



Ægis Questions

**New Trier Varsity 2007
Round 1**

Tossup 1: Literature (Literature)

As a socialist, he campaigned along with Upton Sinclair in the Sacco and Vanzetti trials, and he traveled to the Soviet Union in 1927 for information for two socialist books. His last novel, *The Stoic*, ended a trilogy about Charles Yerkes. His first novel follows Caroline Meeber, a country girl who becomes a big city mistress, and was initially a failure; his first commercial success came with a novel about Clyde Griffiths. Name this American author of *Sister Carrie* and *An American Tragedy*.

Answer: **Theodore Dreiser**

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

Given a description of a U.S. historical figure with a middle initial of "S," identify him.

1. This 33rd president of the United States was Commander-in-Chief during the Korean War.

Answer: **Harry S. Truman**

2. This World War II General who led the Third Army was killed after being involved in a car accident in 1945.

Answer: **George Smith Patton Jr.**

3. This 18th U.S. President, a former Civil War general, reigned during the Whiskey Ring scandal.

Answer: **Hiram Ulysses S. Grant**

Tossup 2: Social Studies (Geography)

It was settled in 1788 by Admiral Arthur Philip, though he had originally gone to Botany Bay before going to Port Jackson. Phillip renamed Port Jackson after the British home secretary, but now the area is referred to by many as the Circular Quay. Many of its first residents were convicts, but now it is a more metropolitan area known for its Opera House. Name this capital of New South Wales, the largest city in Australia.

Answer: **Sydney**

Bonus 2: Miscellaneous (Interdisciplinary)

Identify these facts related to December 15th.

1. In 1791, this document, which contains the first 10 amendments to the U.S. Constitution, was made into law.

Answer: **Bill of Rights**

2. In 1891, this man debuted a brand new game he had invented called basketball.

Answer: **James A. Naismith**

3. This movie based on a Margaret Mitchell book premiered in 1939.

Answer: **Gone With the Wind**

Tossup 3: Science (Biology)

Injury to it may occasionally be repaired by patch graft angioplasty or end-to-end anastomosis, but a synthetic graft is most often used. It is divided up into two main sections, the thoracic and the abdominal, based on its relative position to the diaphragm. In the abdomen, it stretches alongside the inferior vena cava before reaching the gut organs and kidneys, and finally dividing into its two branches, the common iliac arteries, which provide blood to the lower limbs. Name this artery, the largest artery in the human body.

Answer: **Aorta**

Bonus 3: Literature (Literature)

Identify the following characters involved in a twisted family tree.

1. This king of Thebes is prophesied to kill his father and marry his mother, famously recorded in the first play in a trilogy by Sophocles.

Answer: **Oedipus**

2. This daughter of Oedipus and Jocasta is the titular character in the third part of that trilogy.

Answer: **Antigone**

3. This son of Creon and Eurydice is betrothed to Antigone.

Answer: **Haemon**

Tossup 4: Math (Other) -- Computational (30 Seconds)

Find the variance of the set 7, 9, 11, 13, 15. It may help you to know that variance is the average of the squared differences between individual data points and the mean of all data points.

Answer: **8**

Bonus 4: Science (Physics)

Identify the SI units for the following quantities.

1. Absolute temperature.

Answer: **Kelvin**

2. Electric current.

Answer: **Ampere**

3. Pressure.

Answer: **Pascal**

Tossup 5: Fine Arts (Music)

He worked to collect English folk songs before volunteering for World War I at age 40. He wrote an operatic version of John Bunyan's *The Pilgrim's Progress*, and his seventh symphony is based on his music for the film *Scott of the Antarctic*. Identify this British composer famous for the *Pastoral Symphony* and *Fantasia on a Theme by Thomas Tallis*.

Answer: **Ralph Vaughan Williams** (*do not prompt on partial last name*)

Bonus 5: Math (Geometry)

Answer the following about an ellipse of equation $x^2/4 + (y-3)^2/16 = 1$.

