotland, England, Ireland, Wales, and Heaven. Although it is not part of the United Kingdom, it is a Crown dependency. Name this island located in the Irish Sea at the geographic center of Great Britain and Ireland.

Answer: **Isle of Man**

Bonus 7: Science (Physics)

The CGS system is the same as the SI system, except its units are based on centimeters, grams, and seconds, instead of meters, kilograms, and seconds. Given a CGS unit, name the physical quantity it measures.

A: Dyne

B: Barye

C: Erg

D: Esu

Answers: A: **Force** (*accept weight, do not accept mass*) B: **Pressure** C: **Energy** (*accept work*) D: **Electric charge**

Tossup 8: Literature (Language Arts)

A possible etymology is the Scottish word for river gravel. Though it was once a collective noun, it now refers to individual pieces. When not created properly, they might be hanging, dimpled, or pregnant. Name these circles of paper everyone was talking about during the 2000 elections, that share their name with an African country.

Answer: **Chad**

Bonus 8: Math (General)

Give the largest prime number smaller than each of these numbers.

A: 25

B: 50

C: 75

D: 100

Answers: A: **23** B: **47** C: **73** D: **97**

Tossup 9: Fine Arts (Music)

A Lithuanian Jew, his father changed their last name to sound more American before emigrating to the United States. This is somewhat ironic, because he is now seen as an iconic American composer, with such works as the ballets "Billy the Kid", Martha Graham's "Appalachian Spring," and "Rodeo" (*roh-DAY-oh*). Name this composer of "Lincoln Portrait" and "Fanfare for the Common Man."

Answer: **Aaron Copland**

Bonus 9: Social Studies (U.S. History)

There have been a good number of failed assassination attempts on U.S. Presidents. Given the would-be assassin, name the president who wasn't killed.

A: John Hinckley, Jr.

B: Vladimir Arutinian

C: Sara Jane Moore and Lynette Fromme

D: Richard Paul Pavlick

Answers: A: **Ronald Reagan** B: **George W. Bush** (*i.e., the younger; prompt on Bush*) C: **Gerald Ford** D: **John F. Kennedy** (*yes, three years before the successful attempt*)

Tossup 10: Science (Biology)

Each monomer has formula $C_8H_{13}NO_5$, almost the same as cellulose except that one hydroxyl group is replaced by an acetamide (*uh-SEE-tul-A-meen*) group. Coming from the Greek word for "tunic," name this polymer sometimes used in surgical thread, naturally occurring in the cell walls of fungi and exoskeletons of arthropods.

Answer: **Chitin** (*KITE-in*)

Bonus 10: Miscellaneous (Sports)

A well known television program moved from ABC to ESPN this year, and in its ESPN premiere, broadcasted a doubleheader.

A: Name that program, which has been hosted by, among others, Howard Cosell, Al Michaels, and Dennis Miller.

B: This broadcaster joined the program in 2006, having previously worked on ESPN shows such as The Sports Reporters and Pardon the Interruption.

C: This team won the first game of the doubleheader over the Washington Redskins on a last minute field goal by Ryan Longwell.

D: This team shut out the Oakland Raiders 27-0 in the second game, which included an Antonio Gates touchdown reception.

Answers: A: **Monday Night Football** B: **Tony Kornheiser** C: **Minnesota Vikings** (*accept either or both*) D: **San Diego Chargers** (*accept either or both*)

HALFTIME

Tossup 11: Social Studies (World History)

Though it still has over a million members, it does not have much political power, last winning parliamentary elections in 1997. Founded in September 1980, this non-violent trade union was led by an electrician who later became TIME Magazine's 1981 Man of the Year, and was elected President of his country in December 1989 after the Communist regime there collapsed. Name this Polish trade union formed by Lech Walesa (*LEK vuh-WEN-suh*).

Answer: **Independent Self-governing Trade Union Solidarity** (*accept Solidarność*)

Bonus 11: Miscellaneous (Interdisciplinary)

Answer the following questions about islands found in the Aegean Sea from clues that have nothing to do with the geography.

A: A work by Delacroix portrays a massacre at this island, home to an 1822 rebellion against the Turkish rulers.

B: This island is most famous for a statue roughly the size of the Statue of Liberty; the statue is considered one of the Seven Wonders of the Ancient World.

C: This island was home to one of the nine canonical lyric poets of Ancient Greece; Plato called her the tenth muse, and scholars wonder whether the Cleis in her poems refer to a daughter or simply a young girl.

D: According to myth, Hephaestus landed on this island when Zeus threw him from Mount Olympus. The island was home to his forge, and myths tell of fire that could be seen rising from the mountains.

Answers: A: **Chios** (*KEE-ose*) B: **Rhodes** (*The Statue of Zeus was in Olympia, on the Greek mainland.*) C: **Lesbos** D: **Lemnos**

Tossup 12: Literature (Literature)

One of the bestselling children's books of all time, it depicts the events leading up to the American Revolution, culminating in the battles of Lexington and Concord, through the eyes of a young apprentice. Name this Newbery Medal-winning novel by Esther Forbes.

Answer: **Johnny Tremain**

Bonus 12: Science (Chemistry)

Given an ion, state its most typical charge.

A: Plumbic ion

B: Aluminum ion

C: Acetate ion

D: Nitrite ion

Answers: A: **+4** B: **+3** C: **-1** D: **-1**

Tossup 13: Fine Arts (Visual Art)

Though he rejected the label of abstract expressionism, he has become one of the best-known figures of the movement. He claimed to care nothing for form and color, but sought to represent basic emotions by filling the canvas with few but intense colors and little apparent detail. Name this Latvian-born artist and creator of a namesake chapel in Houston.

Answer: **Mark Rothko**

Bonus 13: Literature (Mythology) -- Five Parts

Complete the following famous mythological pairs.

A: Pyramus

B: Castor

C: Baucis

D: Vertumnos

E: Phrixos

Answers: A: **Thisbe** B: **Pollux** C: **Philemnon** D: **Pomona** E: **Helle**

Tossup 14: Math (Other)

Treating the two inputs as column matrices, it is equivalent to the transpose of the first times the second. When divided by the product of the two magnitudes, it is equal to the cosine of the angle between the two vectors. Also known as the "inner product," it takes two vectors and returns a scalar, unlike a similarly-named operation that returns another vector. Name this binary product operation that equals zero when performed on two perpendicular vectors.

Answer: **Dot product**

Bonus 14: Social Studies (U.S. History)

Identify the Amendment to the U.S. Constitution that revised each of the following points of law.

A: This Amendment repealed Prohibition.

B: This Amendment clarified and changed the original jurisdiction of the Supreme Court, limiting the rights of citizens to sue states.

C: This Amendment changed the rules of presidential succession.

D: This Amendment repealed the three-fifths clause of the Constitution, and prohibits states from abridging any citizen's right to due process.

Answers: A: **21st** B: **11th** C: **20th** D: **14th**

Tossup 15: Science (Physics) -- Computational (30 Seconds)

To two significant figures, if a wave with wavelength 2.5 meters is traveling in a vacuum, what will its wavelength be when passing through glass with an index of refraction of 1.5?

Answer: **1.7 meters**

Bonus 15: Math (Geometry)

Find the degree measure of an interior angle of each of the following regular polygons.

A: Dodecagon

B: 36-gon

C: 80-gon

D: 360-gon

Answers: A: **150 degrees** B: **170 degrees** C: **175.5 degrees** (accept 351/2) D: **179 degrees**

Tossup 16: Social Studies (U.S. History)

He entered into a financial investment company with Ferdinand Ward, but when Ward swindled the money, he realized his family would need money quickly. When The Century Magazine offered a low sum for the publishing rights to his memoirs, Mark Twain stepped in and offered 75% of the royalties from sales. Name this man, who died a few days after finishing his memoirs of his experiences as a Union general and 18th President.

Answer: **Ulysses S. Grant**

Bonus 16: Science (Biology)

Answer these questions about the making of eggs.

A: This process creates ova, or egg cells.

B: In that process, meiosis (*my-OH-sis*) creates two types of cells, egg cells and this smaller type.

C: In that process, this number of egg cells is made from each precursor cell.

D: Meiosis of egg cells begins before birth, but is arrested in this phase until menstruation.

Answers: A: **Oogenesis** B: **Polar body** C: **1** D: **Prophase I** (prompt prophase)

Tossup 17: Miscellaneous (Entertainment)

Spanish is reduced to "No me gusta" and Arabic to words like "jihad," "Sherpa," and "Allah" in a parody of American ethnocentrism. Although Kim Jong-Il and several actors including Alec Baldwin and Matt Damon are openly mocked, the film never mentions Bush or any other American politicians. Name this over-the-top satire by South Park creators Trey Parker and Matt Stone.

Answer: **Team America World Police**

Bonus 17: Fine Arts (Music)

Name the Russian composers of the following operas.

A: The Queen of Spades

B: Prince Igor

C: The Love for Three Oranges

D: The Tale of Tsar Saltan

Answers: A: **Pyotr Ilyich Tchaikovsky** B: **Alexander Borodin** C: **Sergei Prokofiev** D: **Nikolai Rimsky-Korsakov**

Tossup 18: Literature (Literature)

George W. Bush reportedly read this classic in the summer of 2006, apparently prompting discussions about existentialism with his staff. It tells of an alienated young man who is imprisoned for shooting an Arab and is evaluated as incapable of remorse. Name this novel by Albert Camus.

Answer: **The Stranger** (*accept L'Etranger*)

Bonus 18: Math (Other)

Take a standard deck of cards and remove the face cards. Now, each of the remaining cards is equal to its face value; for example, tens are worth ten and aces are worth one. Find the probability that, by drawing two cards with replacement, the point value of the draw satisfies the following requirements. Express your answers as fully reduced fractions.

A: The sum is two.

B: The sum is ten.

C: The sum is prime.

D: The sum is greater than or equal to eighteen.

Answers: A: **1/100** B: **9/100** C: **37/100** D: **3/50**

Tossup 19: Science (Chemistry)

Though intoxicating, it would be better not to drink it, because several milliliters is enough to cause permanent blindness, and 100 is fatal. Like its more common relative, it is broken down in the liver by alcohol dehydrogenase, though its metabolites cause its high toxicity, so it is usually treated by administering ethanol as a competitive inhibitor. Name this chemical, whose metabolites of formic acid and formaldehyde destroy the optic nerve, the simplest alcohol, with formula CH₃OH.

Answer: **Methanol**

Bonus 19: Literature (Literature)

Identify the authors of each of the following famous American short stories.

A: An Occurrence at Owl Creek Bridge

B: The Lady or the Tiger?

C: The Celebrated Jumping Frog of Calaveras County

D: To Build a Fire

Answers: A: **Ambrose Bierce** B: **Frank R. Stockton** C: **Mark Twain** D: **Jack London**

Tossup 20: Math (Algebra) -- Computational (30 Seconds)

Find the sum of the solutions to the equation two x cubed plus four x squared minus 22 x minus 24 equals zero. Because all of its roots are integers, they can be found by trial and error. However, since only their sum is requested, it would be much faster to remember the relation between the sum of a polynomial's roots and its second term.

Answer: **-2** (*do not accept 2; roots are -1, -4, and 3*)

Bonus 20: Social Studies (Other)

Given an African country, identify its currency.

A: Swaziland

B: Sudan

C: Egypt

D: Nigeria

Answers: A: **Swazi Lilangeni** B: **Sudanese Dinar** (*prompt on dinar*) C: **Egyptian Pound** (*prompt on pound; accept al-Gunaih al-Masri*) D: **Nigerian Naira**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Social Studies (World History)**

Her sister was actually her brother, and no, I'm not talking about in-breeding. Less famous than her sibling vessel, she took the lead in destroying Allied Convoy PQ-17 in July 1942. She was called the "Lonely Queen of the North" in Norway, in whose fjords she ultimately met her end in Operation Catechism. Identify this sister ship of the Bismarck.

Answer: **Tirpitz**

Bonus 21: Science (Chemistry)

Given the atomic symbol, name the element. Each element is named for a nationality.

A: Fr

B: In

C: Ge

D: Ga

Answers: A: **Francium** B: **Indium** C: **Germanium** D: **Gallium**

Tossup 22: Science (Biology)

No net mutations occur; individuals neither enter nor leave the population; the population is large; individuals mate randomly; selection does not occur. These are the five assumptions of what population condition? It states that allele frequencies in a population tend to remain the same from generation to generation and is named for the two men who independently proved it.

Answer: **Assumptions of Hardy-Weinberg genetic equilibrium**

Bonus 22: Social Studies (U.S. History)

Given the year and a candidate, name the man who defeated him to be elected U.S. president.

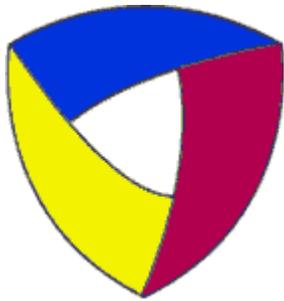
A: 1920; Eugene Debs

B: 1924; Robert M. LaFollette

C: 1928; Alfred Smith

D: 1948; Strom Thurmond

Answers: A: **Warren G. Harding** B: **Calvin Coolidge** C: **Herbert Hoover** D: **Harry S. Truman**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 6

Tossup 1: Social Studies (World History)

In 1964, he became prisoner number 46664 on Robben Island, charged with sabotage as a member of the ANC. There, he wrote his autobiography, *Long Walk to Freedom*. After a long international campaign, President de Klerk finally released him in February 1990. In 1994, however, this man finally saw his dreams come true as he was elected President in his country's first democratic elections with universal suffrage. Name this man who remained President until 1999, five years after the apartheid (*uh-PAR-tide*) was lifted from his country of South Africa.

Answer: **Nelson Mandela**

Bonus 1: Literature (Literature)

Given a work's alternate or subtitle, name the work.

A: A Novel Without a Hero

B: Life Among the Lowly

C: The Modern Prometheus

D: The Children's Crusade

Answers: A: **Vanity Fair** B: **Uncle Tom's Cabin** C: **Frankenstein** D: **Slaughterhouse-Five**

Tossup 2: Math (Algebra) -- Computational (30 Seconds)

Y varies inversely as the square of x. If y equals 12 when x equals 3, what does y equal when x equals 6? Give your answer as a mixed number reduced to lowest terms.

Answer: **3**

Bonus 2: Miscellaneous (Entertainment)

Identify the following characters from television, movies and video games. Include both first and last names in your answers.

A: Played by John Krasinski, this character is a five year veteran of Dunder-Mifflin Paper Company. He secretly harbored feelings for Pam, the secretary, before these became public on 'Casino Night'.

B: He was incarcerated for armed robbery before being released into his brother's custody. His jilted fiancée comes after him multiple times, including once with a rocket launcher.

C: This character wears a full-body Power Suit, which features an arm cannon and allows her to morph into a ball.

D: This man, played by Wentworth Miller, was a structural engineer prior to his incarceration at Fox River State Penitentiary.

Answers: A: **Jim Halpert** (from NBC's *The Office*) B: **"Joliet" Jake E. Blues** (prompt on "Joliet" Jake) (from *The Blues Brothers*) C: **Samus Aran** (from Nintendo's *Metroid* series) D: **Michael "Fish" Scofield** (from Fox's *Prison Break*)

Tossup 3: Literature (Literature)

He is the subject of Larry Niven's "The Return of William Proxmire," where time travelers cure him of pulmonary tuberculosis so he can follow his career path in the Navy. This is not the true story however, because in reality he took up writing science fiction novels such as *Rocket Ship Galileo*, *Farnham's Freehold*, and *Starship Troopers*. Name this author, most famous for *Stranger in a Strange Land*.

Answer: **Robert A. Heinlein**

Bonus 3: Science (Chemistry)

Name each of these artificial sweeteners.

A: Possibly the most famous artificial sweetener, it can be found in NutraSweet, Equal, and Candarel.

B: This new artificial sweetener is found in Splenda.

C: This sweetener gets its name from a word meaning "sugary," and can be found in Sweet'N Low.

D: This sweetener is usually used in conjunction with other artificial sweeteners to mask their aftertaste, but can still be found alone in the product Sucaryl.

Answers: A: **Aspartame** B: **Sucralose** C: **Saccharin** D: **Cyclamate**

Tossup 4: Fine Arts (Visual Art)

Despite being often parodied and trivialized, his paintings have a complexity that belies their apparent simplicity of rectangular forms and primary colors. Name this central figure of the De Stijl (*DAY SHTEEL*) movement and creator of non-representational compositions such as *Broadway Boogie-Woogie*.

Answer: **Piet Mondrian**

Bonus 4: Math (Geometry)

The volume of a cube is 729 cubic feet. Answer the following questions, giving proper units.

A: What is the side length?

B: What is the length of the great diagonal of the cube?

C: What is the surface area?

D: What is the lateral surface area?

Answers: A: **9 feet** B: **$9\sqrt{3}$ feet** C: **486 square feet** D: **324 square feet**

Tossup 5: Science (Biology)

It begins when oxaloacetic (*ox-AL-o-a-SEE-tic*) acid combines with acetyl coenzyme-A to form a six-carbon molecule, and its five repeating steps generate another oxaloacetate molecule, along with two ATP, six NADH, two FADH₂, and four carbon dioxide molecules. Name this cycle in cellular respiration named after either a biologist or its starting molecule, the acid that makes lemons sour.

Answer: **Krebs cycle** (*accept citric acid cycle*)

Bonus 5: Social Studies (U.S. History)

Given a description, name the member of the Continental Congress.

A: This man nearly missed the voting for the Declaration of Independence. He is pictured riding a horse on the Delaware state quarter.

B: This Connecticut politician became the Mayor of New Haven in 1784.

C: This Virginian delegate served as Secretary of State under Jefferson, and then succeeded him as president.

D: This man, one of the authors of the Federalist Papers, was the first Secretary of the Treasury. You might recognize him, as he is pictured on the ten dollar bill.

Answers: A: **Caesar Rodney** B: **Roger Sherman** C: **James Madison** D: **Alexander Hamilton**

Tossup 6: Math (General) -- Computational (30 Seconds)

You want to find the cubed root of 50,653. Because its ones digit is three, you know there is only one possibility for the ones digit of the cubed root. In addition, because 50 cubed is 125,000, you know that the answer is substantially less than 50. With this information, find the cubed root of 50,653.

Answer: **37**

Bonus 6: Literature (Literature)

Answer these questions about books with animals in them.

A: This graphic novel about the Holocaust by Art Spiegelman depicts Germans as cats.

B: This novel by Richard Adams features a group of rabbits led away from their previous home by the rabbit Hazel.

C: This was the first of what is currently an eighteen-book series by Brian Jacques, about a group of mice and other animals at the titular abbey.

D: All of these books apply human characteristics to non-humans, a technique called this, from the Greek for "human" and "form."

Answers: A: **Maus: A Survivor's Tale** B: **Watership Down** C: **Redwall** D: **Anthropomorphism**
(accept other forms of the word)

Tossup 7: Social Studies (U.S. History)

This man learned Hebrew from John Milton in exchange for teaching Milton how to speak Dutch. In the early 1600s, he left his home country for New England, where he settled in Salem, Massachusetts. However, once there, he insisted that the settlers should break all ties with the Church of England and voiced his dissatisfaction with the Massachusetts Charter, leading to his banishment in 1636. He then established a new colony, purchasing the land from a group of Indians. Name this founder of Rhode Island.

Answer: **Roger Williams**

Bonus 7: Fine Arts (Music)

Identify the nickname of each of the following Haydn symphonies.

A: Number 94 is named after the unexpected loud crash in the middle of the piece, though it really isn't all that astonishing.

B: Haydn wrote Number 45 to persuade his patron to allow the orchestra to take a vacation. At the end of this work, all the orchestra members leave in pairs, and at the end, only the first violinists are left.

C: Number 101 is named after a ticking rhythm in its second movement.

D: His last symphony, Number 104, is called by this nickname which is sometimes given to all of his twelve last symphonies, for the city in which he composed them.

Answers: A: **Surprise Symphony** B: **Farewell Symphony** C: **Clock Symphony** D: **London Symphony**

Tossup 8: Literature (Mythology)

One side reads, "Take me up," and the other, "Cast me away." In some versions of the myth, this weapon is retrieved after another one breaks in a fight against King Pellinore. Its owner wields it for the rest of his life, and as he dies, commands Sir Bedivere to throw it back into the lake where it came from. Name this weapon whose scabbard prevents the bearer from dying of blood loss, the mystical sword of King Arthur.

Answer: **Excalibur**

Bonus 8: Math (Other)

In set theory, certain letters are used to represent very common groups, for example, capital N represents the natural numbers. Name the sets represented by the following letters.

A: Capital R

B: Capital C

C: Capital Z

D: Capital Q

Answers: A: **Real numbers** B: **Complex numbers** (do not accept imaginary) C: **Integers** D: **Rational numbers**

Tossup 9: Science (Chemistry) -- Computational (30 Seconds)

To three significant digits, how much volume is taken up by half a mole of carbon dioxide, at one atmosphere of pressure and 546 Kelvins? It may help you to realize that 546 Kelvins is twice the absolute temperature of 273 Kelvins.

Answer: **22.4 liters**

Bonus 9: Social Studies (Geography)

Given a country, name its highest point.

A: Pakistan

B: Argentina

C: Turkey

D: Canada

Answers: A: **K2** B: **Aconcagua** C: **Mount Ararat** D: **Mount Logan**

Tossup 10: Miscellaneous (Other)

On February 22, 2006, 16-year-old Alex Ostrovsky of West Bloomfield, Michigan, was catapulted to fame using this. Among the file formats the software can read are MP3, WAV (*wave*), AAC, and even Windows Media format. Available for Mac OS X, as well as Windows 2000 and up, it is currently at Version 6.0.3. For ten points, Speed of Sound by Coldplay was the billionth song sold on what music store run by Apple Computers?

Answer: **iTunes Music Store** (*prompt on iPod*)

Bonus 10: Science (Physics)

Identify these eponymous electrical devices.

A: A hollow metal globe, it accumulates very high voltages on the surface, so touching it will make your hair stand up.

B: Named after the creator of alternating current, it is made of coupled resonant circuits that can generate dangerous pulses of high-voltage plasma.

C: Made of two large discs rotating in opposite directions and two metal spheres, it can generate high voltages simply by spinning the discs.

D: Named after a university in the Netherlands, this cylinder was the first capacitor.

Answers: A: **Van de Graaff generator** B: **Tesla coil** C: **Wimshurst machine** D: **Leyden jar**

HALFTIME

Tossup 11: Science (Earth Science)

It is located directly above the subduction zone of the Eurasian and Indo-Australian Plates, in the Sunda Strait near Indonesia. Its 1883 eruption consisted of four enormous eruptions, accompanied by large tsunamis and pyroclastic flows. The last and largest eruption was the loudest sound in recorded history, heard 2200 miles away, and destroyed more than two-thirds of the island behind. Name this volcano near Java and Sumatra whose eruption was among the most violent events in modern time.

Answer: **Krakatoa** (*accept Krakatau*)

Bonus 11: Literature (Language Arts) -- Five Parts

British and Americans don't always seem to speak the same language. For each of the following British words, give its American equivalent.

A: chemist

B: petrol

C: flat

D: lift

E: adhesives

Answers: A: **drugstore** (*do not accept druggist or pharmacist*) B: **gas(oline)** C: **apartment** D: **elevator** E: **postage stamps**

Tossup 12: Miscellaneous (Sports)

In 1998, they led the major leagues in payroll, and the next year, the division rival Yankees took over both the largest payroll and the AL East division crown. Their owner, Peter Angelos, was the only owner to vote against the relocation of the Montreal Expos. Name this team, which had considered trading Miguel Tejada for Mark Prior after the 2005 season.

Answer: **Baltimore Orioles** (*accept either half of name*)

Bonus 12: Fine Arts (Visual Art)

You may not be sure what you want to be when you grow up, but do yourself a favor and don't become a Post-Impressionist painter. Given a miserable life, name the Post-Impressionist who lived it.

A: After stalking another artist with a razor, this artist mutilated his left ear, then wrapped the lobe in newspaper and presented it to a local prostitute. Two years later, he shot himself in the chest, missed his heart, and died two days later.

B: After his decision to become artist, his wife and five children left him. Frequently struggling with depression, this artist attempted suicide after fleeing the materialism of Europe. He died in French Polynesia after enduring ten years of extreme poverty and venereal disease.

C: As a result of his family's inbreeding, this artist's legs did not heal from an injury, and he would grow no taller than four-eleven. He died at age 37 from complications of alcoholism and syphilis.

D: His paintings required such a large amount of work that he only completed seven. His family's background forced him to keep his wife and child a secret. He and his baby son died within a few weeks of each other, he at the age of 31.

Answers: A: **Vincent van Gogh** B: **Paul Gauguin** C: **Henri Toulouse-Lautrec** D: **Georges-Pierre Seurat**

Tossup 13: Literature (Literature)

He was a gambler, like Alexai. He was epileptic, like Pavel Smerdyakov. He was not an idiot like Myshkin, but an intellectual, though not as rebellious and neurotic as Raskolnikov or the Underground Man. His work explored not only the struggles of nineteenth century Russian life, but also the quest for God and the problem of evil. Identify the author of "The Gambler," "The Idiot," and "Crime and Punishment."

Answer: **Fyodor Dostoevsky**

Bonus 13: Social Studies (World History)

Name these things about Napoleon.

A: He was born on what French island?

B: When he was exiled the first time, Napoleon was sent to what island?

C: When he was exiled for the second time, Napoleon was sent to what island?

D: During what year did Napoleon launch a failed attack on Russia, that was doomed by the cold winter?

Answers: A: **Corsica** B: **Elba** C: **St. Helena** D: **1812**

Tossup 14: Math (Geometry) -- Computational (30 Seconds)

The volume of a cube is 3375 cubic inches, and you want to know the lateral surface area of the cube. Keeping in mind that the lateral surface area is only concerned with the sides around the cube and not the top and the bottom, and that 3375 is between 10 cubed and 20 cubed, find the lateral surface area of this cube.

Answer: **900 square inches**

Bonus 14: Science (Physics)

Identify these terms related to nuclear reactors.

A: Heavy water or graphite can serve as this type of medium that slows down neutrons.

B: In contrast, this type of material absorbs neutrons to keep the fission under control, and can be fully lowered into the central core to stop a reactor.

C: This term that is not "slow" refers to reactors that do not use fast neutrons, instead slowing down the neutrons to the kinetic energy of surrounding materials.

D: This type of reactor is designed to create more fissile fuel than it uses.

Answers: A: **Neutron moderator** B: **Control rod** C: **Thermal reactor** D: **Breeder reactor**

Tossup 15: Social Studies (U.S. History)

The real names of the men involved with this scandal were Jean Hottinguer (*Hawt-in-gare*), Pierre Bellamy, and Lucien Hauteval (*Loo-see-en Haw-tay-voll*). Those three men met with Elbridge Garry, Charles Pinckney, and John Marshall, requesting large sums of money and an apology from President John Adams in exchange for cooperating with the American diplomats. These events comprised what late 18th century scandal, in which the lackeys of French foreign minister Talleyrand demanded \$250,000 for a meeting with him?

Answer: **XYZ Affair** (*accept reasonable alternatives that include "XYZ"*)

Bonus 15: Math (Algebra)

Solve the following equations for x.

A: The absolute value of 3x minus 2 equals 10.

B: The square root of 2x plus 4 equals 4.

C: 10x minus 11 is greater than or equal to 5x plus 1.

D: 12 minus x squared equals 4x.

Answers: A: **x equals 4 and -8/3** (*must have both, do not prompt on one*) B: **x equals 6** C: **x is greater than or equal to 12/5** (*or 2.4*) D: **x equals 2 and -6** (*must have both, do not prompt on one*)

Tossup 16: Fine Arts (Music)

Tom Lehrer commented at age 36 that it was sobering to realize that at his own age, this composer had already been dead a whole year. Despite this young death, he wrote more than 600 works according to the Kochel (*KER-shul*) catalogue, including 27 piano concertos, 41 symphonies, and many operas in several languages, like "Idomeneo," "The Marriage of Figaro," "Cosi fan Tutte," and "The Magic Flute." Name this prolific young composer whose last work was an unfinished Requiem.

Answer: **Wolfgang Amadeus Mozart**

Bonus 16: Miscellaneous (Technology)

Name these popular social networking websites.

A: Founded by Mark Zuckerberg, this website started at Harvard, expanded to all colleges, and in September 2005, opened to high school students as well.

B: This website allows users to design their own profile pages in HTML. Open to all people age 14 or over, this site's profiles include the standard blurbs "About Me" and "Who I'd Like to Meet."

C: This blogging website's mascot is Frank the Goat. Perhaps the best-known hosted blog service, it allows four different states of friendship between users.

D: Another popular hosted blog service, this website allows users to subscribe to other blogs, or join blogrings. Its five-letter name can be pronounced in many different ways.

Answers: A: **Facebook** B: **MySpace** C: **LiveJournal** D: **Xanga**

Tossup 17: Science (Physics)

Because it is electrically neutral and a lepton, it only interacts by the weak nuclear force and gravity, but has so little mass that it would take a light-year-thick block of lead to stop only half of the ones passing through. Existing in the electron, muon, and tau flavors, name this weakly-interacting particle whose name was given by Enrico Fermi, the diminutive of "neutral" in Italian.

Answer: **Neutrino**

Bonus 17: Literature (Literature)

An 1899 novel explores a woman's struggle to live her own life.

A: Name this novel, where a woman's newfound ideals and emotions conflict with traditional Creole society.

B: Name the author of this work, also famous for "The Story of an Hour" and "The Gentleman from New Orleans".

C: Name the protagonist, a wife and mother who finds that her life is unfulfilled after spending most of the summer with another man.

D: Name this other man, a businessman who cannot express his love for the married protagonist.

Answers: A: **The Awakening** B: **Kate Chopin** C: **Edna Pontellier** (accept either half) D: **Robert Lebrun** (accept either half)

Tossup 18: Math (Calculus) -- Computational (30 Seconds)

Find the area under the curve of y equals 4 secant squared of x plus 10 cosine of x , from x equals zero to x equals pi over four. It may help you to know that cotangent of zero is undefined.

Answer: **4 plus $5\sqrt{2}$**

Bonus 18: Social Studies (U.S. History)

Identify these American Naval vessels, given a description.

A: Nicknamed "Old Ironsides," it is the oldest active vessel in the United States Navy.

B: An Iowa Class Battleship, this vessel was the site of the Japanese surrender in World War II.

C: Having exploded in Havana Harbor, this ship's destruction served as the rallying cry for the Spanish-American War.

D: A Portland Class heavy cruiser, this ship carried the first atomic bomb to an air base on Tinian Island.

Answers: A: **The U.S.S. Constitution** B: **The U.S.S. Missouri** C: **The U.S.S. Maine** D: **The U.S.S. Indianapolis**

Tossup 19: Literature (Literature)

A contemporary of Jack London, many of his works had characters with animalistic characteristics, which stemmed from his belief in Darwinism. He was writing the Epic of Wheat trilogy when he died, and his most famous novel was turned into a 1924 movie named Greed. Name this naturalist author of works such as The Pit and McTeague.

Answer: **Benjamin Frank(lin) Norris**

Bonus 19: Math (General)

Find the square root of each of the following large numbers. Each of these four numbers is a perfect square.

A: 784

B: 3,136

C: 5,776

D: 10,609

Answers: A: **28** B: **56** C: **76** D: **103**

Tossup 20: Social Studies (Other)

After working in the business world for a year, this man moved to Chicago, working on the Altgeld housing projects of the city's South Side. It was at this point in his life that he converted from Islam to Christianity. This Hawaiian-born author of Dreams from My Father was chosen to give a keynote address at the 2004 Democratic National Convention that garnered him national attention. Identify this man who has the highest approval rating among US Senators, according to a July 2006 poll.

Answer: **Barack Hussein Obama, Jr.**

Bonus 20: Science (Biology)

What are the four nitrogenous bases in DNA? Well, that's a bit too easy. So answer each of the following questions with adenine, thymine, cytosine, or guanine. Each is used only once.

A: A pyrimidine, it is replaced by uracil in RNA.

B: The other pyrimidine, it was used in 1998 as one of the first quantum computers.

C: A purine, it is commonly phosphorylated (*FOSS-for-ill-a-tid*) to form the energy currency of cells.

D: The other purine, it is used in some cosmetics to provide luster.

Answers: A: **Thymine** B: **Cytosine** C: **Adenine** D: **Guanine**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Science (Physics) -- Computational (30 Seconds)**

A spaceship goes on a long journey traveling at 80% the speed of light. According to observers on Earth, the journey takes two years. Time is dilated for the passengers on the space ship, meaning that they age less than two years. According to the theory of special relativity, how long does the journey take for the people on the spaceship?

Answer: **6/5 years** (*prompt for units; accept 1.2*)

Bonus 21: Social Studies (World History)

The Nazi Concentration Camps used triangles usually pointing downwards for people's crimes. Given the type of triangle identify the persecuted group of people.

A: yellow

B: pink

C: a letter "P"

D: red

Answers: A: **Jews** B: **Homosexuals OR Gays** (*Do NOT accept lesbians*) C: **Polish people** (*accept: Poles*) D: **political prisoner OR political enemies OR communists OR POWs**

Tossup 22: Social Studies (World History)

Helen inspected it, calling out the names of Achaean (*uh-kay-un*) warriors in the voices of their respective wives; Menelaus helped to prevent the warriors from deserting. Built by Epeius and commanded by Odysseus, name this structure, wheeled into the gates of Ilium, from which 40 warriors emerged.

Answer: **Trojan horse**

Bonus 22: Science (Chemistry)

Give the chemical formulas for the following compounds.

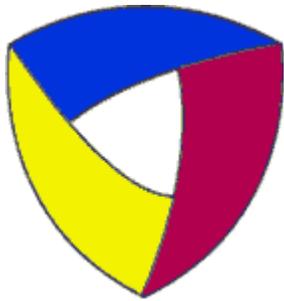
A: Ethene (*ETH-een*)

B: Propyne (*PRO-pine*)

C: Aluminum phosphate

D: Potassium iodide

Answers: A: **C₂H₄** B: **C₃H₄** C: **AlPO₄** D: **KI**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 7

Tossup 1: Social Studies (Current Events)

He had requested a nondenominational funeral, but he received a Muslim one. His body is now buried in London, but he wants his final resting place to be in Chechnya. He used to work for the Federal Security Service of the Russian Federation, but he resigned after claiming that his superiors had assassinated a citizen. Name this man recently killed by polonium poisoning.

Answer: **Alexander Valterovich Litvinenko**

Bonus 1: Literature (Literature)

You know 'Before and After' from Wheel of Fortune? Link the following sets of two items together to form one. For instance, if I said: "The author of The Jungle and the author of Babbit", you would take "Upton Sinclair" and "Sinclair Lewis" and combine them into "Upton Sinclair Lewis".

A: The most famous work of John Milton and a utopian work by James Hilton.

B: Chaucer's best known work and a work by Michener that was made into a musical.

C: A play that follows the Younger family; and a novel about Jake Barnes and Brett Ashley.

D: The work featuring the Houyhnhnms and the non-fiction novel about Steinbeck and his poodle.

Answers: A: **Paradise Lost Horizon** B: **The Canterbury Tales of the South Pacific** C: **A Raisin in the Sun Also Rises** D: **Gulliver's Travels with Charley**

Tossup 2: Math (Algebra) -- Computational (30 Seconds)

Find the sum of the period and the magnitude of the phase shift of the following periodic equation.

$Y = 3 \sin(2x - \pi/4) + 3$. Express your answer as an improper fraction. It may help you to know that both the period and the phase shift will have pi as a term.

Answer: **$9\pi/8$** (or $9/8 \pi$)

Bonus 2: Science (Chemistry)

Of the three electron orbitals given, name which one is filled first in a ground state atom, under the Aufbau rule.

A: 1s (one-ess), 2s, or 3s

B: 2p, 2s, or 3s

C: 3d, 4s, or 4p

D: 4p, 5s, or 4d

Answers: A: **1s** B: **2s** C: **4s** D: **4p**

Tossup 3: Miscellaneous (Sports)

In 1965, this team's nickname was changed to their current nickname, as the Colt Firearms Company objected to sales of souvenirs carrying the Colt name. That year was also the year they moved into the first domed stadium in Major League history, but it wasn't until the following year that they first introduced artificial turf. Name this baseball team that played in and lost its first World Series in 2005 to the Chicago White Sox.

Answer: **Houston Astros** (prompt on either half of the name)

Bonus 3: Social Studies (U.S. History)

Identify these people related to the 1912 Presidential election.

A: This incumbent lost his bid for the White House; he later served as Chief Justice.

B: This former President ran on the ticket of the Progressive party, which was nicknamed the Bull Moose party.

C: This Democrat won the election.

D: This man ran for the fourth time on Socialist party ticket.

Answers: A: **William Howard Taft** B: **Theodore "Teddy" Roosevelt** (prompt on Roosevelt) C: **Thomas Woodrow Wilson** D: **Eugene Victor Debs**

Tossup 4: Science (Physics)

Stress and strain are second-rank types of these, while elasticity is fourth-rank. In different cases, they are higher-degree analogs of scalars, vectors, or matrices. Scalar quantities are zeroth-rank types of these, and vectors first-rank. Name this type of multidimensional array that doesn't sound very relaxed.

Answer: **Tensor**

Bonus 4: Math (Other)

Calculate the following combinations or permutations.

A: 9 P 4

B: 5 C 0

C: 10 C 3

D: 9 P 9

Answers: A: **3024** B: **1** (*do not accept 0 or "does not exist"*) C: **120** D: **362880**

Tossup 5: Literature (Literature)

"Evidence," Reason," "Runaround," "Robby," and "The Evitable Conflict" are among the stories in this science-fiction short story collection. The stories were originally published separately and can be taken individually, but they do share recurring themes and characters, such as Powell and Donovan and Dr. Susan Calvin. In what seminal work of science-fiction did Isaac Asimov introduce his Three Laws?

Answer: **I, Robot**

Bonus 5: Fine Arts (Visual Art)

Identify the following architects, given a work or two.

A: The Guggenheim Museum in New York

B: The glass pyramid at the Louvre; The Rock and Roll Hall of Fame

C: The original building of the Milwaukee Art Museum; The Gateway Arch

D: The Guggenheim Museum in Bilbao, Spain

Answers: A: **Frank Lloyd Wright** B: **leoh Ming Pei** C: **Eero Saarinen** D: **Frank Owen Gehry** (*also accept Ephraim Owen Goldberg*)

Tossup 6: Math (Calculus) -- Computational (30 Seconds)

Find the limit as x approaches $5\pi/4$ of the function y equals $10 \sin x \cos 2x$. It may help you to know that $\cos 2x$ equals $1 - 2 \sin^2 x$.

Answer: **0** (*do not accept "the limit does not exist"*)

Bonus 6: Literature (Language Arts)

English has many calques, that is, phrases taken from direct translations of sayings from other languages. For example, "blue blood" is a calque from the Spanish "sangre azul" meaning the same thing. Given a phrase, name the language it came from.

A: Paper tiger

B: Moment of truth

C: Vicious circle

D: Overman

Answers: A: **Chinese** B: **Spanish** C: **Latin** D: **German**

Tossup 7: Social Studies (Geography)

The Cascade mountain range runs from north to south through this state. Peaks of the Cascades in this state include Mount Baker, Mount Adams, and Mount Rainier, and the High Cascades are volcanic. The Columbia River forms most of its border with its neighbor to the south. Identify this state, the 42nd admitted to the Union, which shares a border with British Columbia and whose capital is Olympia.

Answer: Washington

Bonus 7: Math (General)

Given the following set of numbers: 2, 3, 4, 5, 5, 7, 9, 9, and 10, answer the following regarding the set.

A: What is the arithmetic mean?

B: What is the median?

C: Describe the mode of the set.

D: What is or are the mode or modes?

Answers: A: 6 B: 5 C: Bimodal D: 5 and 9 (must have both, do not prompt on partial answer)

Tossup 8: Fine Arts (Music)

Originally growing out of the Italian overture form, these only began to take on their current form in the eighteenth century, when they were arranged in a fast-slow-fast fashion. A fourth section was later added, and this form soon established itself as a mainstay of the classical period. Name this musical form that often consists of four movements played by an orchestra, and whose most famous examples include the 106 of Haydn, 41 of Mozart, and nine of Beethoven.

Answer: Symphony

Bonus 8: Miscellaneous (Entertainment)

Identify the state in which each of the following television series are set.

A: Family Guy

B: Twin Peaks

C: Boy Meets World

D: Medium

Answers: A: Rhode Island B: Washington C: Pennsylvania D: Arizona

Tossup 9: Science (Biology)

P680 and P700 are responsive up to 680 and 700 nanometer wavelengths, respectively, though the "b" variety of P680 is most effective below 500 nanometers. The difference in absorbance spectra comes from their differing colors: "a" is green, but "b" is yellow-green. After absorbing light, they pass on excited electrons to their photosystems, which pass them to the electron transport chain. Name this molecule with a central magnesium atom, that absorbs light for plants to use in photosynthesis.

Answer: Chlorophyll

Bonus 9: Social Studies (Geography)

Name the capitals of the following countries. All the answers begin with the letter A.

A: Netherlands

B: Jordan

C: Ethiopia

D: Nigeria

Answers: A: Amsterdam B: Amman C: Addis Ababa D: Abuja

Tossup 10: Literature (Literature)

During a storm, he claims that the bay of Lisbon was created expressly for the Anabaptist Jacques to drown in. He is a teacher of metaphysico-theologico-cosmolo-nigology, and he suffers from a sexually transmitted disease, the curing of which loses him an eye and an ear. Name this philosopher and teacher of Candide.

Answer: **Dr. Pangloss**

Bonus 10: Science (Physics)

A 2-kilogram mass is dragged with a constant force of 10 Newtons, along a surface whose coefficient of sliding friction is .1. Use 10 meters per second squared as the acceleration of gravity, and ignore significant figures.

A: What is the force of friction on the mass?

B: What is the resultant force on the mass?

C: What is the acceleration of the mass?

D: Assuming the mass actually slides, what is the maximum possible coefficient of static friction of the surface?

Answers: (prompt for units) A: **2 Newtons** B: **8 Newtons** C: **4 meters per second squared** (or meters per second per second) D: **.5** (or 1/2; has no units)

HALFTIME

Tossup 11: Literature (Mythology)

Racine wrote a play about her and Samuel Barber wrote an orchestral song about her. Her son, Astyanax, was killed by Neoptolemus, which is ironic considering Neoptolemus's father killed her husband. Later, she married her deceased husband's brother, Helenus. Name this wife of Hector.

Answer: **Andromache**

Bonus 11: Math (Calculus)

Find the derivatives of the following functions at x equals 1. Express any fractional answers greater than one as improper fractions.

A: F of x equals $12x$ to the fifth power minus $11x$ plus 2.

B: F of x equals $2x$ plus $9e$ to the $3x$ power.

C: F of x equals 4 times the sine of $2\pi x$ over 3.

D: F of x equals $2x$ cosine of πx over 2.

Answers: A: **49** B: **2 plus 27 e cubed** (accept "to the third power" for "cubed") C: **Negative 4 pi over 3** D: **Negative pi**

Tossup 12: Science (Chemistry)

This standard set of conditions is used for experimental measurements. These conditions are held constant so that other factors such as volume or volumetric flow can be compared without any variables present. The definition of these conditions changed in 1997 when IUPAC changed one aspect from one atmosphere to one bar. Now, when these conditions are present, one mole of gas occupies 22.4 liters. What name refers to gas at 101 kiloPascals and 273 Kelvin?

Answer: **STP (Standard Temperature and Pressure)**

Bonus 12: Social Studies (World History)

Identify what in what current day country these battles were held in.

A: World War II; Battle of El-Alamein

B: Napoleonic Wars; Battle of Borodino

C: World War I; Ypres (*EE-pruh*)

D: War of the Spanish Succession; Battle of Blenheim

Answers: A: **Egypt** B: **Russia** C: **Belgium** D: **Germany** (*prompt on Bavaria*)

Tossup 13: Fine Arts (Visual Art)

The title suggests that this painting examines the relationship between the artist and his hometown. It is considered a surrealist work because of its dreamlike imagery, which include a goat being milked in the cheek of a sheep or horse and an upside down violinist. The images weave together Russian folk tales and Jewish proverbs, both central to the artist's identity. Identify this famous work of Marc Chagall.

Answer: **I and the Village**

Bonus 13: Science (Earth Science)

Name these hurricanes whose names have been retired.

A: In 2005, this hurricane killed about 2,000 people, and breached the levees around New Orleans causing flooding.

B: Although only Category 1, this 2005 hurricane caused mudslides in Central America killing up to 2,000 people.

C: The first hurricane of 1992, this became the last Category 5 hurricane to make landfall in the U.S. in the twentieth century.

D: A Category 4 hurricane, this was the sixth named hurricane of 1999, and the deadliest hurricane to reach the U.S. since 1972.

Answers: A: **Hurricane Katrina** B: **Hurricane Stan** C: **Hurricane Andrew** D: **Hurricane Floyd**

Tossup 14: Social Studies (U.S. History)

The Elastic Clause mentioned in the first article of the Constitution was used in this case, and affirmed the "implied powers" of the Supreme Court. The trouble started when state officials threatened to tax any banks that were not state chartered, of which the Second Bank of the United States was the only one. Name this 1819 Supreme Court case which declared a state could not tax a federal institution.

Answer: **McCulloch v. Maryland**

Bonus 14: Literature (Literature)

Name the authors of the following works that have something in common.

A: "An Occurrence at Owl Creek Bridge"

B: One Flew Over the Cuckoo's Nest

C: After Many a Summer Dies the Swan

D: The "Parliament of Fowls"

Answers: A: **Ambrose Bierce** B: **Ken Kesey** C: **Aldous Leonard Huxley** D: **Geoffrey Chaucer**

Tossup 15: Math (General)

If their argument is not a multiple of pi over two, then they cannot be referred to except by this name. That's equivalent to saying that they don't lie on either axis of an Argand diagram, because both axes represent subsets with special names. Because they lie on a plane instead of a line, they do not have an ordering, though their magnitude can be determined by the square root of the sum of the squares of the coordinates. Name this plane of numbers which can be written in the form $a + bi$, a set of numbers which includes the real and imaginary numbers.