1. What is the center of the ellipse?

Answer: **(0,3)**

2. What is the area of the ellipse?

Answer: **8 pi square units**

3. What is the eccentricity of the ellipse?

Answer: **root 3 over 2**

Tossup 6: Miscellaneous (Entertainment)

The words "You Suck!" are edited into the Atlantic Records Wikipedia article by the main character, who is a fan of M.C. Escher. That speaker claims he can play Minesweeper for days, and hopes that nobody sees him with his bubble wrap, getting freaky. In this, that character is a member of AV club, Glee club, and the Chess team, and the toughest question he ever faced was whether his favorite Star Trek character was Kirk or Picard. Name this Weird Al Yankovic song which may aptly describe some Scholastic Bowl players.

Answer: **White and Nerdy** (prompt *Weird Al Yankovic*)

Bonus 6: Social Studies (Current Events)

Given a quote from this year's Presidential Campaign, identify the speaker.

1. "It's silly season. I understand she's been quoting my kindergarten teacher in Indonesia."

Answer: **Barack Hussein Obama**

2. "In case you missed it, a few days ago Senator Clinton tried to spend \$1 million on the Woodstock Concert Museum. Now, ladies and gentlemen, I wasn't there. I'm sure it was a cultural and pharmaceutical event. I was tied up at the time."

Answer: **John Sidney McCain III**

3. "My plan for secure borders? Two words: Chuck Norris."

Answer: **Michael Dale "Mike" Huckabee**

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

Solve the following system of equations: $2y$ equals $4x$ minus 10, and $3x$ plus $4y$ equals 13. As the first equation is given in a modified version of slope-intercept form, the substitution method may be fastest.

Answer: **(3, 1)** or **$x=3, y=1$**

Bonus 7: Fine Arts (Visual Art)

Given a description, identify an artist and then two facts related to him.

1. Name the artist who painted View of Toledo and The Burial of the Count of Orgaz.

Answer: **El Greco** (accept *Domenikos Theotokopolous*)

2. Name the 16th Century Italian sculptor who completed Perseus with the Head of Medusa, which is on display in Florence.

Answer: **Benvenuto Cellini**

3. El Greco and Cellini both belonged to what school of art whose name, though it sounds English, comes from the Italian word for style?

Answer: **Mannerism** (accept *Mannerist*)

Tossup 8: Social Studies (World History)

He became the leader of Spear of the Nation in 1961, and organized sabotage campaigns to do what he felt non-violent protest could not. Allegedly, the CIA informed authorities of this man's whereabouts for a 1962 arrest, which led to the Rivonia Trial and his 27 year imprisonment, mostly spent on Robben Island. Identify this man, preceded by F.W. de Klerk in his position as President of South Africa.

Answer: **Nelson Mandela**

Bonus 8: Science (Astronomy)

Identify these U.S. firsts in space.

1. This was the first American satellite in space.

Answer: **Explorer I** (accept *Satellite 1958 Alpha*)

2. He was the first American in space.

Answer: **Alan Bartlett Shepard Jr.**

3. She was the first woman in space.

Answer: **Sally Kristen Ride**

Tossup 9: Literature (Literature)

He may be considered an early feminist writer for his portrayal of Carol Kennicott in one of his most famous works. Another famous work, set in Zenith, was originally titled Pumphrey before being renamed for the titular real estate salesman. His philosophy on fascism led him to write *It Can't Happen Here*, about the election of a fascist US President. Identify this author, the first American Nobel Laureate for Literature, famous for *Main Street* and *Babbitt*.

Answer: **Sinclair Lewis**

Bonus 9: Math (General)

Give all answers as reduced fractions. Two cubical dice are rolled. Find the probability that the tops of the dice will add up to exactly eleven if:

1. The dice are labeled normally.

Answer: **1/18**

2. One die is labeled normally, and the other die has its sides labeled with the numbers seven through twelve.

Answer: **1/9**

3. One die is labeled with the positive odd numbers up to and including eleven, and the other die is labeled with the positive even numbers up to and including twelve.

Answer: **5/36**

Tossup 10: Science (Chemistry)

Over 80 million liters of this substance was released in 1986 in Cameroon by Lake Nyos, in an event known as a limnic eruption. With a density of about two grams per liter, it is produced during fermentation along with ethanol. Name this gaseous compound formed in complete combustion reactions, whose solid form is known as dry ice.

Answer: **Carbon dioxide** (accept *CO2*)

Bonus 10: Literature (Literature)

Identify these Roman writers.