Answer: **Complex numbers** (*do not accept real or imaginary numbers*)

Bonus 15: Miscellaneous (Sports)

Name the mascots of the following baseball teams.

A: Philadelphia Phillies. This green fuzzy creature with a long beak has been the mascot since 1978.

B: Montreal Expos. This orange giant was originally a Jim Henson creation. When the Expos moved to Washington, this mascot was adopted by the Montreal Canadiens.

C: New York Mets. This baseball-headed mascot was featured in a "This is Sportscenter" commercial, driving home with wife and sleeping child in tow.

D: Chicago Cubs. While he is not an official mascot, he considers himself the Troubadour of the Cubs. His skill basically consists of yelling "Woo! Cubs!" and the like.

Answers: A: **Philly Phanatic** B: **Youppi!** C: **Mr. Met** D: **Ronnie Woo Woo**

Tossup 16: Literature (Literature)

This poem's author wanted the title entity to have the old english spelling so that it would evoke more emotion. The title character of the poem is thought to represent the Industrial Revolution in England, which is reinforced by the lines "What the hammer? what the chain? In what furnace was thy brain?" Written in 1794, it is commonly compared to one of the author's earlier poems, The Lamb, which portrayed an idyllic pastoral scene. Name this poem that is contained within the collection 'Songs of Experience', by William Blake and is about an animal that is "Burning bright, In the forests of the night."

Answer: **The Tyger**

Bonus 16: Science (Biology)

Answer these questions related to everyone's favorite, the X chromosome.

A: Some men have more than one X chromosome, leading to this syndrome.

B: Some women, on the other hand, only have one X chromosome, leading to this syndrome.

C: In a process called Lyonization, all but one of the X chromosomes in every cell is deactivated and turned into one of these compact versions.

D: Nothing on the X chromosome determines femaleness. Rather, humans need one of these regions on a Y chromosome to make them male.

Answers: A: **Klinefelter syndrome** B: **Turner syndrome** C: **Barr body** D: **SRY gene** (accept sex-determining region Y)

Tossup 17: Miscellaneous (Other)

In economics, Giffen's states that increasing the price of certain products may cause consumers to purchase more of it. Many relate to infinity, such as Galileo's, or the speed of light, such as the twin. A logic one is named for Epimedes, who was told by a Cretan that "All Cretans are liars." Zeno's states that an object will never reach its destination. What is the term for a seemingly true statement that leads to a contradiction?

Answer: **Paradox**

Bonus 17: Social Studies (U.S. History)

Identify these facts related to John Brown.

A: Although he is famous for events that occurred in two other states, Brown was actually born in Torrington in this New England state.

B: In May of 1856, Brown led a group of abolitionists that killed five pro-slavery people at this Kansas location.

C: Brown and others captured an armoury at this Virginia town in 1859.

D: Brown was defeated by a unit led by this future Confederate general.

Answers: A: **Connecticut** B: **Pottawatomie Creek** C: **Harpers Ferry** D: **Robert Edward Lee**

Tossup 18: Science (Physics) -- Computational (30 Seconds)

Use 10 meters per second squared as acceleration due to gravity, and give an exact answer. What is the period of a pendulum with length of 40 centimeters?

Answer: **$2/5 \pi$ seconds** (prompt for units; accept $.6 \pi$, $2\pi/5$)

Bonus 18: Fine Arts (Music)

Name these nationalistic composers.

A: This Finnish composer of The Swan of Tuonela is more famous for his Finlandia.

B: This Bohemian composer showed the influence of folk music in such works as his Slavonic Dances, the opera Rusalka, and his famous nicknamed Ninth Symphony, which was supposedly influenced by American spirituals.

C: This Hungarian composer of Romanian Folk Dances is perhaps better known for Mikrokosmos and his opera, Duke Bluebeard's Castle.

D: This Norwegian composer is best known for his incidental music for Henrik Ibsen's play, Peer Gynt, which contains the famous piece, In the Hall of the Mountain King.

Answers: A: **Jean Sibelius** B: **Antonin Dvorak** C: **Bela Bartok** D: **Edvard Grieg**

Tossup 19: Math (Geometry) -- Computational (30 Seconds)

A right triangle's hypotenuse is divided into two segments of length 6 by the triangle's altitude to the hypotenuse, a line perpendicular to the hypotenuse that passes through the alternate vertex. You want to find the area of the entire triangle, which you realize must be isosceles. You can easily set up a system to solve for the leg and altitude, recognizing that two times the square of the leg must equal twelve squared, and that six squared plus the altitude squared equals the leg squared. Using this or any other method, what is the area of the entire triangle?

Answer: 36

Bonus 19: Literature (Literature)

Given the title of a work, identify the author of the source that the title is taken from.

A: Brave New World by Aldous Huxley

B: The Doors of Perception, also by Huxley

C: For Whom the Bell Tolls by Ernest Hemingway

D: Things Fall Apart by Chinua Achebe

Answers: A: **William Shakespeare** (from "The Tempest") B: **William Blake** (from "The Marriage of Heaven and Hell") C: **John Donne** (from "Meditation XVII") D: **William Butler Yeats** (from "The Second Coming")

Tossup 20: Social Studies (World History)

In this man's youth, he once ran away with a friend, only to be caught by his father, the king. Also during his youth he corresponded with Voltaire, which makes sense considering he was an enlightened monarch. He got into many wars during his reign, including the War of Austrian Succession, in which he got Silesia. Name this Prussian ruler, the son of Frederick William I.

Answer: **Frederick the Great** (prompt on Frederick; accept Frederick II)

Bonus 20: Math (Algebra)

Given the two-by-two matrix with top row 4, 7, and bottom row 1, 2, find the following.

A: Its determinant.

B: Its inverse matrix.

C: Its trace.

D: The matrix produced after performing Gauss-Jordan elimination on the original matrix.

Answers: A: 1 B: **Top row 2, -7, bottom row -1, 4** (accept equivalents) C: 6 D: **Top row 1, 0, bottom row 0, 1** (accept equivalents)

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Math (Geometry) -- Computational (30 Seconds)**

Find the area of a triangle that has two sides of length 12 units, and an angle of 60 degrees that is not between the two sides. It may help you to use the law of cosines, and that the cosine of 60 degrees is 0.5.

Answer: $36\sqrt{3}$ square units

Bonus 21: Math (Other)

Answer the following questions about drawers of socks.

A: A drawer has 4 red socks and 4 blue socks. How many ways can these socks be ordered in a line?

B: A drawer has 2 orange socks, 2 black socks, and 2 purple socks. What is the probability that the first two socks, drawn without replacement, will be the same color?

C: A drawer has 3 green socks, 3 mauve socks, 3 taupe socks, and 3 beige socks. What is the probability that four socks pulled with replacement will all be different colors?

D: A drawer has 10 white socks and an unknown number of yellow socks. If the probability of drawing 2 yellow socks with replacement is one-ninth, how many yellow socks are there?

Answers: A: 70 B: 1/5 or 0.2 C: 3/32 D: 5

Tossup 22: Literature (Mythology)

Bhaumasura (*BOW-ma-SOO-ra*) captured 16,000 wives for him, though his favorite woman was Radha, a gopi (*go-pee*). He spared the life of Kaliya, and to prevent a flood, lifted up a mountain with a single finger. Putana, Bakasura, and Aghasura were sent to kill him by Kamsa, but all failed. Name this Indian deity, the eighth avatar of Vishnu.

Answer: Krishna

Bonus 22: Social Studies (U.S. History)

Identify these facts related to the Wilmot Proviso.

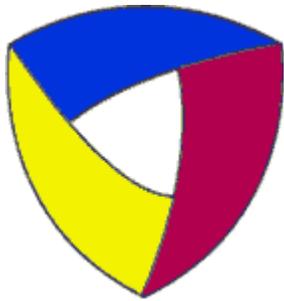
A: The proviso was proposed by David Wilmot, a congressman from this eastern state.

B: The proviso was proposed right after this war.

C: This man was President when the Proviso was proposed.

D: This party was created out of the discussion over the proviso.

Answers: A: Pennsylvania B: Mexican-American War (*do not accept Spanish-American War*) C: James Knox Polk D: Free Soil Party



Aegis Questions

NIC-9 Conference, 2006-2007

Round 8

Tossup 1: Literature (Literature)

His first play to be produced on Broadway, "The Man Who Had All The Luck," earned a Theater Guild National Award, but closed after only a handful of performances. Three years later, he earned his first commercial success and two Tony Awards in 1947 with a play revolving around Joe Keller, "All My Sons." His struggles with the House Un-American Activities Committee provided inspiration for one of his most famous works. Name this American playwright, famous for an allegorical play illustrating America's struggles with Communism, "The Crucible."

Answer: **Arthur Miller**

Bonus 1: Social Studies (Current Events)

Name the following 2006 Nobel Laureates based on their description.

A: The winner of the Nobel Prize in Literature was this Turkish author of The Black Book. He was retroactively accused of insulting the nation of Turkey by making remarks about the Armenian genocide.

B: This winner of the Nobel Peace Prize founded the Grameen Bank in 1976 to provide loans and microcredit to the poor classes of Bangladesh.

C: This man's work on eukaryotic transcription earned him the Nobel Prize for Chemistry, 47 years after his father earned the Nobel Prize for Medicine.

D: The winner of the Nobel Memorial Prize in Economics was this American, who earned the prize for work studying the short-run nature of unemployment.

Answers: A: **Orhan Pamuk** B: **Muhammad Yunus** C: **Roger Kornberg** D: **Edmund Phelps**

Tossup 2: Science (Physics)

There are two main varieties, ionization and photoelectric. The ionization type uses americium-241 to emit alpha particles, creating a current between two electrodes separated by the outside air. The photoelectric type uses an infrared beam, checking whether the outside air has particulates significantly scattering the beam from its normal path. Either way, they emit a loud sound when the air has abnormally many particles. Name this common household device that wakes you up if your house is on fire.

Answer: **Smoke detector** (*prompt fire alarm, related answers*)

Bonus 2: Math (Algebra)

Answer the following questions regarding series. Express all answers as decimals or fully reduced fractions.

A: What is the fifth term of the geometric series with ratio four-fifths and sum of 50?

B: What is the ratio of the infinite geometric series with first term 9 and sum 90?

C: What is the sum of the infinite series 4, 2, 1, and so on?

D: What is the sixth term of the geometric series with second term 3 and ratio of negative one-half?

Answers: A: **4.096** (*4 and 12/125*) B: **0.9** (*9/10*) C: **8** D: **0.1875** (*3/16*)

Tossup 3: Social Studies (U.S. History)

After serving as Governor of Maine for 4 years, this man became the president of his alma mater Bowdoin College from 1871 to 1883, during which time he taught every course in the curriculum except for mathematics. He is better known for his exploits during the Civil War, which included fighting in the battles of Antietam, Fredericksburg, and Chancellorsville, and presiding over the ceremony of the surrender and parole of the Confederate infantry at Appomattox Courthouse in 1865. He is best known for the defense of Little Round Top during the second day of the Battle of Gettysburg.

Answer: **Joshua Lawrence Chamberlain**

Bonus 3: Miscellaneous (Sports)

Name the following individuals who performed the following feats.

A: This member of the Boston Red Sox was the last player to win the batting Triple Crown. He did it in 1967 by batting .326, hitting 44 home runs, and batting in 121 runs.

B: In 2002, this Arizona Diamondback became the most recent to win the National League's pitching Triple Crown, by winning 24 games with an ERA of 2.32 and 334 strikeouts.

C: Roger Clemens won the American League pitching Triple Crown in his only two seasons with this team, 1997 and 1998. He was traded to the division rival New York Yankees in the 1998-99 offseason.

D: This racehorse was the last to win horse racing's Triple Crown. He won the Kentucky Derby, Preakness, and Belmont Stakes in 1978.

Answers: A: **Carl Yastrzemski** B: **Randy Johnson** C: **Toronto Blue Jays** (accept either half) D: **Affirmed**

Tossup 4: Math (Other) -- Computational (30 Seconds)

You are trying to figure out the probability of rolling a sum of seven on three six-sided dice. You know that to find this sum, you need to add together the probabilities of each possible combination that yields a seven, making sure to account for the orders in which each can occur. Knowing that there are four such combinations, and that three of them can occur in three ways, and the fourth can occur in six ways, what is the probability that you roll a sum of seven?

Answer: **5/72**

Bonus 4: Science (Chemistry)

Name these thermodynamic measures of energy in systems.

A: The first law of thermodynamics deals with when this measure of energy is conserved, and is the sum of all molecular kinetic energy and atomic potential energy.

B: This measure of energy is typically expressed as capital H, and includes the work that the system does on the atmosphere.

C: Typically represented capital G, chemical reactions that decrease this value give off energy, and are favored.

D: Usually represented capital A, for the German for "work," it represents the amount of useful work a system can perform with constant temperature and volume.

Answers: A: **Internal energy** B: **Enthalpy** (do not accept entropy) C: **Gibbs free energy** D: **Helmholtz free energy**

Tossup 5: Fine Arts (Visual Art)

The man at the center of this painting is kneeling with his hands over his head. The people around him are shielding their eyes from looking at him as the soldiers on the other side of the painting prepare to shoot the man. Name this example of romantic art, a painting by Spanish artist Francisco Goya.

Answer: **Execution of the rebels of the 3rd of May, 1808**

Bonus 5: Literature (Literature)

Given a line by John Keats, name the poem from which it is taken.

A: "Beauty is truth, truth beauty—that is all ye know on earth, and all ye need to know."

B: "Much have I travell'd in the realms of gold, and many goodly states and kingdoms seen."

C: "My heart aches, and a drowsy numbness pains my sense, as though of hemlock I had drunk."

D: "Where are the songs of Spring? Ay, where are they?"

Answers: A: **Ode on a Grecian Urn** B: **On First Looking Into Chapman's Homer** C: **Ode to a Nightingale** D: **To Autumn**

Tossup 6: Literature (Language Arts)

Give the first two words. Though using it is called greeking by typesetters, it is actually a modified version of the Latin text in a speech by Cicero called "On the Ends of Good and Evil." Said to approximate an English distribution of letters, name these words used in PowerPoint and other programs as nonsense filler text, followed by "dolor sit amet."

Answer: **Lorem ipsum**

Bonus 6: Math (Calculus)

Find the derivatives of the following functions. Simplify your answers so that none contain more than one trig function.

A: 12 sine squared of x.

B: Sine of x times cosine of x.

C: 8 times tangent of x.

D: Inverse sine of x.

Answers: A: **12 sine of 2x** B: **cosine of 2x** C: **8 secant squared of x** (accept 8 over cosine squared of x) D: **1 over the square root of 1 minus x squared**

Tossup 7: Math (Geometry) -- Computational (30 Seconds)

Find the total surface area of a cube with great diagonal length of 9 inches. It may help you to know that the great diagonal can be found by making it the hypotenuse of a right isosceles triangle where the other two sides are two face diagonals of the cube.

Answer: **162 square inches**

Bonus 7: Social Studies (U.S. History)

Identify these facts related to General John Pershing.

A: Pershing went by this nickname, which is also the name of a card game.

B: Pershing was in charge of this army unit during World War I.

C: Pershing led a failed search in Mexico for this man during the Mexican Revolution.

D: From 1906-1913, Pershing was a Brigadier General in this Pacific location.

Answers: A: **Black Jack** B: **American Expeditionary Force** (accept AEF) C: **Pancho Villa** (VEE-yuh; accept Doroteo Arango Arámbula or Francisco Villa) D: **Phillipines**

Tossup 8: Miscellaneous (Entertainment)

In his first appearance, this character was known as 'Chick'. Created by Bob Montana in 1941, he appears in what is widely considered one of the most absurd crossovers ever, when he met up with DC Comics' The Punisher. His best friend, Forsythe Pendleton Jones III, who not surprisingly detests his name, is almost a polar opposite of this girl-crazy teenager. Identify this character, the namesake of a comic book publisher, who, when we first meet him in Pep Comics #22, is already getting caught up the love triangle that he is known for, faced with a choice between Betty and Veronica.

Answer: **Archibald "Archie" Andrews**

Bonus 8: Fine Arts (Music)

Many composers wrote a Sixth Symphony.

A: This nickname of Beethoven's sixth symphony refers to its programmatic description of country life.

B: This nickname of Tchaikovsky's sixth symphony means "passionate" in Russian, not "pitiful" as it seems to suggest.

C: Philip Glass's sixth symphony is named after a poem by Allen Ginsburg, using this adjective that is also used in Poe's 'The Raven' to describe the shore.

D: Mahler's sixth symphony is given this adjectival nickname after the nature of its ending.

Answers: A: **Pastoral** B: **Pathétique** C: **Plutonian Ode** D: **Tragic**

Tossup 9: Social Studies (World History)

His life ended when he committed suicide in Utica. He led the conservative senatorial establishment in Rome, though never rising beyond the rank of praetor. His senatorial army was defeated by Caesar in North Africa. Name this senator admired by other senators as being incorruptable, though he is not as well known as his grandfather.

Answer: **Cato The Younger** (*prompt on Cato*)

Bonus 9: Science (Biology)

Name these terms relating to chromosomal disorders.

A: This term refers to the condition of having an abnormal number of chromosomes in a cell.

B: The most common type is having three of one chromosome instead of two, a condition referred to as this.

C: Having three of chromosome 21 results in a condition known as this, first described by its namesake doctor in 1866.

D: Having only one X chromosome is also fairly well-documented, called this after its 1940s discoverer.

Answers: A: **Aneuploidy** B: **Trisomy** C: **Down syndrome** D: **Turner syndrome**

Tossup 10: Science (Chemistry)

The thallium variety is often used in thermometers because its freezing point is lower than that of pure mercury. Though iron cannot form one, most other metals can. Because silver and gold can readily form them, they have been used in mining. The type with copper is still commonly used in dental fillings. Name this term that refers to any alloy of mercury.

Answer: **Amalgam**

Bonus 10: Literature (Literature)

Given a list of characters, name the work by Ernest Hemingway.

A: Brett Ashley, Jake Barnes

B: Catherine Barkley, Frederic Henry

C: Anselmo, Robert Jordan

D: Yogi Johnson, Scripps O'Neill

Answers: A: **The Sun Also Rises** B: **A Farewell To Arms** C: **For Whom the Bell Tolls** D: **The Torrents of Spring**

HALFTIME

Tossup 11: Math (Calculus) -- Computational (30 Seconds)

Find the slope of the function y equals 10 times the square root of the quantity 12 minus $4x$, close quantity, where x equals two. It may help to remind you that the chain rule is necessary in this situation.

Answer: **-10**

Bonus 11: Literature (Mythology)

Answer the following questions from The Odyssey of Homer...Simpson. Of course, all answers correlate to the epic of Odysseus' return from Troy.

A: Patty and Selma oddly represent these women, who almost lure the men to their deaths before they sail away in disgust.

B: This woman turns Homer's shipmates into pigs, which are then eaten by Homer. She informs Homer that he has eaten his friends, much to his horror. Of course, she then reveals that she'd been saying that for hours.

C: The song "Lady" plays in the background as Homer traverses this body of water on his return trip to Ithaca. Homer's response to the sight of skeletons rocking out is, "Oh, this truly is hell!"

D: Though he didn't make an appearance, Santa's Little Helper would have represented what faithful dog of Odysseus?

Answers: A: **The Sirens** B: **Circe** C: **The River Styx** D: **Argos**

Tossup 12: Social Studies (Geography)

Mud puppies and spotted turtles can be found in this American river that flows for over 80 miles. Swimming and fishing are not common activities in this body water because of its high pollution content, which isn't surprising given its location near a large New England city. Name this Massachusetts river that runs through Cambridge and Boston.

Answer: **Charles River**

Bonus 12: Science (Physics)

Identify these fundamental forces of the universe.

A: By far the weakest force, at sea level it exerts a force of 9.8 Newtons for each kilogram of mass.

B: This force was unified by Maxwell's four equations governing both aspects of it. Its force carrier is the photon.

C: This force, sometimes combined with the previous one, changes the flavor of quarks, as in beta decay. It is governed by the W and Z bosons, and gets its name from the fact that it is many times less powerful than another force.

D: Described by quantum chromodynamics, it is mediated by gluons. Its name suggests it is the most powerful force.

Answers: A: **Gravity** B: **Electromagnetic** (*do not accept electroweak*) C: **Weak nuclear force** (*do not accept electroweak*) D: **Strong nuclear force**

Tossup 13: Science (Astronomy)

It forms a very pronounced curve when plotted, because luminosity and spectral type depend only on mass. Also known as dwarf stars, stars on this band fuse hydrogen. Name this curve on the Hertzsprung-Russell diagram on which most stars are located.

Answer: **Main sequence**

Bonus 13: Fine Arts (Visual Art)

Identify the painters or sculptors of the following works.

A: Ecstasy of Saint Theresa

B: Venus of Urbino

C: Fountain

D: Oath of the Horatii

Answers: A: **Giovanni Lorenzo Bernini** B: **Titian** (also accept *Tiziano Vecelli* or *Vecellio*) C: **Marcel Duchamp** D: **Jacques-Louis David**

Tossup 14: Literature (Literature)

Give the full name. Thanks to reincarnation, he has killed Agrijag hundreds of times. Also, he learned to fly by heeding the words "Aim for the ground and miss." These are spectacular achievements by an exceedingly unspectacular individual, who just fell into incredible circumstances. He was introduced to the President of the Galaxy thanks to the Improbability Drive of the Heart of Gold and his friendship with Ford Prefect. What man, who had his house bulldozed by bureaucrats, was the protagonist of the Hitchhiker's Guide to the Galaxy series?

Answer: **Arthur Dent**

Bonus 14: Social Studies (U.S. History)

Given a description, identify the U.S. Secretary of Defense.

A: This Secretary under George W. Bush resigned in December of 2006.

B: This man, who served as Secretary of Defense from 1961-1968 under John F. Kennedy and Lyndon B. Johnson, was once president of Ford Motor Company.

C: This man was the very first Secretary of Defense. He served under Harry Truman.

D: This Secretary of Defense under Truman was more famous for a "plan" he made to halt the spread of communism.

Answers: A: **Donald Henry Rumsfeld** B: **Robert Strange McNamara** C: **James Vincent Forrestal** D: **George Catlett Marshall, Jr.**

Tossup 15: Miscellaneous (Interdisciplinary)

In 1995, a hurricane by this name hit Mexico and caused in the neighborhood of 1.5 billion dollars in damage. In that same year, 'A Goofy Movie' sees her as the dream date of Goofy's son, Max. Coming from the Persian, it is the usual westernized form of the name of Alexander the Great's wife who bore him a child six months after his death. She is loved by Christian de Neuvillette in Rostand's *Cyrano de Bergerac*. Daryl Hannah plays the title role in the 1987 Steve Martin film based on Rostand's work. Identify this girl's name, who "don't have to put on the red light" in a 1978 single from The Police.

Answer: **Roxanne** (also accept *Roxana*, though this really only applies to the Alexander clue)

Bonus 15: Math (Geometry)

Name the number of faces that the following solids have.