1. This man wrote of the travels of Aeneas in the *Aeneid*.

Answer: **Virgil** (accept *Publius Vergilius Maro*)

2. *Ars Amatoria* and *Fasti* are two of the works by this author of the *Metamorphoses*.

Answer: **Ovid** (accept *Publius Ovidius Naso*)

3. This poet, who coined the term *Carpe Diem* (*car-PAY DEE-um*) and wrote *Ars Poetica*.

Answer: **Horace** (accept *Quintus Horatius Flaccus*)

HALFTIME

Tossup 11: Miscellaneous (Technology)

Its announcement led to a lawsuit over its name, which had been trademarked by Infogear in 1996 for an unrelated device. Supposedly intended to capture one percent market share, it was discovered soon after launch that it could be partially unlocked without activating it, and later, that third-party applications could be loaded onto it. With a two megapixel camera, and either 8 or 16 gigabytes of memory, its most prominent feature is a large multi-touchscreen. Name this mobile phone released on June 29, 2007 by Apple.

Answer: iPhone

Bonus 11: Literature (Mythology)

Identify these people from Homer's The Odyssey.

1. At one point, this witch turns most of Odysseus's crew into pigs.

Answer: Circe (accept *Kirke*)

2. Earlier, Odysseus and his men had a disastrous run-in in a cave with this one-eyed giant.

Answer: Polyphemos

3. After he returns from his voyage, Odysseus goes to see this man, his father.

Answer: Laertes

Tossup 12: Social Studies (Current Events)

In this nation, Gillian Gibbons was recently sentenced to fifteen days in prison. Gibbons, an elementary school teacher from England, was sentenced because her class of seven-year-olds voted to name the class teddy bear Mohammed. Name this African nation, headed by Omar al-Bashir, that has been in the news the past few years because of atrocities in its Darfur region.

Answer: The Sudan

Bonus 12: Math (Other)

You have a sack with two red kittens, two green kittens, and a blue kitten.

1. If you let two cats out of the bag, without replacement, what is the probability that they are both red?

Answer: 1/10

2. You avert further cat-astrophe and recover the kittens. You let two out again. What is the probability that one is red and one is green?

Answer: 2/5

3. You then play poker with the two green kittens. The chance that a kitten beats you at poker is 1/5, but half of all winning kittens play dirty. If both kittens beat you, what is the chance that they are both cheetahs?

Answer: 1/4

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

Find the area between the curves f of x equals x cubed plus 3 and g of x equals x squared from x equals 0 to x equals 4. It will help you to know that, in the first quadrant, f of x is always greater than g of x .

Answer: 64/3 square units

Bonus 13: Science (Chemistry)

Identify these gas laws.

1. According to this law, the pressure and volume of a gas are inversely proportional.

Answer: **Boyle('s) law**

2. According to this law, the volume of a gas is proportional to the number of particles.

Answer: **Avogadro('s) law**

3. Combining Boyle's law, Avogadro's law, Charles's law, and Gay-Lussac's law yields this gas law, often stated as $P V$ equals $n R T$.

Answer: **Ideal gas law**

Tossup 14: Literature (Literature)

Characters in this 1843 work include Dick Wilkins and Mrs. Dilber. Peter, Martha, and Belinda are the children of the main character's clerk, Bob Cratchit. The book begins with the proclamation that the main character's former business partner, Jacob Marley, is dead, and the main character is later visited by ghosts. Name this Charles Dickens work about Ebenezer Scrooge.

Answer: **A Christmas Carol**

Bonus 14: Miscellaneous (Sports)

Answer these questions about the finalists for the 2007 Heisman trophy award.

1. Chase Daniel led this school to a Big 12 North title by beating rival Kansas before falling to Oklahoma.

Answer: **University of Missouri Tigers** (*prompt on Mizzou; accept either Missouri or Tigers*)

2. This Hawaii quarterback holds the NCAA career record for touchdown passes.

Answer: **Colton "Colt" James Brennan**

3. This Florida quarterback was the winner of the Heisman trophy.

Answer: **Timothy Richard Tebow**

Tossup 15: Science (Earth Science)

Forty thousand kilometers long, it is composed of numerous sections. The easternmost is located at the subduction of the Nazca and Cocos Plates under the South American plate, and the northern portion occurs because of the subduction of the Juan de Fuca Plate below the North American Plate. Consisting of 452 volcanoes, name this semicircular strip circling the Pacific Ocean which has been home to ninety percent of the world's earthquakes.