A: Tetrahedron

B: Icosahedron

C: Parallelepiped (*PAIR-a-LEL-ih-PIE-ped*)

D: Dodecahedron

Answers: A: **4** B: **20** C: **6** D: **12**

Tossup 16: Science (Biology)

Caused by a mutation on the fourth chromosome, it is autosomal dominant, unlike most genetic diseases. The mutation causes its namesake protein to have significantly more than the typical 40 glutamine residues, causing a buildup of the protein in the brain, particularly in the frontal lobe. Causing a degradation of motor and cognitive ability, the onset is typically around 40 years of age. Name this rare degenerative genetic disease named after the Ohio doctor who described it in 1872.

Answer: **Huntington('s) disease** (*accept Huntington's chorea*)

Bonus 16: Literature (Literature) -- Five Parts

Answer the following about Pulitzer Prize winning plays.

A: This play centers around the dysfunctional Tyrone family, including Mary, the mother of Edmund and a morphine addict.

B: All of the action in this play takes place on the Mayo family farm, and opens with Robert sitting atop a fence and reading.

C: At the end of this play, Nina and Darell are the only two who know who the real parents of Gordan Evans are.

D: The title character of this play is the daughter of a sailor, and her father is incensed when she falls in love with Mat.

E: All four of these plays were written by what author?

Answers: A: **Long Day's Journey into Night** B: **Beyond the Horizon** C: **Strange Interlude** D: **Anna Christie** E: **Eugene O'Neill**

Tossup 17: Social Studies (U.S. History)

Section 10 reserved Congress the right of eminent domain on any lands allotted by this act. Section 8 notes that it did not apply to the Five Civilized Tribes and several others. Section 1 allotted 160 acres of land to any Native American head of household. Name this 1887 act, named for a Massachusetts Senator, which allowed Americans to acquire land in the Indian Territory.

Answer: **Dawes Severalty Act or the General Allotment Act of 1887**

Bonus 17: Miscellaneous (Entertainment)

The Godfather movies were good, and some of its actors went on to star in other movies. Given a character, name the person who played him or her.

A: Don Vito Corleone

B: Sonny Corleone

C: Tom Hagen

D: Kay Adams

Answers: A: **Marlon Brando** B: **James Caan** C: **Robert Duvall** D: **Diane Keaton**

Tossup 18: Fine Arts (Music)

While its most famous accolade may actually belong to Jacopo Peri's Dafne, this is not usually accepted because Dafne has been lost. First performed in 1607, this work is considered the start of a genre of musical drama, a reference to the Ancient Greeks who would sing their plays. Name this work by Claudio Monteverdi that tells the Greek myth of Eurydice's death and her husband's attempt to return her to life, and is considered the first opera.

Answer: **Orfeo** (*or-fay-o; do not accept Orpheus*)

Bonus 18: Science (Chemistry)

Name these functional groups from organic chemistry.

A: With general formula ROH, it is found in all alcohols.

B: With general formula RSH, it has a sulfur atom replacing an oxygen in the alcohol group.

C: With general formula RNH₂, it is often found in the same molecule as an acid group.

D: With general formula RCOOH, it is found in organic acids.

Answers: A: **Hydroxyl** B: **Sulfhydryl** (*accept thiol*) C: **Amine** (*accept amino*) D: **Carboxyl(ic) acid**

Tossup 19: Literature (Literature)

When we first meet him, he is a twenty-one year old hay trusser, and after he dies, in his will he stipulates that no one remember his name. Eighteen years after an infamous incident at Weydon-Piers, he becomes a successful corn merchant in the titular locale, but reflects on the past and begins competing with Donald Farfrae. Name this title character of a novel by Thomas Hardy about a man who sells his wife and child to a sailor who later enters politics.

Answer: **Michael Henchard** (*accept "The Mayor of Casterbridge"*)

Bonus 19: Math (General)

Given two numbers in a Pythagorean triple, find the third. Remember, a Pythagorean triple consists of three integers, where one of their squares equals the sum of the other two squared.

A: 9 and 40.

B: 21 and 29.

C: 8 and 17.

D: 24 and 25.

Answers: A: **41** B: **20** C: **15** D: **7**

Tossup 20: Math (Algebra) -- Computational (30 Seconds)

Express your answer as a fully simplified fraction. The Cubs and Cardinals are set to play an exhibition 3 game series. It is assumed that the chance of the Cubs winning a single game against the Cardinals is 40 percent. What is the probability that the Cubs win the series by taking 2 of 3 games or by sweeping all 3?

Answer: **44/125**

Bonus 20: Social Studies (World History)

Identify these facts related to a November 5th, 1605 event.

A: English Roman Catholics were intending to blow up this governmental structure.

B: The assailants also intended to kill this then current monarch and members of his family.

C: The event became known as this plot.

D: November 5th is now named after this man, who was discovered on the night of November 4th.

Answers: A: **Parliament** B: **James I** (*prompt on James*) C: **Gunpowder Plot** D: **Guy Fawkes**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Math (Geometry) -- Computational (30 Seconds)**

Find the value of sine theta times cosine theta, where theta equals 15 degrees. It could help you to know that the sine of 15 degrees is root six minus root two, all over four. It would probably be faster, however, to realize that sine theta times cosine theta is one half of the sine of two theta.

Answer: 1/4

Bonus 21: Literature (Literature) -- Three Parts

Given the color, name the corresponding wizard in the Lord of the Rings trilogy.

A: Brown

B: Gray, and then later, white

C: White, and then later, many-colored

Answers: A: Radagast B: Gandalf C: Saruman

Tossup 22: Social Studies (U.S. History)

Its name means cottonwood trees in Spanish, and it was originally built to educate Native Americans. Its unsuccessful defense was led by William Travis, who died on March 6th, 1836 along with about 200 of his men. Name this fort attacked by the Republic of Mexico that is located in San Antonio.

Answer: The Alamo

Bonus 22: Science (Chemistry)

Give the number of equivalents in one mole of each of the following acids.

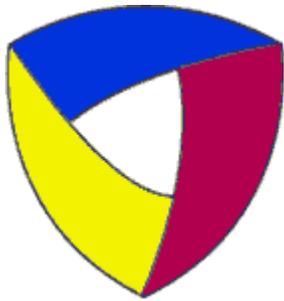
A: Sulfuric acid

B: Nitric acid

C: Propanoic (*PROH-puh-NOH-ick*) acid

D: Phosphoric acid

Answers: A: 2 B: 1 C: 1 D: 3



Aegis Questions

NIC-9 Conference, 2006-2007

Round 9

Tossup 1: Science (Biology)

Their phospholipids contain a different stereoisomer of glycerol, and they have ether-linked lipids rather than ester-linked ones. In addition, they have unusual introns and almost all lack peptidoglycan cell walls. Though classified in the kingdom Monera, they are now viewed as separate from other bacteria. Name this domain of living organisms that usually prefer extreme environments.

Answer: **Archaea** (accept *archaebacteria*)

Bonus 1: Social Studies (Current Events)

Identify these 2008 Presidential candidates.

A: This Illinois senator recently formed an exploratory committee.

B: If he were to win the election, this New Mexico governor would be the first Latino to win.

C: This Delaware senator was one of the first to announce his candidacy.

D: This former general, who ran in the 2004 Presidential race, has not yet declared his candidacy, though he is expected to.

Answers: A: **Barack Hussein Obama, Jr.** B: **William "Bill" Blaine Richardson Lopez** (prompt on Lopez) C: **Joseph "Joe" Robinette Biden, Jr.** D: **Wesley "Wes" Kanne Clark**

Tossup 2: Literature (Literature)

In the 1990's, he reached a deal to publish a book version of his final work, "Hapworth 16, 1924", but the ensuing publicity made him cancel the deal. In 1941, he started dating the daughter of Eugene O'Neill. During World War II he met Ernest Hemingway, who was then a war correspondent. By 1948, his published work in The New Yorker magazine launched him to fame, including the story "A Perfect Day For Bananafish" as well as other short stories revolving around the Glass Family. Name this reclusive author best known for the novel The Catcher in the Rye.

Answer: **Jerome David Salinger**

Bonus 2: Math (Geometry)

Find the areas of the following triangles.

A: A scalene triangle with sides of length five, six, and seven.

B: An isosceles triangle with sides of length five, five, and six.

C: A right triangle with side lengths of seven root five, fourteen, and seven.

D: An equilateral triangle with side length of four.

Answers: A: **6 root 6** B: **12** C: **49** D: **4 root 3**

Tossup 3: Social Studies (Geography)

It is located near Tortuga Island, and natives called it Quisqueya (*kees-KAY-yuh*). It's highest point is Duarte Peak, and the first European to spot it was Christopher Columbus in 1492, whose name for it translated to "The Spanish Island." Name this Caribbean island, formerly known as Santo Domingo, comprised of Haiti and the Dominican Republic.

Answer: **Hispaniola**

Bonus 3: Fine Arts (Music)

On February 1, 2007, composer Gian-Carlo Menotti died. Answer these questions related to Menotti.

A: He is perhaps most famous for writing this opera, the first opera written specifically for television.

B: That opera is about a young boy who sees these three figures pass him on their journey to visit a newborn baby.

C: He is also known for this opera about the title characters Miss Todd and a convict named Bob, the first opera ever composed specifically for radio.

D: This male composer of Adagio for Strings was Menotti's longtime partner.

Answers: A: **Amahl and the Night Visitors** B: **Three Wise Men** (accept *Magi, clear-knowledge equivalents*) C: **The Old Maid and the Thief** D: **Samuel Barber**

Tossup 4: Math (Other) -- Computational (30 Seconds)

Jack has ordered a miscast coin so that instead of having even odds of flipping heads or tails, heads should come up only 40% of the time. He's trying to figure out the probability that four consecutive flips will be heads. Knowing that 40% can be converted to the fraction two-fifths, Jack can use a simplified form of the binomial theorem to do the calculation. What is the probability that Jack's coin will flip heads four consecutive times?

Answer: 16/625

Bonus 4: Social Studies (U.S. History)

Identify these facts that occurred during the 18th century.

A: This editor of the New York Weekly Journal was brought up on libel charges for articles he written about Royal Governor William Cosby.

B: This "plan" to unite most of the colonies under one executive was put forth in 1754 by Benjamin Franklin.

C: These were made effective on December 15, 1791.

D: Five civilians, including Crispus Attucks, were killed in this March 5, 1770 altercation.

Answers: A: **Peter Zenger** B: **Albany Plan of Union** C: **Bill of Rights** (prompt on variants such as First 10 amendments) D: **Boston Massacre** (prompt on Massacre)

Tossup 5: Fine Arts (Visual Art)

The titular location is located in the Seine (*SENN*) between La Defense and the suburb of Neuilly. The titular time is actually many times, since the artist completed about sixty studies for the huge work. The painting is 81 by 120 inches, and it took the artist two years to complete. Identify this work which has in its foreground two dogs, a monkey, a man with a pipe and a woman with an umbrella, and which was painted by Georges Seurat.

Answer: Sunday Afternoon on the Island of La Grand Jatte (also accept *Un dimanche après-midi à l'Île de la Grande Jatte*)

Bonus 5: Miscellaneous (Interdisciplinary)

Answer these burning questions.

A: This MLS team plays for the Brimstone Cup every year against FC Dallas.

B: It is a low density, relatively low temperature plasma that appears commonly on ship masts, and is caused by the ionization of the air during thunderstorms. It is also the name of a 1985 Brat Pack movie.

C: Harry Truman, Menachem Begin (*BEGG-in*), and Pope Paul VI are all mentioned in this stream-of-consciousness song.

D: This London short story tells the tale of a man and his dog traveling through the Yukon.

Answers: A: **Chicago Fire** (prompt on either half) B: **St. Elmo's Fire** C: **We Didn't Start the Fire** D: **To Build a Fire**

Tossup 6: Social Studies (Other)

Some famous examples include the lady or the tiger, Gabriel's horn, the Chinese room, and the Ship of Theseus. Though they have long existed, the term was coined in German by Hans Christian Oersted in 1812, and refers to an invented scenario proposed to help further understanding. Name this type of experiment that is never performed, most famously used in physics, including the twin paradox, Newton's cannonball, and Schrödinger's cat.

Answer: Thought experiment

Bonus 6: Math (General)

Answer the following questions about different systems of numbers. All of your answers should be expressed in Roman numerals.

A: What is the square root of the binary number 110001?

B: What is the sum of the hexadecimal number A1 and the octal number 22?

C: What is the mean of the following set of base three numbers? 1, 201, 111, 1000?

D: What is the product of the base five numbers 34 and 104?

Answers: A: **VII** B: **CLXXIX** C: **XV** D: **DLI**

Tossup 7: Miscellaneous (Entertainment)

Upon entering his workplace, the protagonist is scolded by his colleagues for being late again, and is told to quickly put on his hazardous environment suit and get to the test lab. During the experiment, however, space-time is ripped apart by a resonance cascade, which causes Xen aliens to begin entering the partially-destroyed Black Mesa Research Facility. It is up to the protagonist to travel to Xen and destroy the dimensional portal, with the help of pistols, machine guns, and of course, a crowbar. Name this hit 1998 first-person shooter produced by Valve Studios, which stars Dr. Gordon Freeman.

Answer: **Half-Life 1** (*do not accept or prompt "Half-Life 2"*)

Bonus 7: Literature (Literature)

Answer the following about The Epic of Gilgamesh.

A: Gilgamesh is the ruler of this Babylonian city.

B: The companion of Gilgamesh, he interprets Gilgamesh's dreams and after his death, Gilgamesh weeps for seven days and seven nights.

C: Gilgamesh's mother, she accepts his companion like a son.

D: Gilgamesh and his companion fight and kill this guardian of the cedar forest in three blows.

Answers: A: **Uruk** B: **Enkidu** C: **Ninsun** D: **Humbaba**

Tossup 8: Math (Algebra) -- Computational (30 Seconds)

You have the quadratic, $x^2 + 3x - 10$. You want to find another quadratic with leading coefficient of one, whose roots are the reciprocals of the roots in the original quadratic. While you can do this by explicitly finding the original roots and then creating a new quadratic, it may be faster to use a trick with the polynomial's coefficients, remembering to divide by ten afterwards. Either way, find a quadratic whose roots are the reciprocals of the roots of $x^2 + 3x - 10$.

Answer: **$x^2 - .3x - .1$** (*or $x^2 - 3/10x - 1/10$*)

Bonus 8: Science (Physics)

Name these terms related to semiconductors.

A: Though pure silicon is an insulator, adding minute amounts of other substances makes it function as a semiconductor, a process called this.

B: Arsenic atoms have one more electron than silicon, so adding arsenic makes an abundance of electrons, creating this type of semiconductor.

C: Boron atoms, on the other hand, have one less electron, creating holes, and a semiconductor of this type.

D: Junctions between the two types of semiconductors can function as these, electrical switches that let current flow through in only one direction.

Answers: A: **Doping** B: **n-type semiconductor** C: **p-type semiconductor** D: **Diodes** (*prompt on p-n junction*)

Tossup 9: Literature (Language Arts)

It comes from the Greek word meaning grace or favor bestowed by the gods, and has always been considered a congenital trait, leading many in the Church to believe it a Divine gift. This is disconcerting because people who have possessed it include H.H. Holmes, Adolf Hitler, Fidel Castro, and Bill Clinton. Identify this eight letter word that refers to the magnetic personality a person can possess that inspires devotion.

Answer: **Charisma**

Bonus 9: Math (Algebra)

Identify the following about the equation $5x^2 + 10 = 4y^2$. Express all answers with decimals rather than fractions, and with fully simplified radicals.

A: What conic section does it describe?

B: What is the length of its major axis?

C: What is the length of its minor axis?

D: What is its eccentricity?

Answers: A: **Hyperbola** B: **$2\sqrt{2}$** C: **$2\sqrt{2.5}$** D: **$\sqrt{2.5}$**

Tossup 10: Science (Chemistry)

It is only .44 kilojoules per mole for hydrogen, but 300 kilojoules per mole for copper. More common values are 37.4 for methanol and 40.65 for water. Measured at the boiling point of a substance and corrected to 298 Kelvins, name this quantity from thermochemistry, a measurement of how much enthalpy a substance must gain to turn into a gas, the numerical opposite of the substance's heat of condensation.

Answer: **Heat of vaporization** (*accept standard enthalpy change of vaporization; accept "condensation" for "vaporization" before last clue*)

Bonus 10: Literature (Literature)

Identify the following Jonathan Swift works from a description.

A: In this work, Swift satirizes Catholicism, Protestantism, and the Church of England via three sons who alter coats inherited from their father.

B: In this work, Swift devises a plan to save Ireland from famine, while claiming not to stand to gain profit from it, for his youngest child is nine and his wife past child-bearing.

C: In this work, the main character becomes accustomed to the society of the Houyhnhnms (*WHIN-nms*) and begins to despise mankind and ends his days talking to horses.

D: This work takes place in the St. James library and is a satire of the conflict between whether the Ancient Greeks and Romans or the contemporary Europeans were the greater minds.

Answers: A: **A Tale of a Tub** B: **A Modest Proposal** C: **Gulliver's Travels or Travels into Several Remote Nations of the World in Four Parts by Lemuel Gulliver** D: **The Battle of the Books**

HALFTIME

Tossup 11: Literature (Mythology)

Every year on April 15th pregnant cows were sacrificed at a festival named Fordicia that was held for her. Taking at least partial responsibility for earthquakes and farmland, her Greek counterpart was Gaia. Name this Roman goddess whose full name, in Latin, means "Mother Earth."

Answer: **Terra Mater** (accept Tellus Mater)

Bonus 11: Miscellaneous (Interdisciplinary)

Answer these questions about the first Nobel Prizes.

A: The first winner of the Nobel Prize in Physics was this man, for the discovery of x-rays.

B: The first Nobel Peace Prize was awarded to two men, including this founder of the Red Cross.

C: The first Nobel Prize in Chemistry was awarded to this Dutch chemist, quote, "for his discovery of the laws of chemical dynamics and osmotic pressure in solutions."

D: Those and the other first Nobel Prizes were awarded in this year, five years after Alfred Nobel's death.

Answers: A: **Wilhelm Roentgen** B: **Jean Henri Dunant** C: **Jacobus Henricus van 't Hoff** D: **1901**

Tossup 12: Math (Calculus)

Legendre was responsible for the notation of this function, the capital version of the letter commonly used to represent the Euler-Mascheroni (*OIL-ur-MASH-ur-OWN-ee*) constant. When evaluated at n , it equals to the integral from 0 to infinity of t to the n minus one, times e to the negative t , dt . It equals the square root of pi at $1/2$, 1 at 1, and 120 at 6. Name this function, an extension of factorials to all real and complex numbers with positive real part, symbolized by the third letter in the Greek alphabet.

Answer: **Gamma function** (do not accept factorial)

Bonus 12: Science (Chemistry)

Name these intermolecular forces.

A: Named after a German physicist and not a town, these are caused by electron clouds forming temporary multipoles.

B: Stronger are these interactions, between permanent regions of slight positive or negative charge.

C: Even stronger are these bonds, formed when the namesake atom is bonded to a very electronegative atom, giving this atom a slight positive charge.

D: The weakest two of these forces are generally lumped together into this one term, a class of intermolecular forces named after a Dutch chemist.

Answers: A: **London dispersion forces** B: **Dipole-dipole interactions** (accept *Keesom interactions*) C: **Hydrogen bonds** D: **Van der Waals forces**

Tossup 13: Miscellaneous (Other)

In the year 0 by Argivian Reckoning, the brothers Mishra and Urza were born. Finding the Mightstone and Weakstone at the Caves of Koilos, the brothers became powerful leaders, but after discovering his brother had been corrupted by Phyrexians, Urza declared war on Mishra, annihilating both armies of the Brothers' War with a sylex blast that started the Ice Age and turned Urza into a Planeswalker. Urza immediately began planning for the Phyrexian invasion by building a flying ship, the Weatherlight, and trying to organize a worldwide alliance. The Phyrexians attempt a planeshift to merge Rath onto Dominaria, but Urza and Gerrard Capashen save Dominaria by sacrificing themselves during the Apocalypse, in the early storyline of what popular trading-card game by Wizards of the Coast?

Answer: **Magic: The Gathering**

Bonus 13: Fine Arts (Visual Art)

Answer the following questions about Flemish painter Jan Van Eyck.

A: This brother of Van Eyck's helped him with many works.

B: Van Eyck's most famous work was this 1434 piece depicting a marriage. His own reflection is in the mirror in the painting.

C: Van Eyck was helped by his brother with this work, which features 12 panels in rows, and could be folded to show different pictures.

D: Van Eyck was once a court painter at this Dutch city.

Answers: A: **Hubert Van Eyck** (prompt on Van Eyck) B: **Arnolfini Wedding** (accept reasonable alternatives including Arnolfini) C: **The Ghent Altarpiece** (accept Adoration of the Mystic Lamb, The Lamb of God, or Het Lam Gods) D: **The Hague**

Tossup 14: Science (Biology)

The organism must be found in all diseased animals but no healthy animals. It must be isolated from a diseased animal and grown in pure culture. That culture should cause disease when exposed to healthy animal. The organism must then be found in the experimentally infected animal. Give the collective name for these postulates named after the discoverer of the anthrax and tuberculosis bacteria, postulates that establish a link between a disease-causing organism and a disease.

Answer: **(Henle-)Koch('s) postulates**

Bonus 14: Social Studies (World History)

Identify these facts related to the Congress of Vienna.

A: The Congress was set up to reorganize Europe after this man fell from power. He returned from Elba during the conference.

B: This Austrian diplomat headed the proceedings.

C: This man was the first British representative.

D: This nobleman, who went through the French Revolution virtually unscathed, was the French representative at the conference.

Answers: A: **Napoleon Bonaparte** (accept Bonaparte) B: **Prince Klemens Wenzel von Metternich** C: **Viscount Castlereagh** (accept Robert Stewart) D: **Charles Maurice de Talleyrand-Périgord, Prince de Benevente**

Tossup 15: Fine Arts (Music)

Its main strings are typically tuned to major or minor triads on C sharp or D, and it is used in songs like "Paint it, Black" and "Tomorrow Never Knows." Despite the fact that its name is derived from the Persian words for "three strings," it usually has eighteen to twenty strings, and is played with a pick-like tool called a mezbab. Name this Asian instrument which first reached Western consciousness through The Beatles' exposure to it from player Ravi Shankar.

Answer: **Sitar**

Bonus 15: Science (Chemistry)

Given a chemical symbol, name the element. (Spell out symbols.)

A: Pb

B: W

C: Md

D: Bh

Answers: A: **Lead** B: **Tungsten** C: **Mendelevium** D: **Bohrium**

Tossup 16: Social Studies (U.S. History)

This Ohio native, born in 1826, began his career in the newspaper business. In 1866 he was appointed to the U.S. Senate representing Kansas, but lost his re-election campaign in 1870. From 1885 to 1889, he served as governor of the New Mexico Territory. He was one of 8 U.S. Senators featured in John F. Kennedy's Profiles in Courage for his most famous action - casting the deciding vote of acquittal in President Andrew Johnson's impeachment trial.

Answer: **Edmund G. Ross**

Bonus 16: Math (Calculus)

Find the derivatives of the following functions.

A: $7x^3 - 17x^2 + 8x - 10$.

B: The quantity $3x - 5$, close quantity, divided by the quantity $7x + 1$, close quantity. Leave your answer factored.

C: The quantity $3x + 1$, close quantity, times the quantity $11x + 2$, close quantity.

D: $4e^{\cos^2 x}$. Do not simplify your answer with a double angle formula.

Answers: A: **$21x^2 - 34x + 8$** B: **$\frac{38}{7x + 1}$** C: **$(3x + 1)(11x + 2)$** D: **$-8 \sin x \cos x e^{\cos^2 x}$**

Tossup 17: Science (Chemistry)

Discovered in 1905 by Albert Einhorn, it has a half-life in the body of about one minute. A sizable percentage of the population experiences adverse effects because they are unable to correctly metabolize it. Along with its short duration and the later discovery of better local anesthetics, it is not commonly used today, though to most people, its name remains synonymous with visits to a particular type of doctor. Name this drug commonly associated with dental anesthesia, whose name comes from the fact that it is a "newer" replacement for cocaine.

Answer: **Novocain** (*accept procaine*)

Bonus 17: Literature (Language Arts)

Identify these constructed languages.

A: The most widely-used constructed language, it was created in 1887 by Dr. Zamenhof as a neutral international language.

B: With a name short for "language for all," in 1907 it branched off from the first international language, in an attempt to make reforms.

C: Designed by Marc Okrand to sound alien, it does just that. It is understandable because it is the language of an alien race in Star Trek.

D: Created by Charles Ogden as an easy version of English, it has only 850 core words, and extremely simplified grammar.

Answers: A: **Esperanto** B: **Ido** C: **Klingon(ese)** D: **Basic English**

Tossup 18: Math (Calculus) -- Computational (30 Seconds)

Find the derivative of the function $f(x) = \frac{x - 1}{x + 1}$. It may help you to know that the degree of the numerator will reduce from one to zero.

Answer: **$\frac{2}{(x + 1)^2}$**

Bonus 18: Social Studies (World History)

Identify these facts related to the French Revolution.

A: King Louis XVI called together this body to help deal with the mounting crisis. It had not convened since 1614.

B: The Third Estate was upset at being at a disadvantage at the answer to Part A, so they convened a meeting known as this.

C: This is the term for the period of the revolution that saw tens of thousands of people guillotined.

D: This director of the Committee of Public Safety was eventually guillotined himself.

Answers: A: **Estates General** B: **Tennis Court Oath** C: **Reign of Terror** (*prompt on radical phase*)

D: **Maximilien de Robespierre** (*accept Maximilien-François-Marie -Isidore de Robespierre*)

Tossup 19: Literature (Literature)

The first victim of the titular entity was Monsieur Michel, the concierge of Doctor Rieux's hotel. As its victims grew more numerous, the town of Oran was quarantined, to prevent its spreading to other towns. Despite the danger, some people, like the journalist Rambert, attempt to escape the town to be reunited with their friends and family. Others, like Tarrou, decide there is nothing to do but fight against it, and form sanitary crews to help the doctors contain its spread. Name this novel by Albert Camus (*kah-MOO*) about a deadly flea-borne epidemic in 1940s Algeria.

Answer: **The Plague**

Bonus 19: Science (Astronomy)

Given the name of a moon in the solar system, name the object which it orbits.

A: Callisto

B: Proteus

C: Phoebe

D: Dysnomia, formerly known as Gabrielle

Answers: A: **Jupiter** B: **Neptune** C: **Saturn** D: **Eris** (*accept 2003 UB313; prompt Xena*)

Tossup 20: Social Studies (Current Events)

The first round took place from August 27th to August 29th, 2003, the second round, February 25th to February 28th, 2004, the third, June 23rd to June 25th, 2004, with subsequent rounds taking place in multiple phases over the next three years. Involving Russia, China, Japan, The US, South Korea and North Korea, the fifth round of them stalled for over a year. In that time frame, North Korea managed a successful nuclear test. Identify these meetings, which are a result of North Korea's 2003 withdrawal from the Nuclear Non-Proliferation Treaty.

Answer: **Six-party talks**

Bonus 20: Literature (Literature)

Given the author and subtitle of a popular and kind of recent work of nonfiction, give the title.

A: Steven D. Levitt and Stephen J. Dubner; A Rogue Economist Explores the Hidden Side of Everything

B: Jared Diamond; The Fates of Human Societies

C: Thomas L. Friedman; A Brief History of the Twenty-first Century

D: Malcolm Gladwell; How Little Things Make a Big Difference

Answers: A: **Freakonomics** B: **Guns, Germs, and Steel** C: **The World is Flat** D: **The Tipping Point**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Math (Other) -- Computational (30 Seconds)**

Give your answer as a fully reduced fraction. A dartboard has total radius of 1 foot and bullseye radius of 1 inch. Given that all points on the board are equally probable to be hit, what is the probability that a dart that hits the dartboard hits the bullseye?

Answer: 1/144 (Do not accept any answers including units or pi)

Bonus 21: Literature (Literature)

Name these short stories by O. Henry.

A: In this story, Della sells her hair to buy a watch fob for Jim, and Jim sells his watch to buy Della combs.

B: In this story, Sam and Bill kidnap the rich Ebenezer Dorset's son, hoping to collect a large ransom.

C: In this story, a parody of Sherlock Holmes, a man named Whatsup follows the titular New York detective as he makes astute observations.

D: In this story, safe-cracker Jimmy Valentine tries to lead a straight life, but is tempted back to his old ways.

Answers: A: The Gift of the Magi B: The Ransom of Red Chief C: The Adventures of Shamrock Jones D: A Retrieved Reformation

Tossup 22: Literature (Literature)

Sarah Williams; George Peters; a member of a smallpox-ridden family; an orphaned owner of a slave; Adolphus, the servant of Harvey and William Wilks; and then a friend of his. These names and situations are assumed by what literary character, who is only really himself when he is rafting down the Mississippi River?

Answer: Huckleberry Finn (accept The Adventures of Huckleberry Finn before "character")

Bonus 22: Social Studies (Geography)

Given a country, name its largest city.

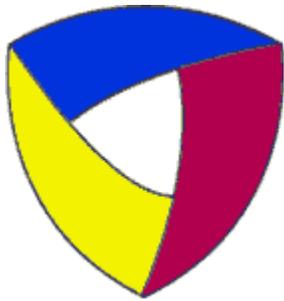
A: Brazil

B: India

C: Scotland

D: United Arab Emirates

Answers: A: Sao Paulo B: Mumbai C: Glasgow D: Dubai



Aegis Questions

NIC-9 Conference, 2006-2007

Round 10

Tossup 1: Science (Biology)

Called "adaptor molecules" by Francis Crick, they are usually about 80 nucleotides long. One end has an anticodon region, and the other end attaches to an amino acid. Name this molecule that helps ribosomes during translation, one of the types of RNA.

Answer: **tRNA** (accept *transfer RNA*)

Bonus 1: Social Studies (Geography)

Name the state in which each of these tourist attractions can be found.

A: Painted Desert

B: Carlsbad Caverns

C: Rock and Roll Hall of Fame

D: Graceland

Answers: A: **Arizona** B: **New Mexico** C: **Ohio** D: **Tennessee**

Tossup 2: Literature (Literature)

She had a relationship with a literary critic and married man, George Henry Lewes. In publishing an essay entitled "Silly Novels by Lady Novelists" in the Westminster Review, she adopted a pseudonym in order to keep her private matters from public scrutiny. Her first novel, published in 1859, aroused public interest in who this new author was. Eventually she was forced to own up to her authorship of Adam Bede due to pretenders claiming the work to be theirs. Identify this pen name of Mary Anne Evans, who was the author of *The Mill on the Floss*, *Middlemarch* and *Silas Marner*.

Answer: **George Eliot** (accept *Mary Anne Evans* before it is mentioned)

Bonus 2: Math (Geometry)

Find the volumes of the following shapes.

A: A regular hexagonal pyramid with base sides of length 1, and perpendicular height of 5.

B: A cube with great diagonal of $12\sqrt{3}$.

C: An ellipsoid with semi-axes of 5, 7, and 9.

D: A cylinder with height 10 and lateral surface area of 60π .

Answers: A: **$5\sqrt{3}/2$** B: **1728** C: **420π** D: **90π**

Tossup 3: Social Studies (U.S. History)

Born in Boston to a prominent abolitionist family, this man served for two years with the second Massachusetts infantry as first lieutenant and was later promoted to captain. In 1863 he was promoted to Major and then Colonel and was chosen by the governor of Massachusetts to command one of the first regiments of black troops for the Union. His story, and that of the 54th Massachusetts regiment was portrayed in the 1989 movie *Glory*, where his role was played by Matthew Broderick.

Answer: **Robert Gould Shaw**

Bonus 3: Fine Arts (Music)

Identify the following musical works that have something in common.

A: The finale of this fourteen-movement suite by Camille Saint-Saëns was featured in *Fantasia 2000*.

B: This 1936 composition by Sergei Prokofiev tells a children's story with a narrator and orchestra, representing the titular boy with a string theme.

C: This ballet by Pyotr Ilyich Tchaikovsky features Prince Siegfried and his attempt to marry the charmed Odette.

D: This opera by Puccini is about a Japanese geisha girl who marries an American naval lieutenant, only to kill herself after he leaves her.

Answers: A: **Carnival of the Animals** B: **Peter and the Wolf** C: **Swan Lake** D: **Madama Butterfly**

Tossup 4: Math (Algebra) -- Computational (30 Seconds)

Express your answer in base ten. What is the sum of the two base three numbers 1 0 1 1, and 1 2 0 1? It may be faster to add these two numbers in base three before converting their sum, instead of converting each one first.

Answer: 77

Bonus 4: Social Studies (Other) -- Five Parts

Expand the following military acronyms, abbreviations and initializations.

A: DMZ

B: AWOL

C: IED

D: ROTC

E: MRE

Answers: A: Demilitarized Zone B: Absent Without Leave C: Improvised Explosive Device D: Reserve Officers' Training Corp E: Meal, Ready-to-Eat

Tossup 5: Fine Arts (Visual Art)

This same title is shared by two paintings by the same artist. Taking place in an ancient Greek utopia, it depicts a group of shepherds standing around a tomb with the titular Latin inscription, perhaps reminding the viewer that death is present even in paradise. Name this painting by Nicolas Poussin, a sobering memento mori.

Answer: Et in Arcadia ego (accept *The Arcadian Shepherds* or *I am also in Arcadia, and close equivalents*)

Bonus 5: Miscellaneous (Entertainment)

Given a song by Weird Al Yankovic, identify the artist or band whose song is being parodied. For example, for "Like a Surgeon", you'd answer "Madonna."

A: Internet Sandman

B: Trapped in the Drive Thru

C: The Saga Begins

D: White and Nerdy

Answers: A: Metallica B: R. Kelly C: Don McLean D: Chamillionaire

Tossup 6: Social Studies (World History)

In 1987 it was made a UNESCO World Heritage Site. A charity run alongside it reported that it was clearly discernible and only moderately eroded along 22% of the run; usually discernible but frequently broken or eroded 41% of the run, and scarcely discernible and almost totally eroded 37% of the run. Its visibility from space is a highly contested fact. Identify this structure that was not constructed as a single endeavor, but was built over nearly two millenia and was overseen by many different dynasties.

Answer: Great Wall of China

Bonus 6: Math (Other)

Answer the following questions involving a hat with 3 red balls, 4 yellow balls, and 5 green balls. Simplify all fractions.

A: What is the probability of pulling a green ball, then a red ball, with replacement?

B: What is the probability of pulling a green ball, then a red ball, without replacement?

C: What is the probability of pulling a green ball, then a red ball, when you replace each pull with a red ball?

D: What is the probability of pulling five green balls without replacement?

Answers: A: 5/48 B: 5/44 C: 5/36 D: 1/792

Tossup 7: Miscellaneous (Sports)

In September 2006, Mitch Cozad, a backup player at this position for Northern Colorado University, ambushed the starting player at the position and stabbed him in the right leg. In 2003, Jacksonville Jaguars coach Jack Del Rio used an axe and a tree stump as a motivational tool; it ended badly when Chris Hanson, the Jaguars' starter at this position, cut himself in the leg while chopping at the stump. Notable players of this position include Sean Landeta, Shane Lechler (*lek-ler*) and Todd Sauerbrun. Identify this football position, used almost exclusively on fourth down, that tries to force the opponent into bad field position by dropkicking the ball away.

Answer: **Punter**

Bonus 7: Literature (Literature)

Authors commonly name their novels after the primary character, but often leave out the first name. Given a title, give the title character's first name.

A: Dr. Zhivago

B: Mrs. Dalloway

C: Herzog

D: Madame Bovary

Answers: A: **Yury Andreyevich** B: **Clarissa** C: **Moses** D: **Emma**

Tossup 8: Math (Calculus) -- Computational (30 Seconds)

Find the absolute value of the difference between the values of y and y prime of the function y equals $8x$ squared minus $15x$ plus 1 , at the value x equals 3 .

Answer: **5** (*do not accept negative 5*)

Bonus 8: Science (Astronomy)

Given the names of two moons, identify the planet they orbit.

A: Cordelia and Miranda

B: Nereid and Proteus

C: Janus and Rhea

D: Ganymede and Leda

Answers: A: **Uranus** B: **Neptune** C: **Saturn** D: **Jupiter**

Tossup 9: Literature (Literature)

This author's first novel was *The Mysterious Affair at Styles*, which introduced her most famous character. Another famous character, an old woman, was first seen in *Murder at the Vicarage*. Her most famous play is *The Mousetrap*, though she is more famous for novels such as *And Then There Were None*. Name this British author who created Miss Jane Marple and Hercule Poirot.

Answer: **Dame Agatha Christie**

Bonus 9: Math (Algebra)

If set A contains the numbers 1, 2, 3, 5, 8, and 10, and set B contains the numbers 2, 4, 6, 7, 8, and 9, find the following.

A: The cardinality of A.

B: The cardinality of the power set of A.

C: The set A intersection B.

D: If A union B represents the universal set, then find the complement of A.

Answers: A: **6** B: **64** C: **2, 8** (*in either order*) D: **4, 6, 7, 9** (*in any order*)

Tossup 10: Science (Physics)

The dynamic type is measured in "Pascal-seconds," and the kinematic type in "stokes." If a substance is Newtonian, like most fluids, the velocity and shear stress are related linearly by its coefficient. The higher it is, more stress is needed to produce a velocity. Name this property of fluids that makes some thick and hard to pour.

Answer: **Viscosity**

Bonus 10: Literature (Literature)

Answer the following questions about the novel The Catcher in the Rye.

A: Name the main character. Give first and last name.

B: Name that character's younger brother who died in 1946.

C: Name the city used as the main setting.

D: Name the Scottish folk song that inspired the title

Answers: A: **Holden Caulfield** B: **Allie Caulfield** C: **New York, New York** D: **Comin' through the Rye**

HALFTIME

Tossup 11: Literature (Mythology)

He revealed his true glory to Semele, who, as a result, was burned to a crisp. He then kept her unborn baby, which was his son, in his thigh until it was born. This is not the only strange childbearing moment in which he partook. One of his mistresses lay eggs out of which came Helen of Troy— among others, and another gave birth out of his head after he ate her. Identify this father of Perseus, Dionysus, and Athena.

Answer: **Zeus** (accept *Jupiter*)

Bonus 11: Miscellaneous (Sports)

Name the following Most Valuable Players of the four major sports leagues from 2005.

A: This NFL MVP broke Priest Holmes' record for touchdowns in a season with 27 rushing and 1 receiving touchdown, and has become the latest victim of the Madden Curse.

B: In the NBA, this Canadian has won two consecutive MVP awards with the Phoenix Suns since leaving the Dallas Mavericks in 2004.

C: Major League Baseball awards 2 MVP awards, one to each league. Name the winner from the National League in 2005, who beat out Barry Bonds and carried his team to the NLCS before falling to Houston.

D: In 2005, the NHL MVP was this center, who was traded from Boston to San Jose in midseason, marking the only time an MVP has been traded in the middle of his MVP season in any of the four major leagues.

Answers: A: **Shaun Alexander** B: **Steve Nash** C: **Albert Pujols** (*pronounced POO-holes*) D: **Joe Thornton**

Tossup 12: Math (General)

Quaternion multiplication is not, but complex multiplication is. Exponentiation and tetration are not, but intersection and union are. Groups that are, are called abelian (*uh-BEE-lee-un*). In rings, addition functions always are, though multiplication doesn't have to be. Name this fundamental property of binary operations that means that $A + B$ always equals $B + A$.

Answer: **Commutative**

Bonus 12: Science (Biology)

Name the animal phylum into which each of these animals is classified.

A: Sponges

B: Roundworms

C: Insects

D: Humans

Answers: A: **Porifera** (accept *sponges*) B: **Nematoda** (accept *nematodes*) C: **Arthropoda** (accept *arthropods*) D: **Chordata** (accept *chordates*)

Tossup 13: Miscellaneous (Other)

This company's logo has been said to feature potential subliminal advertising via an arrow formed by the white space between the last two letters of the name. Founded by Fred Smith in 1971, it began transporting cargo via jet airliners in 1973 and changed its name to the common five letter abbreviation in 2000. Name this company that bought Kinko's in 2004 and was featured in the 2000 Tom Hanks film, *Cast Away*.

Answer: **FedEx** or **Federal Express**

Bonus 13: Fine Arts (Visual Art)

Identify the following works by Frank Lloyd Wright.

A: This proposed structure that was one mile high was viewed as a semi-serious alternative to urban sprawl.

B: Although it survived a magnitude 7.9 earthquake in 1923, time took its toll on this building, and in 1976 the facade and pool of this Japanese building were moved to a museum while the rest was demolished.

C: Wright's personal home was this studio in Spring Green, Wisconsin.

D: Arguably the most famous work by Wright was this Pennsylvania residence of Edgar J. Kaufmann.

Answers: A: **The Illinois or Mile High Illinois or Illinois Sky-City** B: **The Imperial Hotel, Tokyo** C: **Taliesin 1, 2, and/or 3** D: **Fallingwater**

Tossup 14: Science (Astronomy)

Occurring over the Chandrasekhar limit, their fusion reactions are the main source for elements heavier than oxygen, even sometimes producing plutonium. If they contain hydrogen spectra, they are Type II, and if not, they are classified as Type I. Name these very large and hot stellar explosions whose name sounds more exciting than surface explosions on white dwarfs.

Answer: **Supernova** (*do not accept or prompt nova*)

Bonus 14: Social Studies (World History)

Poor Scandinavia, everyone always forgets about it. Identify the Scandinavian ruler given a description.

A: This current president of Finland is the first female president of that country.

B: This ruler of Sweden from 1632-1654 traveled to Rome and is buried in St. Peter's Basilica.

C: This king led Sweden through part of the 30 years war and died at the Battle of Lutzen. He is the father of the answer to Part B.

D: This Danish king is famous for wearing the Star of David during the occupation by the Nazis.

Answers: A: **Tarja Kaarina Halonen** B: **Christina** (*accept Maria Christina Alexandra or Count Dohna*) C: **Gustavus Adolphus** (*accept Gustav II Adolf, Gustavus II Adolphus, or Gustaf Adolf the Great*) D: **Christian X** (*prompt on Christian*)

Tossup 15: Fine Arts (Music)

As this opera begins, three Norns weave the rope of Destiny, and leave after their rope breaks. Siegfried and Brünnhilde depart from each other, but only after Siegfried gives her the ring. That ring ends up causing a lot of trouble, as Siegfried is eventually murdered by Hagen in an attempt to get it. In the end, Valhalla burns, and the flames eventually cover up even the gods. Name this opera by Richard Wagner, the last opera in his Ring Cycle, whose one-word title means "The Twilight of the Gods."

Answer: **Die Götterdämmerung** (*accept "The Twilight of the Gods" before mentioned*)

Bonus 15: Science (Chemistry)

Identify these various chemicals given a brief description.

A: Also known as carb-amide or di-amino-methanal, this organic compound is one way that organisms excrete nitrogen, and was the first organic compound to be synthesized.

B: Also known as magnesium silicate, this mineral is 1 on Mohs' scale of hardness.

C: Once called oil of vitriol, this strong acid is manufactured using the contact process.

D: Also known as methyl-benzene, when three nitro- groups are added to this liquid, it becomes a powerful explosive.

Answers: A: **Urea** B: **Talc** C: **Sulfuric acid** D: **Toluene**

Tossup 16: Social Studies (Current Events)

In some countries it is also known as Pancake Day, and in any given year it can fall between February 3 and March 9. Though it is more famously connected with another city Mazatlan and St. Louis, among many others, also celebrate on this day. Identify this last day of Carnival (*car-nee-VAHL*), the day immediately preceding Ash Wednesday, which is also known as Fat Tuesday.

Answer: **Mardi Gras** (*prompt on Fat Tuesday or Shrove Tuesday*)

Bonus 16: Math (Calculus)

Find the derivatives of the following functions at x equals three.

A: e to the quantity x squared, close quantity, power.

B: x cubed + $2x$ squared + 3π .

C: Sine of x times cosecant of x .

D: Inverse tangent of x .

Answers: A: **$6e^9$** B: **39** C: **0** D: **$1/10$** (*or .1*)

Tossup 17: Science (Physics) -- Computational (30 Seconds)

What is the equivalent resistance of three resistors in parallel with resistance of two ohms, three ohms, and four ohms? To calculate the equivalent resistance, remember that its reciprocal is the sum of the reciprocals of the resistances of the other resistors.

Answer: **$12/13$ Ohms**

Bonus 17: Literature (Literature)

Given the subtitle of a work, identify its more famous title.

A: What You Will

B: There and Back Again

C: A Tale of the Christ

D: The Parish Boy's Progress

Answers: A: **Twelfth Night** B: **The Hobbit** C: **Ben-Hur** D: **Oliver Twist**

Tossup 18: Math (Geometry) -- Computational (30 Seconds)

A rectangle with integral side lengths greater than one has an area of 28 square inches. After a height of five inches is added, what is the surface area of the new rectangular prism?

Answer: **166 square inches**

Bonus 18: Social Studies (U.S. History)

Answer the following questions about the 1948 Presidential election.

A: This Missouri native was the incumbent.

B: Strom Thurmond was a candidate running on this party's ticket.

C: After the election, a newspaper erroneously reported that this Republican nominee had won the election.

D: This newspaper carried that headline.

Answers: A: **Harry S. Truman** B: **Dixiecrat Party** (*accept States Rights Democratic Party*) C: **Thomas Edmund Dewey** D: **Chicago Daily Tribune** (*prompt on Daily or Chicago Daily*)

Tossup 19: Literature (Literature)

After this man, the father of 10 children, went to America in 1842, he wrote "American Notes for General Circulation." Six years later his "Dombey and Son" was published, and "Little Dorrit" followed nine years later in 1857. He created characters such as Uriah Heep, who appeared in the semi-autobiographical "David Copperfield," and Sydney Carton, who was in "A Tale of Two Cities." Name this British author of "Great Expectations."

Answer: **Charles John Huffam Dickens**

Bonus 19: Science (Biology)

Answer these questions about the hormone-producing cells of the pancreas.