Answer: **Pacific Ring of Fire**

Bonus 15: Social Studies (World History)

Identify these women from European history.

1. This Russian Empress fought a war with the Turks and partitioned Poland multiple times during her reign.

Answer: **Catherine the Great** (*prompt on Catherine; accept Catherine II*)

2. This Austrian wife of France's Louis XVI was known for her expensive tastes, which led in part to her death at the guillotine.

Answer: **Marie Antoinette** (*accept Maria Antonia Josefa Johanna von Habsburg-Lothringen*)

3. Marie Antoinette was one of 16 children of this Austrian ruler, whose ascension to the throne promulgated the War of the Austrian Succession.

Answer: **Maria Theresa**

Tossup 16: Fine Arts (Visual Art)

A copy of it at the Cleveland Museum of Art was badly damaged when a bomb exploded at its feet in 1970. It is said that its artist, upon meeting Lenin face to face, presented him with a version of it with a chimpanzee in place of the title character. Originally named The Poet, it is a characterization Dante. Originally appearing above the Gates of Hell portal, identify this sculpture of a man by Rodin.

Answer: **The Thinker**

Bonus 16: Math (Algebra)

Given the matrix with top row 9, 0 and bottom row 1, 5, answer the following.

1. What is the determinant?

Answer: **45**

2. What is the trace?

Answer: **14**

3. What is the product of this matrix with the matrix with top row 9, 1, and bottom row 0, 5?

Answer: **Top row 81, 9, bottom row 9, 26**

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

A circle has diameter AB and chord CD perpendicular to the diameter meeting at point E. The radius of the circle is 18, and the length of segment BE is 6. Using this information, what is the length of segment CE?

Answer: **12 units**

Bonus 17: Literature (Literature)

Identify the following about a winner of the Nobel Prize in Literature.

1. Winning as a first-year candidate in 1938, she was selected without due consideration, and is considered a failure of a selection by the Swedish Academy.

Answer: **Pearl S. Buck**

2. Along with the Japanese occupation of China, this is the work that catapulted Buck into prominence, a novel featuring Wang Lung and O-Lan.

Answer: **The Good Earth**

3. Under the pseudonym John Sedges, The Good Earth was released together with two of Buck's other works to form this trilogy.

Answer: **The House of Earth Trilogy**

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

When he ran for President, the only states he won were Missouri and New Jersey, and he had to split the New Jersey delegates. He occasionally had eggs thrown at him on the campaign trail, and some historians believe that he held the hat of the man he lost to during the Inauguration. He was associated with the Freeport Doctrine, which had helped him win a Senate election but worked against his Presidential ambitions. Name the candidate of the Northern Democratic Party who lost the 1860 Presidential Election to another Illinois politician.

Answer: **Stephen Douglas**

Bonus 18: Science (Biology)

Mitosis is the process in which cells divide to create two daughter cells identical to the mother cell.

1. In mitosis, the mother and daughter cells typically have two sets of each chromosome, making them this.

Answer: **Diploid**

2. Diploid cells are contrasted with this type of cell which has only one set of each chromosome.

Answer: **Haploid**

3. In this process, one diploid cell divides into four haploid sex cells.

Answer: **Meiosis**

Tossup 19: Science (Physics)

Coined by William Whewell from the Greek for "descent," in diagrams of semiconductor diodes, this can be represented by a line. In electroplating cells, the item to be plated is made this component of the circuit. While they can be either positive or negative, they are always the location of reduction in an electro-voltaic cell. Name this electrode that lends its name to a type of tube used in monitors.

Answer: **Cathode**

Bonus 19: Fine Arts (Music)

The Romantic era is well known for virtuosi performers. Identify the following pianists.

1. This Polish piano virtuoso wrote numerous mazurkas, polonaises, and etudes.

Answer: **Frederic Chopin**

2. This composer is well known for his Hungarian Rhapsodies as well as having hands capable of stretching up to ten full steps.