A: The endocrine cells of the pancreas are located in thousand-cell clusters called these, because they resemble islands.

B: Named after a Greek letter, this best-known and most common type of endocrine cell produces insulin.

C: Also named after a Greek letter, this type of endocrine cells produces glucagon.

D: Yes, also named after a Greek letter, this least common type of endocrine cell produces somatostatin.

Answers: A: **Islets of Langerhans** B: **Beta cell** C: **Alpha cell** D: **Delta cell**

Tossup 20: Social Studies (World History)

His last voyage saw him attacked by Calusas and injured by a poisoned arrow to the shoulder. This Spaniard traveled with Christopher Columbus on his second trip to the New World in 1493, and was appointed the first Governor of Puerto Rico by the Spanish Crown. While he was ousted as Governor of Puerto Rico, he was later reassigned to explore Cuba. And in the midst of exploring Cuba, he became the first European to set foot in Florida. Identify this conquistador who unsuccessfully searched for the Fountain of Youth.

Answer: **Juan Ponce de León**

Bonus 20: Literature (Literature)

Given two central characters of a science fiction series, give the first in the series.

A: Hari Seldon and Salvor Hardin

B: Paul Atreides and Stilgar

C: Zaphod Beeblebrox and Trillian

D: Meg Murry and Charles Wallace

Answers: A: **Foundation** B: **Dune** C: **The Hitchhiker's Guide to the Galaxy** D: **A Wrinkle in Time**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Science (Chemistry) -- Computational (30 Seconds)**

If the electron configuration of lithium is $1s^2 2s^1$, then what is the electron configuration of argon?
Argon is the third noble gas.

Answer: $1s^2 2s^2 2p^6 3s^2 3p^6$

Bonus 21: Math (Other)

You have 2 red balls, 4 blue balls, and 3 green balls. Answer these questions about them. Assume there is no replacement.

A: What is the probability of selecting a red ball and then a green ball?

B: If you get 1 dollar for selecting a red ball, 7 dollars for a blue ball, and 2 dollars for a red ball, what is your expected value for 1 selection if you pay two dollars to select a ball?

C: If you take out all the balls, in how many distinct ways can you order them in a line?

D: If you add in 2 white balls, what is the probability of selecting a blue ball and then a red ball?

Answers: A: $1/12$ B: 2 C: 1260 D: $4/55$

Tossup 22: Math (Algebra) -- Computational (30 Seconds)

What is the vertex of the parabola whose equation is x equals $4y$ squared minus $28y$ plus 45 ? To find the vertex, you'll need to find the y value of the vertex, then substitute that value in the original function to find x . Means of finding the y coordinate of the vertex could include converting the equation into vertex form or finding the midpoint of the roots of the equation.

Answer: $(-4, 7/2)$ (x equals -4 , y equals $7/2$; 3.5 is acceptable for $7/2$)

Bonus 22: Literature (Literature)

Identify the work given a description.

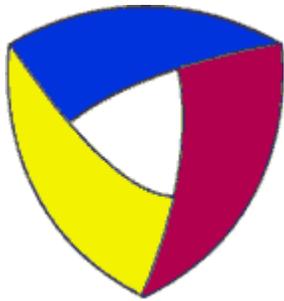
A: This book, the fourth in a series of 8 by Lucy Maud Montgomery, is about the titular character who teaches at a high school on Prince Edward Island.

B: This work by Wilson Rawls is about Billy Colman, who wants to own a dog.

C: This work by Daniel Keyes features Charlie Gordon, who undergoes an operation to become a genius.

D: This story about Ephraim Cabot and Abbie Putnam was written by Eugene O'Neill.

Answers: A: Anne of Windy Poplars B: Where the Red Fern Grows C: Flowers for Algernon D: Desire Under the Elms



Aegis Questions

NIC-9 Conference, 2006-2007

Round 11

Tossup 1: Social Studies (Geography)

This peak is also known as Mount Godwin Austen, after a surveyor and geographer who studied it in the 19th century. The first two people to ever reach its summit were Achille Compagnoni and Lino Lacedelli, who did so in 1954. Even though it is controlled by the Pakistani government, part of it actually lies in China, and its common name comes from the fact that it was the second to be measured in the Karakoram Range. Name this mountain, the second highest in the world.

Answer: **K2** (accept *Dapsang, Chogori, Lambha Pahar, Qogir, Kechu or Ketu*)

Bonus 1: Literature (Literature) -- Five Parts

In the 1920s, Sinclair Lewis wrote a number of novels that satirized various aspects of American life. Given a target of satire, name which novel he wrote in the 1920s satirizing it.

A: The medical profession

B: Small-town life

C: Christian fundamentalism

D: The real-estate business

E: The automobile industry

Answers: A: **Arrowsmith** B: **Main Street** C: **Elmer Gantry** D: **Babbitt** E: **Dodsworth**

Tossup 2: Math (Geometry) -- Computational (30 Seconds)

Find the total surface area of a cylinder with radius 4 inches and height 1 foot. It will help you to convert the units into either feet or inches, but it does not matter which one you choose.

Answer: **128 pi square inches** (accept *8 pi/9 square feet*)

Bonus 2: Science (Biology)

Name these classes of mollusks.

A: Including clams, oysters, and mussels, these aquatic mollusks have two shells.

B: The largest class of mollusks, these include slugs and snails.

C: These include octopi and squid, and have tentacles instead of the typical mollusk foot.

D: Their name means they have no plates, and until 1987, they were thought to be related to sea cucumbers.

Answers: A: **Bivalves** (or *bivalvia, pelecypoda, lamellibranchia*) B: **Gastropods** (or *univalves*) C: **Cephalopods** D: **Aplacophora**

Tossup 3: Literature (Literature)

The main male character, a Swiss scholar of literature, is raised by his widower father following the untimely death of his mother after she is struck by lightning. His first love, Annabel, dies of typhoid before he is able to consummate his relationship with her, an incident which that character, Humbert Humbert, claims was the root of the obsession that plagues him throughout his later years. Identify this novel that features Dolores Haze, a twelve year old girl, as its title character and which was written by Vladimir Nabokov.

Answer: **Lolita**

Bonus 3: Social Studies (Other)

Identify these facts related to the invention of the telephone.

A: This Scottish man is typically credited with inventing the telephone.

B: This man, a native of Ohio, filed a patent the year as the answer to Part A, but did not receive credit because of technicalities.

C: This man was the U.S. President at the time that patent was issued.

D: These were supposedly the first two words that were said over the telephone. They were spoken on March 10, 1876.

Answers: A: **Alexander Graham Bell** B: **Elisha Gray** C: **Ulysses S. Grant** (*accept Hiram Ulysses Grant*) D: **Mr. Watson** (*full phrase: Mr. Watson, come here, I want to see you.*)

Tossup 4: Science (Astronomy)

The third states that the squares of planets' orbital periods are proportional to the cubes of the orbits' semi-major axes. The second states that a line between a planet and star sweeps the same area over equal periods of time. The first states that a planet's orbit about a star is an ellipse with the star at one focus. Name these astronomical laws of motion.

Answer: **Kepler's laws of interplanetary motion**

Bonus 4: Literature (Literature)

Answer the following questions about a mission in World War II.

A: What German town was firebombed for three days in February 1945?

B: That firebombing plays a central role in what novel by the author of *Cat's Cradle* and *The Sirens of Titan*?

C: That novel's main character explains that he has become unstuck in time. Name him.

D: One example of the main character's troubles in time involves his time spent in a zoo with Montana Wildhack on what planet?

Answers: A: **Dresden** B: **Slaughterhouse Five** (*or The Children's Crusade*) C: **Billy Pilgrim** D: **Trafamadore**

Tossup 5: Social Studies (U.S. History)

The only man to be TIME magazine's Man of the Year three times, he was born in New York in 1882 and married his fifth cousin in 1905. Contrary to popular belief, scientists now think he actually contracted Guillain-Barré (*ghee-AHN bar-AY*) syndrome on his 1921 vacation causing his subsequent paralysis. Despite his illness, he went on to become Governor of New York from 1928 to 1932. Name this man who then became President of the United States until his death in 1945.

Answer: **Franklin Delano Roosevelt**

Bonus 5: Math (Algebra)

If x equals one plus two i , and y equals three plus five i , find the following and express your answers in $a + bi$ form when appropriate.

A: The complex modulus of x .

B: x times y .

C: x divided by y .

D: One over x .

Answers: A: **$\sqrt{5} + 0i$** B: **$-7 + 11i$** C: **$\frac{13}{34} + \frac{1}{34}i$** D: **$\frac{1}{5} - \frac{2}{5}i$**

Tossup 6: Fine Arts (Music)

Appointed Master of the King's Music in 1924, his first major orchestral work had fourteen variations, each based on the character of one of his friends. He is best known, however, for Land of Hope and Glory, from the trio of his first Pomp and Circumstance March. Name this English composer responsible for the theme played at most graduations.

Answer: **Edward Elgar**

Bonus 6: Science (Chemistry)

Answer the following questions about amino acids.

A: Amino acids combine in long sequences to form this type of large molecule, like complex sugars or starches, formed by many repeating units.

B: The covalent (*co-VAY-lent*) bond between two amino acids is given this special name.

C: What is the name given to a set of three DNA nucleotides corresponding to a particular amino acid?

D: Amino acid molecules all share two functional groups, an amine group, and this group with formula (*spell out*) COOH.

Answers: A: **Polymer** (*do not accept polypeptide or protein*) B: **Peptide bond** C: **Codon** D: **Carboxyl(ic) acid group** (*prompt on acid*)

Tossup 7: Science (Biology)

Also known as GM2 gangliosidosis, this autosomal recessive disease is caused by a mutation on the HEXA gene of chromosome 15. Usually occurring in infants, it is caused by the lack of an enzyme that breaks down certain fatty acids, causing their accumulation in the brain, leading to death before age 3. Name this genetic lysosomal disease carried by many Ashkenazi Jews.

Answer: **Tay-Sachs disease**

Bonus 7: Social Studies (World History)

Identify these facts that all occurred on February 21st.

A: These two men published the Communist Manifesto in 1848.

B: These two men discovered the structure of DNA.

C: In 1972 this man became the first U.S. president to visit China.

D: In 1924 this man, the first president of Zimbabwe, was born.

Answers: A: **Karl Heinrich Marx** and **Friedrich Engels** B: **Francis Harry Compton Crick** and **James Dewey Watson** C: **Richard Milhous Nixon** D: **Robert Gabriel Mugabe**

Tossup 8: Miscellaneous (Interdisciplinary)

Matt was selected by the San Diego Padres as the first overall pick in the 2004 Major League Baseball draft. Billy co-hosts the NBC show "Grease: You're the One That I Want." The band that goes by this name had a hit in 1995 with "Glycerine". One might refer to something amateur, inferior or crude by this name, in reference to low-level minor league baseball. Identify the name shared by all of these things, as well as another name for a shrub, and most well known as the surname of the 41st and 43rd presidents.

Answer: **Bush**

Bonus 8: Fine Arts (Visual Art)

Answer these questions about Cubism.

A: Cubism is divided into two separate classes, name them both.

B: This artist of Violin and Candlestick, along with Picasso, developed Cubism.

C: Picasso's highest priced painting when sold, Garçon à la pipe, was painted during this period from 1905-1907.

D: This famous huge 1937 painting by Picasso illustrates the horrors of war, dramatizing the Nazi bombing of the title Basque town.

Answers: A: **Synthetic and Analytic** (either order) B: **Georges Braque** C: **Rose Period** D: **Guernica**

Tossup 9: Math (General) -- Computational (30 Seconds)

(Read the three digit number in the first sentence digit by digit.) Convert the base six number 524 into base fourteen. It may help you to know that six to the third power is 216.

Answer: **100** (must be read digit by digit; do not accept one hundred)

Bonus 9: Science (Astronomy)

Name these constellations.

A: Perhaps the best-known constellation, this constellation contains the Big Dipper, and has been seen by many civilizations as a bear.

B: Aldebaran is the alpha star of this constellation that lies between Aries and Gemini.

C: Betelgeuse is the alpha star of this constellation that lies next to Canis Major and Canis Minor, his two dogs.

D: This constellation is named after Castor and Pollux, its alpha and beta stars.

Answers: A: **Ursa Major** B: **Taurus** C: **Orion** D: **Gemini**

Tossup 10: Literature (Literature)

He slays a representative of his enemy with his machete and disappears. When the employer of the dead men comes looking for him, Obierika says that he knows where he is, but will require help for he has committed suicide and therefore cannot be touched by his kinsman. This culminated a drastic fall from grace for the man who was hailed as the strongest in all of Mbanta and Umuofia. Identify the protagonist of Chinua Achebe's Things Fall Apart.

Answer: **Okonkwo**

Bonus 10: Miscellaneous (Entertainment)

Identify the following classic rock bands from songs.

A: London Calling, Rock the Casbah

B: Rainbow in the Dark, Smoke on the Water

C: The Soft Parade, Riders on the Storm

D: Goodbye Blue Sky, Money

Answers: A: **The Clash** B: **Deep Purple** C: **The Doors** D: **Pink Floyd**

HALFTIME

Tossup 11: Science (Chemistry)

By controlling thermal processes, it can be harnessed to do real work. Modeled by the Langevin equation, name this stochastic process first observed in pollen floating in water, that refers to the random motion of tiny particles in fluid. It is named after a botanist, not a color.

Answer: **Brownian motion**

Bonus 11: Math (Calculus)

Find the derivative of each of the following functions. Expand any parentheses when you answer.

A: Four x to the fourth minus three x squared plus eleven x minus 10.

B: The quantity $2x$ minus 4, close quantity, times the quantity $3x$ plus 10.

C: The quantity $5x$ squared plus 1, quantity squared.

D: $10x$ times e to the $4x$ power.

Answers: A: **16x cubed minus 6x plus 11** B: **12x plus 8** C: **100x cubed plus 20x** D: **10e to the 4x power plus 40x times e to the 4x power**

Tossup 12: Literature (Mythology)

According to Ovid, his father was the king of the Myrmidons, and his mother was a sea nymph. After hearing that he would die in battle, he was sent to the court of Lycomedes, where he stayed dressed as a woman, though that did not stop him from having a child with Deidamia named Neoptolemus. After his best friend, Patroclus, was killed by Hector, he killed Hector and then dragged his body behind a chariot. Name this Greek warrior, whose mother, Thetis, tried to make him immortal but forgot to wash his heel

Answer: **Achilles** (accept *Akhilleus*)

Bonus 12: Fine Arts (Music)

Answer these questions related to writing a certain number of symphonies.

A: This supposed curse started when Beethoven died after writing the last of his symphonies. It states that a composer will die before completing his next one.

B: This composer attempted to circumvent the curse by not formally calling "The Song of the Earth" a symphony. He died after writing his next symphony anyway.

C: This Austrian composer of very, very long symphonies also succumbed to the curse, before finishing his final symphony. Maybe it didn't matter, because all of his half-hour-long movements sound sort of similar anyway.

D: Some of this Czech composer's symphonies were discovered after his death, but it turns out that his final symphony, the famous "From the New World" qualified him for this curse as well.

Answers: A: **Curse of the Ninth** B: **Gustav Mahler** C: **Anton Bruckner** D: **Antonin Dvorak** (*d'VOR-zhak*)

Tossup 13: Math (Calculus) -- Computational (30 Seconds)

Find the area under the curve negative $3x$ squared plus $12x$ minus 1, from x equals one to x equals three.

Answer: **20 square units**

Bonus 13: Science (Biology)

Identify these phases of meiosis. You need to include I or II if applicable.

A: Synapsis occurs, forming chromosome tetrads.

B: Crossing over occurs,

C: Though meiosis is only half completed, nuclear membranes begin to re-form around the two daughter cells.

D: Before going through a second round of meiosis, the two daughter cells enter this short state of rest.

Answers: A: **Prophase I** B: **Prophase I** C: **Telophase I** D: **Interkinesis** (*accept Interphase II*)

Tossup 14: Miscellaneous (Sports)

His interest in bringing a baseball team to his hometown nearly led him to purchase the Chicago White Sox, but the American League vetoed the sale. In 1970, he purchased the Seattle Pilots and moved them to Milwaukee. Name this former owner of the Brewers, who gave his ownership of the team to his daughter in 1998 when he became MLB Commissioner.

Answer: **Bud Selig Jr.**

Bonus 14: Literature (Literature)

Answer the following questions about the novel Don Quixote.

A: Who is the author?

B: Who is Don Quixote's sidekick?

C: What is the name of Don Quixote's unattainable beloved?

D: What is the name of Don Quixote's noble steed?

Answers: A: **Miguel de Cervantes Saavedra** B: **Sancho Panza** (*Prompt on Sancho*) C: **Dulcinea del Toboso** D: **Rocinante**

Tossup 15: Social Studies (World History)

The first grandchild of Queen Victoria, he held her in his arms as she passed away in 1901.

Reigning from 1888 to 1918 he was born with a withered left arm due to Erb's palsy. He was close friends with Archduke Franz Ferdinand and, following his assassination, offered his support to Austria-Hungary with regards to destroying the organization that had murdered him, even going so far as to signing a "Blank Check" that authorized the use of force by Austria against the suspected source of that organization, Serbia. Identify this last German Emperor and King of Prussia.

Answer: **Wilhelm II** (*also accept William II*)

Bonus 15: Math (General)

Evaluate the following expressions.

A: Three to the sixth power.

B: Eight choose four.

C: The log base seven of 343.

D: The binary expression one one zero one plus one zero one zero. Express your answer in decimal form.

Answers: A: **729** B: **70** C: **3** D: **23**

Tossup 16: Fine Arts (Visual Art)

Some people are unnerved by this painting because two of the central figures are staring directly at the onlookers eyes; for others, it's the fact that there is a giant woman in the background. There is a ship visible to the right of the woman, and it is also above the head of a man who is pointing his finger while in conversation. At the bottom left of the picture there is a picnic basket on a blue cloth. Name this painting that features a nude woman sitting with two men, painted by Édouard Manet.

Answer: **Luncheon on the Grass**

Bonus 16: Social Studies (Geography)

Answer these questions related to South America.

A: Argentina and the United Kingdom fought a war over this island group off the eastern coast of South America in the 1980s.

B: This largest lake of South America is in both Bolivia and Peru.

C: This river is the longest in Venezuela.

D: This vast region that covers southern Argentina and part of Chile is made up of mostly barren plains.

Answers: A: **Falkland Islands** (accept *Islas Malvinas*) B: **Lake Titicaca** C: **Orinoco** D: **Patagonia**

Tossup 17: Math (Algebra) -- Computational (30 Seconds)

What is the sum of the series n factorial from n equals one to n equals seven? Remember that the factorial of a natural number is the product of all the natural numbers less than or equal to that number.

Answer: **5913**

Bonus 17: Miscellaneous (Entertainment)

Identify the following works of Matthew Perry.

A: Perry has an uncredited cameo in this 2000 Disney film, starring Bruce Willis as a man visited by his eight year old self, who convinces adult Bruce to change his lonely ways.

B: Willis stars as a hitman in this 2000 film, featuring Perry as a neurotic dentist who is sent to the mob to rat him out for money. Amanda Peet plays Perry's dental assistant who is hired to kill him, but can't.

C: Peet plays network president Jordan McDeere, and Perry and Bradley Whitford play the lead writer and director, respectively, of this eponymous show-within-a-show first aired in 2006 on NBC.

D: Whitford is most famous for his role as Deputy Chief of Staff Josh Lyman on this NBC drama. Perry earned two Emmy nominations for Outstanding Guest Actor for his three episode stint on the show.

Answers: A: **The Kid** B: **The Whole Nine Yards** (do not accept *the Whole Ten Yards*) C: **Studio 60 on the Sunset Strip** D: **The West Wing**

Tossup 18: Social Studies (U.S. History)

This unit's most famous member was actually second-in-command; they were actually led by Colonel Leonard Wood. During the Battle of Santiago, they first captured Kettle Hill then went onto their more famous objective. Name this Spanish-American War regiment, officially known as the First United States Volunteer Cavalry, that charged on San Juan Hill, and of which Teddy Roosevelt was a member.

Answer: **Rough Riders**

Bonus 18: Literature (Literature)

Given a line from Shakespeare's *Macbeth*, identify the character who speaks it.

A: "Yet do I fear thy nature. It is too full of the milk of human kindness."

B: "Tomorrow and tomorrow and tomorrow, creeps in this petty pace from day to day, to the last syllable of recorded time."

C: "Fair is foul and foul is fair."

D: "All my pretty ones? Did you say all? O hell-kite! All? What, all my pretty chickens and their dam at one fell swoop?"

Answers: A: **Lady Macbeth** (prompt on *Macbeth*) B: **Macbeth** C: **Three witches** D: **Macduff**

Tossup 19: Science (Physics)

They could break RSA using Shor's algorithm, though Lamport signatures are safe. They also speed up database searching with Grover's algorithm, and even brute-forcing symmetric keys. This advantage comes from the fact that the registers can take on a superposition of every classical value at once, as long as they remain coherent. Represented by Bloch spheres, name this type of miniature computer in development that, unlike classical computers, stores data in qubits (*CUE-bits*).

Answer: **Quantum computer**

Bonus 19: Social Studies (U.S. History)

Given a description, name the U.S. president.

A: The only unmarried President.

B: Only President to hold a patent.

C: Only President to serve as a Chief Justice.

D: The first President to die in office.

Answers: A: **James Buchanan** B: **Abraham Lincoln** C: **William Howard Taft** D: **William Henry Harrison** (*prompt on Harrison; do not accept Benjamin Harrison*)

Tossup 20: Literature (Literature)

The author's dog ate an early manuscript of this work. The novella consistently makes 'most challenged' book lists, for its portrayal of euthanasia. The two main characters dream of owning a farm; specifically one with rabbits on it. Their fantasy comes closer to fruition when Candy and Crooks, two hands on the ranch offer to put up money for a piece of the future farm. The dream falls apart however, when one of the main characters accidentally kills a woman. Identify this work, which has a title that alludes to a Robert Burns poem, and is by John Steinbeck, featuring characters such as Slim, Curley, George and Lennie.

Answer: **Of Mice and Men**

Bonus 20: Math (Other)

Answer the following questions regarding probability using two six-sided dice, expressing all numbers as fully reduced fractions.

A: What is the probability of rolling an even number?

B: What is the probability of rolling an odd number?

C: What is the probability of rolling an 8, a 9, a 10, an 11, or a 12?

D: This part has two answers - both must be correct for the points. First, which is more probable, the event in part 1 or the event in part 3? Second, how much more probable is that event?

Answers: A: **1/2** B: **1/2** C: **5/12** D: **Event 1 is more probable by 1/12** (*accept equivalents*)

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Math (Calculus) -- Computational (30 Seconds)**

Find the value of the tenth derivative of cosine of x at x equals π over 4. It may help you to remember that the derivatives of cosine of x cycle every four derivatives.

Answer: **Negative $\sqrt{2}$ over 2**

Bonus 21: Literature (Mythology)

Answer the following about Book 1 of Homer's epic The Iliad.

A: What god had Agamemnon offended by initially refusing to return the captured Chriseis (Kris-ay-is)? Being the god of plagues, he was able to do significant damage to the Greek army.