Answer: **Franz Liszt**

3. This Russian pianist and composer is well known today for touring throughout America and Europe and for his Rhapsody on a Theme by Paganini.

Answer: **Sergei Rachmaninoff**

Tossup 20: Literature (Literature)

Much like this man himself, a character in one of his works rejects polite conventions of his society, resulting in a general dislike of him. Dying immediately following a performance in which he was portraying a hypochondriac, his on stage coughing fit likely sold the character to the audience. His arguably most famous work was roundly condemned by the religious devoted of his time. Identify this French actor and playwright of *The Misanthrope* and *Tartuffe*.

Answer: **Molière** (accept *Jean-Baptiste Poquelin*)

Bonus 20: Social Studies (U.S. History)

Answer these questions about everyone's favorite Vice President, Aaron Burr.

1. In the election of 1800, Burr received 73 electoral votes, the same amount as this man who, after debate in the House of Representatives, was determined to be the president.

Answer: **Thomas Jefferson**

2. Angered at this man's opposition to his candidacy for Governor of New York, Burr challenged him to a duel, and killed him.

Answer: **Alexander Hamilton**

3. Burr presided over the 1805 impeachment trial of this Justice, who was acquitted.

Answer: **Samuel Chase**

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

This kind of cost must always be expressed for at least two goods. Furthermore, its value for one good will be the inverse of its value for the other good. It includes hidden costs but not sunk costs and can be used to calculate feasible terms of trade. Name this microeconomic concept, the basis for trade-offs and the reason for gains from trade, which is always measured in terms of the next best alternative.

Answer: **Opportunity cost**

Bonus: Fine Arts (Music)

Identify the following musical figures who doubled as religious officials.

1. This composer of Orfeo, one of the earliest operas, was ordained as a Catholic priest in 1632.

Answer: **Claudio Monteverdi**

2. This man, known as the Red Priest, had many works rediscovered in the 1920's, but is still most famous for The Four Seasons.

Answer: **Antonio Vivaldi**

3. This man converted from Judaism to Catholicism and became a Catholic priest before writing libretti for Mozart's Cosi fan Tutte and Le Nozze di Figaro.

Answer: **Lorenzo Da Ponte**



Ægis Questions

**New Trier Varsity 2007
Round 2**

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

He fought 13 duels over the course of his life, many of which were over his wife's honor, which had been tarnished by marrying this man before finalizing her divorce in a previous marriage. Although he was defeated under what he saw as dubious circumstances in 1824, he would later go on to win the elections of 1828 and 1832. Name this 7th President, nicknamed "Old Hickory."

Answer: **Andrew Jackson**

Bonus 1: Math (Other)

Given that you have two six-sided dice, what is the probability of the following occurring?

1. You roll two prime numbers.

Answer: **1/4**

2. You roll a sum on the two dice which is a prime number.

Answer: **5/12**

3. You roll a sum of seven on the two dice.

Answer: **1/6**

Tossup 2: Miscellaneous (Interdisciplinary)

The only poem in Blake's Songs of Experience not paired with a Song of Innocence. The magnetic field resulting from rotation of a superconductor. Vaughn Williams's second symphony. Towns in California, Kentucky, Ohio, and Texas. The German scientist Fritz, after whom dispersion forces are named. Jack, author of The Sea-Wolf. Twelve of Haydn's symphonies. Give the common name shared by all of the previous, most famously the name of a city in England.

Answer: **London**

Bonus 2: Literature (Literature)

Answer the following about Edgar Allan Poe's The Pit and the Pendulum.

1. This temporal figure holds the pendulum that threatens to cut the story's protagonist in twain.

Answer: **Father Time**

2. The Pit and the Pendulum takes place during this heretical torture fest of the Catholic church.

Answer: **The Spanish Inquisition**

3. General Lasalle saves the story's protagonist when he, with the French army, captures this capital of the Inquisition.

Answer: **Toledo, Spain**

Tossup 3: Literature (Literature)

The Hostess of the Boar's Head Tavern describes his death in terms that mirror the death of Socrates. At this point, his now masterless page goes off to war with three of Henry V's soldiers. This companion of Prince Hal and chaser of Mistresses Ford and Page appeared in three of Shakespeare's plays, two histories and a comedy. Identify this character who, at the request of Queen Elizabeth, had a play written specifically about him: The Merry Wives of Windsor.

Answer: **Sir John Falstaff**

Bonus 3: Science (Physics)

Identify these states of matter.

1. This state of matter has no definite shape or volume, and consists of molecules bouncing around freely.

Answer: **Gas**

2. A gas of ionized particles is known as this state of matter, which behaves very differently from an ordinary gas.

Answer: **Plasma**

3. This state of matter first predicted by Einstein in 1925 was not observed until 70 years later. Only existing close to absolute zero, it displays quantum behaviors on a macroscopic scale.

Answer: **Bose-Einstein condensate** (accept BEC)

Tossup 4: Science (Biology)

Named after the Greek word for "shield," after its two-lobed shape, this structure has many follicles which absorb a certain ion from the blood in order for its follicular cells to produce two particular hormones. When that ion is absent in the blood, however, levels of this gland's hormones drop low, and TSH is released by the pituitary gland, stimulating this gland and causing it to enlarge, sometimes dramatically, a condition called goiter. Name this endocrine gland found in the neck which absorbs iodine.

Answer: **Thyroid gland**

Bonus 4: Social Studies (World History)

Identify the following Chinese dynasties.

1. Most of the modern Great Wall of China was built during this dynasty, whose name became associated with a type of vase.

Answer: **Ming**

2. The earliest beginnings of the Great Wall appeared during this dynasty, whose greatest emperor was buried with a famous army of terra cotta soldiers.

Answer: **Qin** (*Chin*)

3. This politically turgid dynasty was the backdrop for the lives of both Kung Fuzi (*foo-tsee*), the founder of Confucianism, and Laozi (*lahw-tsi*), father of Taoism (*DOW-ism*).

Answer: **Zhou** (*Joe*)

Tossup 5: Math (General)

One of his functions, represented by ϕ of n , represents the amount of numbers coprime to n . One of his methods can be used to numerically solve the definite integral of a function. One of his formulas dictates that the number of vertices plus the number of faces minus the number of edges equals two for a polyhedron. Name this Swiss mathematician whose most famous equation states that e to the πi plus one equals zero.

Answer: **Leonhard Euler**

Bonus 5: Fine Arts (Music)

The titular character of this opera is set to marry Elsa, but she asks a forbidden question.

1. Identify this 1850 opera concerning the knight of the Holy Grail and containing the famous Bridal Chorus.

Answer: **Lohengrin**

2. Identify the German composer of Lohengrin.

Answer: **Richard Wagner**

3. This final opera by Wagner tells the story of Lohengrin's father.

Answer: **Parsifal**

Tossup 6: Social Studies (Other)

Before he began advocating the end of the public university system, he attended Rutgers, The State University of New Jersey. After the Great Depression, he worked in the U.S. Treasury Department and was partially responsible for the institution of the payroll withholding method of taxation. With Anna Schwartz, he cowrote "A Monetary History of the United States, 1867-1960". Name this 1976 Nobel Prize Winner who was a professor of economics at the University of Chicago and, with help from his wife Rose, wrote "Free to Choose" and "Capitalism and Freedom".

Answer: **Milton Friedman**

Bonus 6: Miscellaneous (Entertainment)

In September 2007 two rappers had a contest to see who could sell more albums.

1. This Chicago native's Graduation, which contained the hit Stronger, sold the most albums.

Answer: **Kanye Omari West**

2. This artist, who was shot 9 times in 2000, promised to retire if his album Curtis was outsold by West's.

Answer: **50 Cent** (*prompt on Curtis Jackson*)

3. In Stronger, West featured this French group, known for their distinctive style and songs such as One More Time.

Answer: **Daft Punk**

Tossup 7: Fine Arts (Visual Art)

This artist actually attended West Point before deciding to become an artist. A fan of Courbet, he later worked with him while in France. Many of his works have oriental themes to them, including "Symphony in Grey and Green: The Ocean," and "Old Battersea Bridge." He was forced into bankruptcy after he received practically nothing in damages after he won his libel case against John Ruskin. Name this American artist best known "Arrangement in Gray and Black: The Artist's Mother."