B: Agamemnon is forced to return Chriseis to her father. In order to make up for this, he demanded what woman from Achilles?

C: Achilles, humiliated by Agamemnon, prays to what sea goddess, his mother?

D: His mother then goes to Zeus to ask for glory for her son. What action of Zeus causes thunder to crash?

Answers: A: **Apollo** B: **Briseis (Bris-ay-is)** C: **Thetis** D: **Nods his head (accept equivalent)**

Tossup 22: Social Studies (Geography)

It's located in the Khumbu Himal (*KOOM-boo HIM-ull*) range, and the easiest way to get there is to take the South Col pass through Nepal. Its summit was first reached in 1953 by Tenzing Norgay and Edmund Hillary. Name this mountain, which, at over 29,000 feet above sea level, is the tallest in the world.

Answer: **Mount Everest**

Bonus 22: Literature (Language Arts)

Correctly spell the following words.

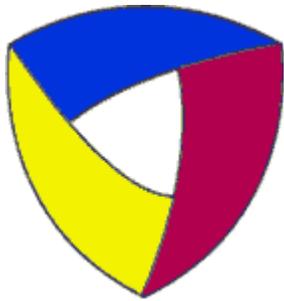
A: Tintinnabulation

B: Perigee (*PAIR-uh-jee*)

C: Myrmidon (*MURR-ma-don*)

D: Reptilian

Answers: A: **TINTINNABULATION** B: **PERIGEE** C: **MYRMIDON** D: **REPTILIAN**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 12

Tossup 1: Social Studies (Current Events)

In 1983, this man indicted two men for oil deals they had made with Iran. A few years later he sent members of prominent New York crime families to jail, and his most famous moments followed about 15 years later. In November of 2006, he formed a committee to explore a bid for the presidency. Name this former governor of New York who served during the September 11th terrorist attacks.

Answer: **Rudolph "Rudy" William Louis Giuliani III**

Bonus 1: Literature (Literature)

Given a group of characters, name the play written by Henrik Ibsen.

A: Jon; Solveig; Aslak

B: Nora and Torvald Helmer; Krogstad

C: Stockmann; Hovstad

D: Gregers Werle; Hedvig; Gina Ekdal

Answers: A: **Peer Gynt** B: **A Doll's House** (accept *A Doll House* - it's a translation issue) C: **An Enemy of the People** D: **The Wild Duck**

Tossup 2: Math (Algebra) -- Computational (30 Seconds)

Find the fourteenth term of the sequence 128,000, 64,000, and so on. You can do this by recognizing that this is a geometric series with first term 128,000, and that the fourteenth term is just the first term times the common ratio raised to some power.

Answer: **125/8** (accept *15.625* or *15 5/8*)

Bonus 2: Science (Astronomy)

Name these stars.

A: The right shoulder and alpha star of Orion, this star is a red giant.

B: The closest star to the sun, what we see is actually a system of four stars, only 4.39 light years away.

C: The brightest star in the night sky, it is visible from almost any part of earth. It is also called the "Dog Star."

D: The brightest star in Orion, its name comes from the Arabic for "left foot of the Central One."

Answers: A: **Betelgeuse** (accept *Alpha Orionis*) B: **Alpha Centauri** (accept *Rigel Kentaurus*) C: **Sirius** (accept *Alpha Canis Majoris*) D: **Rigel** (accept *Beta Orionis*)

Tossup 3: Literature (Literature)

At the first performance of this play, the last act was being typed as the first act was being performed on stage. Notable characters include Mrs. Ogmores-Pritchard, who relentlessly bosses her two dead husbands; Captain Cat who relives his seafaring times; and Mr. Pugh the school master who dreams of murdering his wife. Originally written as a radio presentation, this play opens at night in the Welsh Village of Llareggub, "bugger all" spelled backwards, with everyone dreaming. Identify this play, which featured Richard Burton as 'First Voice' in the radio version, written by Dylan Thomas.

Answer: **Under Milk Wood**

Bonus 3: Social Studies (U.S. History)

Identify these historic Supreme Court cases dealing with racial issues.

A: This 1857 Supreme Court case stated that a slave was property, and wasn't considered free because he was on free land.

B: This 1896 Supreme Court case about segregated boxcars established the doctrine of "separate but equal" facilities.

C: This 1954 Supreme Court case overturned the previous case, saying that separate is inherently unequal, ordering the desegregation of public schools.

D: This 1978 Supreme Court case ruled in favor of a white man denied admission to medical school because of racial quotas.

Answers: A: **Dred Scott v. Sanford** B: **Plessy v. Ferguson** C: **Brown v. Board of Education of Topeka, Kansas** D: **Regents of the University of California v. Bakke** (also accept *The Bakke case*)

Tossup 4: Science (Physics)

Superceding the theory of phlogiston (*fluh-JIS-tun*), it was first introduced by Lavoisier, and formed the basis of Carnot's heat engine theory. Later proven erroneous, it stated that heat is conserved, flowing from warmer to cooler objects. Name this incorrect theory of heat that stated that heat was a fluid passing between objects. It is the namesake of a modern unit of energy.

Answer: **Caloric theory**

Bonus 4: Literature (Mythology)

Answer the following about the Ramayana.

A: The Ramayana is divided into how many sections?

B: What is the name of Rama's wife?

C: His wife is kidnapped by what demon king of Lanka?

D: This friend of Sugriva is a giant monkey, and he is sent to locate Rama's wife after her kidnapping.

Answers: A: **Seven** B: **Sita** C: **Ravana** D: **Hanumana**

Tossup 5: Social Studies (Geography)

This island is separated from the mainland by Bass Strait, in which the Flinders and King islands lie. It is close to Bruny Island, and its highest point is Mount Ossa while Lake St. Clair, the deepest in the country, is located there. Originally known as Van Diemen's Land, it is 150 miles south of Victoria. Name this island with its capital at Hobart that is south of Australia.

Answer: **Tasmania** (accept *Van Diemen's Land before mentioned*)

Bonus 5: Math (Other)

You are rolling two fair six sided dice. Find the probability of rolling the following events. Express your answers as fully reduced fractions.

A: The sum is odd.

B: The sum is a square number.

C: The sum is nine.

D: The sum is less than six.

Answers: A: **1/2** B: **7/36** C: **1/9** D: **5/18**

Tossup 6: Fine Arts (Visual Art)

This late Renaissance artist sought to be apprentice to Titian, but was rejected after only 10 days under his watch. His mastery of color and motion in his paintings contrasted with the works of Michelangelo and da Vinci, making him a forerunner to the Baroque era of art. The use of light and perspective in his Last Supper was unprecedented and demonstrated how much the styles within the Italian Renaissance evolved over time. Identify this painter whose real name was Jacopo Comin and remained in Venice for nearly his entire life.

Answer: **Tintoretto**

Bonus 6: Science (Biology)

Identify these molecules important in cellular respiration.

A: One glucose molecule generates eight of these molecules, which each have enough energy to phosphorylate three ATP molecules.

B: Only two of these molecules are generated by one glucose molecule, and they only phosphorylate two ATP.

C: Glycolysis breaks a glucose molecule into two of these molecules, which are used up by the Krebs cycle.

D: The last molecule in the Krebs cycle, it is recycled into citric acid when two more carbon atoms are added.

Answers: A: **NADH** B: **FADH2** C: **Pyruvate** (accept *pyruvic acid*) D: **Oxaloacetate** (accept *oxaloacetic acid*)

Tossup 7: Science (Chemistry)

Its namesake element is actually not very rare in the earth's crust, and has a stable isotope with a weight of 139. It comprises anywhere from 13 to 15 elements, depending on who is asked. Because moving right along the periodic table along this section of a period can increase the nuclear charge without adding more electron shells, the ionic radii decrease dramatically in a namesake contraction effect. Name this group of elements with unfilled 4-f shells, the top row of rare earth elements.

Answer: **Lanthanide series** (accept *lanthanum*)

Bonus 7: Social Studies (World History)

Given a description, identify the World War II general.

A: This American general vowed to return to the Phillipines, which he did in October, 1944.

B: This Deputy Commander-in-Chief of the Red Army commanded the defenses at Moscow and Stalingrad.

C: This German Field Marshal commanded units during the invasion of Poland and helped plan the proposed invasion of Britain.

D: This British Field Marshal led forces in North Africa and Italy, and also commanded the ground units during Operation Overlord. He is famous for disputes with American officers such as George Patton and Omar Bradley.

Answers: A: **General Douglas MacArthur** B: **Marshal Georgy Konstantinovich Zhukov** C: **Field Marshal Karl Rudolf Gerd von Rundstedt** D: **Field Marshal Bernard Law Montgomery, 1st Viscount Montgomery of Alamein**

Tossup 8: Miscellaneous (Entertainment)

Its title comes from a question posed by Cole Porter in a 1956 song, to which he responds "I don't." Starting in Britain in 1998, it was very popular after its introduction in the U.S., but started to lose popularity, becoming syndicated in 2002, and in 2004, starting a short-lived series with a higher jackpot and such features as "Three Wise Men" and "Double Dip". Name this television game show now hosted by Meredith Vieira, which features contestants in the hot seat playing for the titular amount of money.

Answer: **Who Wants to be a Millionaire?** (prompt partial answers)

Bonus 8: Fine Arts (Music)

Many of Beethoven's piano sonatas are nicknamed.

A: This nickname for #14 was given by critic Ludwig Rellstab, who compared the first movement to this, shining on Lake Lucerne.

B: #21 is often referred to by this name, the name of the Count for whom Beethoven wrote the piece.

C: #26 goes by this name, a French translation of the title of its first movement, "The Farewell."

D: #29 goes by this name taken from the German title meaning "Grand sonata for piano."

Answers: A: **Moonlight** B: **Waldstein** C: **Les Adieux** D: **Hammerklavier**

Tossup 9: Math (Calculus) -- Computational (30 Seconds)

Find dy/dx at the point $(\sqrt{3}, 1)$ for the graph of $x^2 + y^3 = 4$. Instead of solving explicitly for y , it would be much faster to calculate the derivative implicitly, and then plug in the x and y coordinates at the point requested.

Answer: **$-\frac{2\sqrt{3}}{3}$** (or $-\frac{2}{3}$ times root 3, etc)

Bonus 9: Science (Chemistry)

Answer these questions about batteries.

A: Usually powered by a paste of zinc and manganese dioxide, this type of battery includes the common alkaline battery.

B: This type of battery is named after the element it uses, with atomic number three.

C: The rechargeable batteries used in cars contain sulfuric acid and this metal.

D: A common type of small rechargeable battery has two electrode plates, one with nickel, and the other with this element.

Answers: A: **Dry cell** B: **Lithium-ion battery** C: **Lead** D: **Cadmium**

Tossup 10: Literature (Literature)

When she was young, her brother blinded her in one eye when he shot her with a BB gun. The winner of the Pulitzer Prize for Fiction in 1983, she was married to a Jewish man, Mel Leventhal from 1967 to 1976. Together, they were the first legally married interracial couple in segregated Mississippi. Her 1992 work, *Possessing the Secret of Joy* featured, among other protagonists, characters or descendants of characters from her most famous work. Identify this African-American author of *The Color Purple*.

Answer: **Alice Malsenior Walker**

Bonus 10: Miscellaneous (Interdisciplinary)

Oh no! Something seems to be the matter! Answer these questions about our big problem.

A: There's a problem here! The problem is the Riemann hypothesis, one of the seven unsolved problems in mathematics given this collective title by the Clay Mathematics Institute.

B: I think I know who caused the problem! I didn't cause it, but I think it was due to this 800-mile-long geologic feature in California running between the Pacific and North American tectonic plates.

C: I found the solution! It's full of sugar. I managed to get it into this unstable state by heating the water, dissolving extra sugar into it, and slowly cooling the solution down.

D: I'm going to prevent this from happening again! I've learned a lot about how to prevent things by watching commercials with this animal character who first appeared on posters in 1944, wearing blue jeans and a hat.

Answers: A: Millenium Prize Problems B: San Andreas Fault C: Supersaturated solution D: Smokey (the) Bear

HALFTIME

Tossup 11: Literature (Literature)

This creature's head was kept by his nemesis, and that nemesis also killed his mother after he was dead. He lives in an underwater cave, and according to a work by John Gardner, this creature jumped off of a cliff to his death, though in the original story he died after he had his arm ripped off. He once threw apples at Unferth, which was done in the hall of Heorot. Name this creature, a descendant of Cain, who was killed by Beowulf.

Answer: **Grendel**

Bonus 11: Social Studies (Geography)

Identify these Central American countries.

A: This southernmost country touches Colombia.

B: The country contains the largest body of water in Central America.

C: This country, which borders Guatemala and Mexico, actually has English as an official language.

D: This country, which lies between the answers to Parts A and B, was the first nation in the entire world to get rid of its army.

Answers: A: **Republic of Panama** (accept *Republica de Panama*) B: **Republic of Nicaragua** (accept *Republica de Nicaragua*) C: **Belize** (prompt on *British Honduras*) D: **Republic of Costa Rica** (accept *República de Costa Rica*)

Tossup 12: Science (Astronomy)

Launched on January 12, 2005, it separated into two devices, a fly-by probe and an 800-pound section that flew into the comet Tempel 1 at 23,000 miles an hour. Name this NASA space probe with a hard-hitting name that ejected comet material to better understand what comets are made of.

Answer: **Deep Impact**

Bonus 12: Math (Geometry)

If the cosine of an angle is $\frac{8}{17}$, and the angle is located in the fourth quadrant, find the following.

A: The sine of the angle.

B: The cosecant of the angle.

C: The secant of the angle.

D: The tangent of the angle.

Answers: A: **-15/17** (do not accept $\frac{15}{17}$) B: **-17/15** (do not accept $\frac{17}{15}$) C: **17/8** D: **-15/8** (do not accept $\frac{15}{8}$)

Tossup 13: Social Studies (U.S. History)

In 1952, this man helped Dwight Eisenhower receive support in Minnesota, so Eisenhower rewarded him by making him an Assistant Attorney General in the Justice Department. Four years later he was appointed to the US Court of Appeals, and in 1969 he was appointed to the Supreme Court. Name this Chief Justice who succeeded Earl Warren and, in 1973, presided over *Roe v. Wade*.

Answer: **Warren Earl Burger**

Bonus 13: Literature (Literature)

Name the French authors of the following works.

A: No Exit

B: The Human Comedy

C: In Search of Lost Time

D: Salammbô

Answers: A: **Jean-Paul Sartre** B: **Honoré de Balzac** C: **Marcel Proust** D: **Gustave Flaubert**

Tossup 14: Math (General)

As usual, instead of proving this theorem, its creator simply stated that the proof would be too long to write in the same letter. The second-most famous theorem to bear its author's name, it is arguably more useful than the other, forming the basis of a useful primality test, though all Carmichael numbers fail it. It is most important, however, when used with the Chinese remainder theorem as the basis of RSA public-key encryption. Name this diminutive theorem by Pierre de Fermat, that states that, for a prime number "p" and integer "a," a to the p is congruent to a, modulo p.

Answer: **Fermat's little theorem** (do NOT accept *Fermat's last theorem*)

Bonus 14: Miscellaneous (Interdisciplinary)

Name the following people who died on their birthday.

A: This man, the father of Johann Sebastian Bach, died on his 50th birthday. First, middle, and last names are required.

B: This Italian painter of "Portrait of Pope Leo X with Two Cardinals" was given the wrong cure for a fever, and died on his 37th birthday.

C: Many believe that this mobster's wife created the image and nickname he is most known by. He was one of the first inmates in Alcatraz, and died on his 59th birthday in Leavenworth, Kansas Penitentiary.

D: This member of the first triumvirate was killed on his 58th birthday by Egyptian assassins who wanted Caesar's approval for killing his enemy. Caesar did not approve, however, and deposed Ptolemy XIII.

Answers: A: **Johann Ambrosius Bach** (must have all three names, as "Johann Bach" is not uniquely identifying) B: **Raphael** C: **George "Machine Gun" Kelly Barnes** D: **Pompey the Great**

Tossup 15: Fine Arts (Music)

Its composer made two different arrangements, one to be accompanied with narration, and the other without. It consists primarily of a fugue by the composer and of a theme by Henry Purcell, using them to highlight alternately various families and instruments. Its inscription indicates it is for the children of John and Jean Maud, for their "edification and entertainment." Name this piece by Benjamin Britten whose narration begins, "The composer has written this piece of music specially to introduce you to the instruments of the orchestra."

Answer: **The Young Person's Guide to the Orchestra**

Bonus 15: Social Studies (World History)

Given a description, identify the ancient battle.

A: This 490 BCE battle is most famous for the fact that a messenger ran many miles to report the outcome.

B: This battle in the Ionian Sea between Marc Antony and Octavian occurred in 31 BCE. It led to Octavian becoming the first Roman Emperor.

C: This 480 BCE battle is famous because the Greeks defended a mountain pass against a much larger Persian force.

D: This other 480 BCE battle was fought in the Saronic gulf. The Greeks were able to win this battle, one of the first recorded naval battles, by outmaneuvering the Persians.

Answers: A: **Battle of Marathon** B: **Battle of Actium** C: **Battle of Thermopylae** (*thur-MAH-puh-lee*) D: **Battle of Salamis**

Tossup 16: Social Studies (Other)

After working in the business world for a year, this man moved to Chicago, working on the Altgeld housing projects of the city's South Side. It was at this point in his life that he converted from Islam to Christianity. This Hawaiian-born author of *Dreams from My Father* was chosen to give a keynote address at the 2004 Democratic National Convention that garnered him national attention. Identify this man who, according to a July 2006 poll, has the highest approval rating among US Senators, and recently announced his candidacy for the Presidency.

Answer: **Barack Hussein Obama, Jr.**

Bonus 16: Math (Calculus)

Find the following limits.

A: The limit as theta approaches pi over four of the function cosine of x times cotangent of x.

B: The limit as x approaches ten of the function quantity x to the fourth minus 96 x squared minus 400, close quantity, divided by the quantity x squared minus 100.

C: The limit as x approaches infinity of the function x to the sixth power divided by the quantity 2x to the fifth power minus 11x to the fourth power plus 1.

D: The limit as x approaches 2 of the function quantity x squared minus 4, close quantity, over the quantity x plus 2.

Answers: A: **$\sqrt{2}$ over 2** B: **104** C: **Infinity or the limit does not exist** D: **0**

Tossup 17: Miscellaneous (Other)

He can be found in *The Cake Factory*, *Ancient Rome*, *On The Beach*, in *The Corridors of Time* and even in *Hollywood*. It is Wizard Whitebeard's magic that allows this character to travel around with such ease. His dog Woof is usually found along with him, but is easily frightened and oftentimes hides behind things. This character's mortal enemy is Odlaw, who is constantly trying to get his loathsome hands on our hero's walking stick. Featured in such works as *The Ultimate Fun Book*, *The Wonder Book* and, most recently, *The Great Picture Hunt*; identify this man, clad in red and white, who, in Soviet Russia, finds you.

Answer: **Where's Waldo**

Bonus 17: Literature (Literature)

Modern American drama is filled with dysfunctional families. Given the family name, identify the play they come from.

A: Wingfields

B: Tyrones

C: Lomans

D: Clearys

Answers: A: **The Glass Menagerie** B: **Long Day's Journey into Night** C: **Death of a Salesman** D: **The Subject was Roses**

Tossup 18: Math (Geometry) -- Computational (30 Seconds)

Ignore units. Find the volume of a sphere whose great circle has a ninety degree sector with area of 36 pi. It may help you to know that the diameter of a great circle is equal to the diameter of its sphere.

Answer: **2304 pi cubic units**

Bonus 18: Science (Physics)

Name these hypothetical ideas from physics.

A: This boson is thought to be responsible for all mass, and if it exists, is likely to be discovered soon at CERN's Large Hadron Collider.

B: No gauge boson has yet been discovered for gravity, but this particle is thought to mediate the gravitational force.

C: These term is given to a class of hypothesized particles that move faster than the speed of light.

D: Gauss's law for magnetism currently states that these do not exist, but it is quite possible that dipoles are not the only configuration in which magnets can exist.

Answers: A: **Higgs boson** B: **Graviton** C: **Tachyon** D: **Magnetic monopole**

Tossup 19: Literature (Literature)

Starting in the late 1760s, this movement's name came from the revised title of a play by Friedrich Klinger originally titled "Chaos". Although coming before Weimar (*VIE-mar*) Classicism, this German literary and musical movement was more similar to Romanticism, in its emotion and focus on energy and passion. Its principal exponents were Goethe and Schiller, in such works as *The Sorrows of Young Werther*, and *Prometheus*. Name this movement whose name is German for "Storm and Stress."

Answer: **Sturm und Drang** (*accept Storm and Stress before mentioned*)

Bonus 19: Math (Algebra)

If $\ln 2$ (*read: l n 2*) is approximately .7, and $\ln 3$ is approximately 1.1, find the following to the nearest tenth.

A: $\ln 6$

B: $\ln 81$

C: $\ln .75$

D: $\ln -2$

Answers: A: **1.8** B: **4.4** C: **-3** D: **undefined** (*do not accept 0, accept .7 + 3.1 i*)

Tossup 20: Science (Biology)

Possibly the most common protein on Earth, this enzyme creates phosphoglycerate by adding carbon dioxide molecules to the carbon molecule RuBP. Because it can also add oxygen molecules, it sometimes leads to photorespiration in C3 plants when not enough carbon dioxide is available.

Name this enzyme of the Calvin cycle key to the carbon fixation process, that is rarely called by its full name, ribulose-1,5-bisphosphate carboxylase/oxygenase.

Answer: **Rubisco**

Bonus 20: Fine Arts (Visual Art)

Identify these famous artworks from the early 20th century.

A: This Marcel Duchamp work added a mustache to the Mona Lisa.

B: This 1922 work by Max Ernst features a giant coming through a window in a red brick building on the left side. It shares its name with a work by Sophocles.

C: This work by Georgia O'Keefe features the titular object in the center of the painting against a gray sky background. To the left of the title object there's a flower and there are mountains at the bottom of the painting.

D: This provocative cubist painting by Duchamp features the title figure at multiple points.

Answers: A: **LHOOQ** B: **Oedipus Rex** (*prompt on Oedipus*) C: **Georgia Ram's Head** (*accept Ram's Head White Hollyhock and Little Hills*) D: **Nude Descending a Staircase Number 2** (*accept Nu descendant un escalier no. 2*)

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Math (Other)**

Born in 1938, among his creations are the quater-imaginary number system and his double-arrow notation for large numbers. If you find an error in one of his textbooks, he is known for sending a check for a hexadecimal dollar, two dollars and 56 cents. He received his Ph.D. in mathematics from the California Institute of Technology, after which he named a popular piece of software. Name this famous computer scientist and mathematician, author of *The Art of Computer Programming*, creator of Metafont and the TeX (*TECH*) typesetting engine.

Answer: **Donald Knuth**

Bonus 21: Science (Biology)

Answer these questions regarding evidence supporting the theory of evolution.

A: What term is given to structures so similar, such as the wings of a bat and a human arm, that they seem to indicate a shared ancestor?

B: What structures appear somewhat alike and serve identical functions, but have different internal anatomy and different embryological origins?

C: What structures, such as the human appendix, no longer serve a function?

D: Differences in what protein, present in red-blood cells, can be used to indicate the degree to which two species are dissimilar?

Answers: A: **Homologous** B: **Analogous** C: **Vestigial** D: **Hemoglobin**

Tossup 22: Literature (Literature)

A theme of naturalism is in many of this author's works, including *The Rougon-Macquart: Natural and Social History of a Family Under the Second Empire*. In 1867, 31 years before his most famous moments, he published his *Therese Raquin*. In 1899 he fled to England because of the backlash from his most famous piece. Name this French author of *Germinal*, most famous for his involvement in the Dreyfuss Affair, in which he wrote the letter *J'Accuse*.

Answer: **Emile Zola**

Bonus 22: Math (Calculus)

Answer the following questions about the curve y equals $3x$ to the fourth power minus $12x$ squared plus 9 .

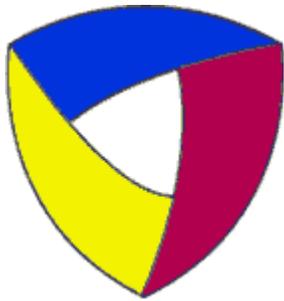
A: What are the x -coordinates of each of the two rational roots? Two answers required.

B: What are the x -coordinates of each of the two irrational roots? Two answers required.

C: What is the y -coordinate of the right-most relative extremum?

D: What is the slope of the line at the right-most root?

Answers: A: **1 and -1** (accept *plus and minus 1*) B: **$\sqrt{3}$ and $-\sqrt{3}$** (accept *plus and minus $\sqrt{3}$*) C: **-3** D: **$60\sqrt{3}$**



Aegis Questions

NIC-9 Conference, 2006-2007

Round 13

Tossup 1: Science (Biology)

These types of cells have no blood vessels, and can be simple or stratified. They form a free surface, and lie on a basement membrane. Either squamous, columnar, or cuboidal, what is this type of cell tissue that forms skin and many other membranes?

Answer: **Epithelial cells** (accept *epithelium*)

Bonus 1: Social Studies (U.S. History)

Identify these famous Supreme Court Justices.

A: This man, the son of the poet who wrote "Old Ironsides," was known as the Great Dissenter.

B: This NAACP lawyer was the first African American man to be appointed to the Supreme Court.

C: This Chief Justice under Lincoln, Johnson, and Grant shared his last name with an earlier justice. He was the first Chief Justice to allow an African American lawyer to practice in front of the Supreme Court.

D: This man, who served as Chief Justice from 1836-1864, presided over the Dred Scott case.

Answers: A: **Oliver Wendell Holmes, Jr.** B: **Thurgood Marshall** C: **Salmon Portland Chase** D: **Roger Brooke Taney**

Tossup 2: Literature (Literature)

The novel begins with a baby being stung by a scorpion. The town doctor refuses to treat the baby based on the poverty of the baby's parents. That doctor only comes to treat baby Coyotito once the title object is acquired by the baby's father. The greedy nature of people becomes evident early as many of them try to steal the object, and when it is to be sold, Kino and Juana are nearly cheated by the La Paz buyers. Identify this gem of a novel that ends with the title object being thrown back into the ocean.

Answer: **The Pearl**

Bonus 2: Math (Algebra)

Solve the following equations for x over the real numbers.

A: $x^2 - 4 = 20 - 5x$

B: $\log_2 \log_2 1024 = \log_4 1024$

C: In radians, the smallest positive solution for $\sin x = \tan x$

D: $x^3 - 3x = 0$

Answers: A: **$x = -8$ or 3** (prompt on just one, must have both answers) B: **$x = 32$** C: **$x = \pi$** (note that 0 is not positive) D: **$x = 3$** (other solutions nonreal)

Tossup 3: Social Studies (Other)

The first English translation of this man's best known work was done by George Eliot, and William Somerset Maugham took the title "Of Human Bondage" from his ideas. This man was descended from Jews expelled from Portugal, though he actually lived in Holland. His teachings held that nothing was actually good or bad, it was only humans that perceived these values. Name this Dutch lens-grinder and author of Ethics.

Answer: **Benedictus de Spinoza** (accept *Baruch de Spinoza*)

Bonus 3: Fine Arts (Visual Art)

Identify the painting or sculpture given a description.

A: This painting features a girl with a muscular deterioration dragging herself across a field to pick flowers.

B: This Rodin work features six men with nooses around their necks, all of whom are seemingly about to be executed.

C: On the right side of this Seurat work is a woman holding an umbrella, with a monkey and a dog at her feet.

D: This Dada work by Marcel Duchamp is, in reality, a porcelain urinal lying on its back.

Answers: A: **Christina's World** B: **The Burghers of Calais** (also accept: *Les Bourgeois de Calais*)

C: **Sunday Afternoon on the Island of La Grande Jatte** (also accept: *Un dimanche après-midi à l'Île de la Grande Jatte*) D: **Fountain**

Tossup 4: Math (Geometry) -- Computational (30 Seconds)

Remember to give proper units in your answer. Find the volume of a cone with vertical height 12 inches and slant height 13 inches. It may help you to know that the formula for volume of a cone requires multiplying the area of the base times the vertical height, divided by three.

Answer: **100 pi cubic inches**

Bonus 4: Social Studies (World History)

Given the name of a battle, identify the modern day country in which it took place.

A: Battle of Marathon

B: San Juan Hill

C: Battle of Blenheim

D: Waterloo

Answers: A: **Greece** B: **Cuba** C: **Germany** D: **Belgium**

Tossup 5: Fine Arts (Music)

Composed "for the profit and use of musical youth desirous of learning, and especially for the pastime of those already skilled in this study", It is made up of two books, compiled 22 years apart from each other. Each book contains twenty-four pairs of preludes and fugues, written in a rising chromatic pattern until every key has been represented, finishing with a B-minor fugue. Identify this collection, by Johann Sebastian Bach, whose name suggests Bach's preference for a specific type of keyboard tuning.

Answer: **The Well-Tempered Clavier** (also accept *Das wohltemperierte Clavier*)

Bonus 5: Miscellaneous (Interdisciplinary)

Everyone loves a good confession. Name the people responsible for the following Confessions.

A: His Confessions are considered to be one of the first autobiographical works in literature, and examine his life as a young sinner to his conversion to Christianity.

B: This man's Confessions are notable for his account of his favorite moments in education, which led to one of his most famous works, *Emile (ay-MEEL)*.

C: This rapper's album titled Confessions broke several records for highest debut for a hip-hop album and featured four number one singles and an additional top ten single.

D: This singer's 2006 Confessions Tour featured a controversial event featuring the diva on a crucifix, and one of the London performances was aired on NBC without that scene.

Answers: A: **St. Augustine** B: **Jean-Jacques Rousseau** C: **Usher** D: **Madonna**

Tossup 6: Social Studies (U.S. History)

This man initially saw action in 1759 while fighting against Cherokee Indians. He didn't begin his well known tactics until 1780, after Charleston fell. He and his men once recaptured over 100 American prisoners, and were also successful in stealing their supplies from the British transports. The British sent Colonel Banastre Tarleton to capture him, but they couldn't because he would always end up disappearing into the woods. Name this man nicknamed the Swamp Fox.

Answer: **Francis Marion**

Bonus 6: Math (Calculus)

Find the following about the function y equals $15x$ to the fourth power minus $12x$ to the third power plus $9x$ squared minus $10x$ plus 1 .

A: The first derivative.

B: The position of the function at x equals negative 1 .

C: The acceleration of the function at x equals 2 .

D: The area under the curve from 1 to 2 .

Answers: A: **$60x^3 - 36x^2 + 18x - 10$** B: **45** C: **594** D: **65**

Tossup 7: Miscellaneous (Entertainment)

These two people appear early in the 2005 Kenny Chesney song I Go Back, though they are more famous for being the namesake of a 1982 song. The narrator of that song cautions youth to "Hold onto 16 as long as you can, changes come around real soon and make us women and men." The male is going to be a football star and also sucks "down chili dogs outside the tasty freeze," while the girl will spend quite a bit of time in the back seat of his car. Name this title pair of a "little ditty" by John Cougar, about "two American kids growin' up, in the heartland."

Answer: **Jack and Diane**

Bonus 7: Literature (Literature)

Identify these facts related to the author of Joe Turner's Come and Gone.

A: This black playwright was the first to have a Broadway theatre named after him.

B: That playwright wrote a cycle named this. It included plays such as Gem of the Ocean and Seven Guitars.

C: This play, arguably the playwright's most famous, is about Troy Maxson and is set in the 1950s. It won a Pulitzer Prize in 1987.

D: This play, which contains the characters Cutler and Toledo in the titular character's band, was the only one of the cycle set in Chicago.

Answers: A: **August Wilson** B: **The Pittsburgh Cycle** C: **Fences** D: **Ma Rainey's Black Bottom**

Tossup 8: Math (General)

Its Taylor series at $x+1$ is the Mercator series. It shows up in the integral of the tangent and cotangent of x , and its own indefinite integral is x times itself, minus x . Defined as the integral from 1 to x of dt over t , what is this function, the inverse of e to the x ?

Answer: **Natural log(arithm)** (*prompt on logarithm, accept "ln"*)

Bonus 8: Science (Chemistry)

How well do you know the most recently named chemical elements? Give their namesake scientists, not the element names.

A: Element 104 is named after this man who disproved the plum pudding model of an atom, using a beam of alpha particles.

B: Element 107 is named after this Danish physicist, despite concerns that the element would be confused with boron.

C: Element 109 is named after this female Austrian physicist who helped discover nuclear fission.

D: Element 111 is named after this German credited with the discovery of x-rays.

Answers: A: **Ernest Rutherford** B: **Niels Bohr** C: **Lise Meitner** D: **Wilhelm Roentgen**

Tossup 9: Literature (Mythology)

When Gangleri asked Harr "What is the way to heaven from earth?", he replied with a description of this. Built by the Æsir, it is guarded constantly by Heimdall, whose hall, Himinbjorg is located at the upper end. According to the Prose Edda, it will collapse when the fire giants ride over it during Ragnarök. Identify this rainbow bridge leading from the realm of the mortals, Midgard, to the realm of the gods, Asgard.

Answer: **Bifröst bridge** (*prompt on Rainbow bridge before it is mentioned*)

Bonus 9: Math (Other)

Find the probabilities of the following events.

A: Rolling a sum of four on three six-sided dice.

B: Drawing two cards without replacement from a standard deck of cards, which share the same rank.

C: Hitting the exact center of a circular target with a dart.

D: Flipping heads on a fair coin five out of ten times.

Answers: A: **$\frac{1}{72}$** B: **$\frac{3}{52}$** C: **0** D: **$\frac{63}{256}$**

Tossup 10: Science (Chemistry) -- Computational (30 Seconds)

At a pressure of 3.5 atmospheres, a particular gas has solubility of .70 grams per liter in water. At the same temperature, what is its solubility at 1 atmosphere? This problem can be easily solved using Henry's law, because it states that solubility and pressure are directly proportional.

Answer: **.20 grams per liter** (*accept equivalents; if using different units, units must be specified*)

Bonus 10: Literature (Literature) -- Five Parts

Identify the authors of the following "tales".

A: The Canterbury Tales

B: The Handmaid's Tale

C: The Winter's Tale

D: Twice-Told Tales

E: Tales of the South Pacific

Answers: A: **Geoffrey Chaucer** B: **Margaret Atwood** C: **William Shakespeare** D: **Nathaniel Hawthorne** E: **James A. Michener**

HALFTIME

Tossup 11: Literature (Literature)

First published anonymously in 1818, a second edition was published in 1823, this time with the author's name attached and a third edition was published in 1831, the third having been heavily revised. This third edition, while still maintaining the epistolary frame story told by Robert Walton, changed the main character's relationship with Elizabeth, making it much less incestuous. Identify this novel, which was originally conceived during the snowy summer of 1816 as the result of a story writing contest between Lord Byron, Percy Shelly and his wife, Mary.

Answer: **Frankenstein**; or, **The Modern Prometheus** (*prompt on the subtitle*)

Bonus 11: Miscellaneous (Sports)

Answer these questions related to Boise State University.

A: The Boise State Bronco's football team plays their home games on this distinctive color turf.

B: On January 1st, Boise State won this bowl game in overtime.

C: The Bronocs beat this Big 12 team featuring running back Adrian Peterson that is coached by Bob Stoops.

D: Boise State Head Coach Chris Petersen won the National Coach of the Year award, which is named after this former Texas A&M and Alabama coach.

Answers: A: **Blue** (*prompt on Smurf Turf*) B: **Tostitos Fiesta Bowl** C: **University of Oklahoma Sooners** (*prompt on Sooners*) D: **Paul "Bear" Bryant**

Tossup 12: Math (Calculus) -- Computational (30 Seconds)

Find the derivative of the function $2x^2 - 11x + 2 \sin x$. Remember that the derivative of a sum is equal to the sum of the derivatives; that is, the term in this function with sine does not alter how the other terms are differentiated.

Answer: **$4x - 11 + 2 \cos x$**

Bonus 12: Science (Chemistry)

Of zero, one, or two rings, name how many cycles each of the following chemicals contain.

A: Benzene

B: Ethanol

C: Naphthalene (*NAFF-thuh-LEEN*)

D: Toluene (*TAHL-you-EEN*)

Answers: A: **1** B: **0** C: **2** D: **1**

Tossup 13: Miscellaneous (Interdisciplinary)

The name's the same. The name given to the last passenger pigeon. The biblical sister of Mary and Lazarus. The name of Paul McCartney's pet sheepdog, immortalized in the title of the song, "BLANK, My Dear." The class of women in The Handmaid's tale that wear green smocks. The first name of Ms. Graham, a leading 20th century dance instructor. The first name of an entrepreneur in magazines, television, and merchandise revolving homemaking products featured prominently at K-Mart. Identify this woman's name, the first name of the first First Lady of the United States.

Answer: **Martha**

Bonus 13: Fine Arts (Music)

Identify the following operas that feature titular women.

A: This opera's title woman is a smuggler working in a cigarette factory.

B: This Richard Strauss opera involves the beheading of John the Baptist.

C: This Verdi opera's title woman is Violetta Valery.

D: This opera's title woman is Cio-Cio san.

Answers: A: **Carmen** B: **Salome** C: **La traviata** D: **Madama Butterfly** (*accept Madame in place of Madama*)

Tossup 14: Science (Physics)

The phosphors used to generate it are typically strontium borate with europium, or barium silicate with lead. Alternatively, one can simply replace a regular lightbulb's glass with barium-sodium-silicate glass and nickel oxide, commonly called Wood's glass. In either case, the primary wavelengths emitted are about 320 to 400 nanometers, just shorter than typical visible light. Name this type of peculiarly-named lamp that actually looks more violet.

Answer: **Blacklight** (accept *ultraviolet light/lamp or similar answers*)

Bonus 14: Social Studies (Current Events)

Identify the following about events recently in the news.

A: Gurbanguly Berdimuhamedow was recently sworn in as the president of what country?

B: What five-time NBA All-Star admitted on at Miami radio show that he "hates gay people" and is "homophobic"?

C: What Republican former Massachusetts governor announced his candidacy for president on February 13, 2007?

D: What country recently agreed to shut down Yongbyon nuclear reactor in exchange for fuel aid and normalization in relations with other countries?

Answers: A: **Turkmenistan** B: **Tim Hardaway** C: **Willard "Mitt" Romney** D: **North Korea**

Tossup 15: Fine Arts (Visual Art)

His mother drowned herself in the Sambre River. This artist was present when her body was retrieved, and the imagery provided by this trauma shows up in much of his work. Some of his most popular works involve recurring themes involving easels, windows, trees and anonymous men. His 'The Son of Man' is a self-portrait of a man in a bowler hat, with his face obscured by a large, floating green apple. Identify this Belgian artist, whose work 'The Treachery of Images' is NOT a pipe.

Answer: **René François Ghislain Magritte**

Bonus 15: Science (Biology)

Identify the following terms related to chromosomes.

A: When chromosomes take on their characteristic X shape, the two sister chromatids are joined together at this location.

B: Chromosomes are made of DNA tightly wound around these spherical proteins.

C: The longer arm of a chromosome is called the "q arm," and the shorter arm is called this, from the French for "small."

D: An image of an organism's chromosomes is called this, and can indicate chromosomal diseases.

Answers: A: **Centromere** B: **Histones** C: **P arm** D: **Karyotype**

Tossup 16: Social Studies (U.S. History)

This man's father was likely gunned down by Al Capone's men for his role in the trial that finally put Capone away. Known for being the lone opposition to nine Japanese 'Betty' bombers on February 20, 1942, and shooting down five, while heavily damaging a sixth, this man eventually was shot down on November 26, 1943 during the first-ever nighttime fighter attack launched from an aircraft carrier. Identify this first recipient of the Navy Medal of Honor, who, on September 19, 1949, had Orchard Depot Airport renamed in his honor.

Answer: **Lt. Commander Edward Henry "Butch" O'Hare**

Bonus 16: Math (General)

Answer the following about measures of central tendency, giving any fractional answers as fully reduced fractions or mixed numbers. The set 3, 9, 27 will be used in this problem.

A: What is the arithmetic mean?

B: What is the geometric mean?

C: What is the quadratic mean, also known as the root mean square?

D: What is the harmonic mean?

Answers: A: **13** B: **9** C: **$\sqrt{93}$** D: **2 and one-thirteenth**

Tossup 17: Science (Biology)

Some genuses include spumavirus and lentivirus, of which HIV is a well-known example. They can mutate quickly because the RNA that they store their genetic code in, is prone to errors. Name this type of virus named after the fact that they use reverse transcriptase to create DNA out of RNA, the opposite of the normal process.

Answer: **Retrovirus**

Bonus 17: Literature (Mythology)

"That's it! I have had it with these mythological snakes on this mythological... plane?" Identify the following concerning snakes from various myths.

A: In Norse myth, this snake, when swallowing its own tail, encircles the earth.

B: According to Greek myth, he once broke up two snakes that were mating, and as punishment had to spend seven years as a woman.

C: He said, "I fear the Greeks, even bearing gifts" and as a result, he and his sons were killed by serpents from the sea.

D: This cousin of Bellerophon gained the ability to hear animals speak when baby snakes licked his ears clean.

Answers: A: **Jormungand** (*prompt on Midgard serpent*) B: **Tiresias** C: **Laocoön** (*pron: LAH-ah-koo-on*) D: **Melampus**

Tossup 18: Math (Algebra) -- Computational (30 Seconds)

A deli's computer failed during a lunch rush, and they need to know how many of each size ham sandwich they sold. They know they made \$120, and they have lost 111 ounces of ham. The regular size has 3 ounces of ham and the jumbo has 7. The two sizes cost \$4 and \$7 respectively.

Assuming no meat or money was stolen, how many of each size sandwich did they sell? It will help you to set this up as a system of equations.

Answer: **9 regular and 12 jumbo** (*Accept logical equivalents.*)

Bonus 18: Social Studies (Geography)

Name the straits of water that separate the following.

A: Mediterranean Sea and Atlantic Ocean

B: United States and Russia

C: English Channel and North Sea

D: Tierra del Fuego and South America

Answers: A: **Strait of Gibraltar** B: **Bering Strait** C: **Strait of Dover** D: **Strait of Magellan**

Tossup 19: Literature (Literature)

Usually grouped along with Pericles, The Tempest and The Winter's Tale, this play's title character is based on a real person from pre-Roman Britain named Cunobelinus. There are many comparisons drawn between it and Much Ado About Nothing because of some similar plot elements, such as the faking of one's death, as well as characters with similar names. It features a great example of Deus ex Machina when, in the middle of the action, Jupiter comes down from the sky and essentially commands an untangled plot. Identify this Shakespearean play that follows Posthumus, a man of low birth who has secretly married Imogen, the daughter of the title king of Britain.

Answer: **The Tragedy of Cymbeline, King of Britain**

Bonus 19: Science (Physics)

Name the following quantities that describe how stiff, thick, rough, or stretchy an object is.

A: Named after an English scientist, this measure of stiffness is the ratio of stress to strain.

B: This measures the shear stress between layers of fluid, measuring its perceived thickness when being poured.

C: Its static and kinetic varieties measure the resistive force experienced by an object as it is dragged along a surface, for each Newton of normal force it experiences.

D: When an object is stretched in one direction, its other two dimensions usually decrease, in proportions described by this ratio named after a French physicist.

Answers: A: **Young's modulus** B: **Viscosity** C: **Coefficient of friction** D: **Poisson's ratio**

Tossup 20: Social Studies (World History)

Her father, Charles VI, made many European countries sign a document called the Pragmatic Sanction, which stipulated that when he died she would be still be recognized as a ruler. She once held up her baby in front of the Hungarian ruling body while trying to persuade them, and her husband Francis I was technically the Holy Roman Emperor. Name this woman who had 16 children, including Joseph II and Marie Antoinette, who ruled Austria.

Answer: **Maria Theresa** (*prompt on either half of name*)

Bonus 20: Literature (Literature)

Identify the following ideal places from literature.

A: The ideal place created by Sir Thomas More.

B: The ideal locale created by James Hilton in Lost Horizon.

C: This splendidous place is known for caves of ice and a stately pleasure-dome.

D: Created by Samuel Butler, this ideal place is a satire of Victorian society.

Answers: A: **Utopia** B: **Shangri-La** C: **Xanadu** D: **Erewhon**

TIEBREAKERS/REPLACEMENTS:**Tossup 21: Literature (Literature)**

Raymond asked him to aid in the torture of his mistress, and he agreed because "he didn't have any reason not to." He concludes that the universe, much like himself, does not care for human life, and his indifference comes out when he shows no remorse at his mother's funeral. Name this title character who killed "the Arab" in a novel by Albert Camus.

Answer: **Meursault** (*mur-SO*) (accept "The Stranger")

Bonus 21: Science (Chemistry)

Given the chemical name of a well-known painkiller, give the name more commonly used.

A: Acetylsalicylic (*uh-SEE-tul-SAL-ih-SIL-ic*) acid

B: Paracetamol (*PARE-uh-SEE-tuh-maul*)

C: Naproxen (*nuh-PROX-in*)

D: Rofecoxib (*ROH-fih-COX-ib*)

Answers: A: **Aspirin** B: **Tylenol** C: **Aleve** D: **Vioxx**

Tossup 22: Math (Geometry) -- Computational (30 Seconds)

What is the area bounded by the y axis, the x axis, and the line y equals negative 2.4 x plus 4.8? It may help you to know that the x and y axes form a right angle, and the line passes through, from left to right, the second, first, and fourth quadrants, bounding an area in the first quadrant. This area is in the shape of a triangle.

Answer: **4.8 square units**

Bonus 22: Literature (Mythology)

Answer the following questions about the extramarital affairs of Aphrodite, Greek goddess of beauty.

A: What Greek god was her husband, who through an ingenious contraption, trapped her in bed with one of her lovers?

B: Who was the immortal lover from part A?

C: Among her most famous affairs was with what mortal who died at the tusks of a boar?

D: What son of Aphrodite and Anchises does Aphrodite save from the battlefield during the Iliad?

Answers: A: **Hephaestus** B: **Ares** C: **Adonis** D: **Aeneas**