Answer: **James Abbott McNeill Whistler**

Bonus 7: Math (Calculus)

For each function, find the value of x that gives the lowest possible value of y.

1. $y=x^2 + 4x + 8$

Answer: **-2**

2. $y=\arccosine\ of\ x$

Answer: **1**

3. $y=e^x - x$

Answer: **0**

Tossup 8: Science (Chemistry)

Their efficiency can be measured in moles per second. Heterogeneous ones like platinum and iron often function through adsorption of reactants, weakening their bonds. Homogeneous ones provide alternate reaction mechanisms which occur more quickly. Either way, by lowering the activation energy of a reaction, they allow it to occur more quickly. Name this type of substance which accelerates a chemical reaction without being itself consumed.

Answer: **Catalyst**

Bonus 8: Social Studies (U.S. History)

Identify these groups of Americans who became commonly known by their location and a number.

1. In 1947, this group refused to answer the question, "Are you now or have you ever been a member of the Communist Party?" They all made speeches in a documentary with the same name as the group that was released in 1950.

Answer: **Hollywood Ten**

2. This group was prevented from entering high school by Governor Orval Faubus in 1957.

Answer: **Little Rock Nine**

3. This group was charged with inciting to riot for events that happened at the same time as the Chicago Democratic Convention. Give the original name of the group, when it included Bobby Seale.

Answer: **Chicago Eight**

Tossup 9: Math (Geometry) -- Computational (30 Seconds)

Express your answer in degrees. The hands on a twenty-four hour clock show a time of 10:20 PM. What angle do the hands make? It may help you to know that 10 PM on a twenty-four clock is in the same position as 11 PM on a twelve-hour clock.

Answer: **145 degrees**

Bonus 9: Literature (Literature)

Identify these characters from Romeo and Juliet.

1. He utters the line, "I am hurt. A plague on both your houses."

Answer: **Mercutio**

2. The person who stabs Mercutio and is soon thereafter stabbed by Romeo.

Answer: **Tybalt**

3. Name either one of the Capulet servants involved in a discussion during the beginning of the first scene.

Answer: **Gregory or Sampson**

Tossup 10: Literature (Literature)

This play was inspired by a lawsuit involving the playwright's father regarding racial discrimination during the Great Depression. In it, Joseph Asagai speaks of African heritage, while Karl Lindner attempts to dissuade Lena Younger from using insurance money to purchase a home in an all-white neighborhood. Identify this play, which takes its name from A Dream Deferred by Langston Hughes, the first and most famous play by Lorraine Hansberry.

Answer: **A Raisin in the Sun**

Bonus 10: Science (Physics)

Given a non-SI unit, name the SI unit which measures the same thing.

1. Erg

Answer: **Joule**

2. Mho (*MOE*)

Answer: **Siemens**

3. Dyne

Answer: **Newton**

HALFTIME

Tossup 11: Literature (Mythology)

This man makes his home at the castle Joyous Guard. Along with his illegitimate half-brother Hector de Maris, and cousins Sir Bors and Sir Lionel, this son of King Ban is one of the Knights of the Round Table. When he was tricked into sleeping with the Fisher King's daughter Elaine, the resulting progeny was Galahad. Spending his childhood with the Lady of the Lake, Identify this Knight of the Round Table who engaged in a notable affair with Queen Guinevere.

Answer: **Sir Lancelot du Lac**

Bonus 11: Miscellaneous (Technology)

The eighth most visited website in the world according to Alexa, it was launched in 2002 and features Scrapbooks, Polls, and Communities.

1. Name this social networking website named after its Turkish creator.

Answer: **Orkut**

2. Orkut is a service offered by this search engine founded by Larry Page and Sergey Brin, which had its IPO in 2004.

Answer: **Google**

3. Google uses this patented algorithm to determine which search results are most relevant, by analyzing which are most heavily linked.

Answer: **PageRank**

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

Find the definite integral from x equals 0 to x equals 1 of the function f of x equals x divided by the quantity x squared plus 1, quantity raised to the one-half power, dx .

Answer: **$\sqrt{2}$ minus 1**

Bonus 12: Social Studies (Geography)

I'll name a pair of countries. You name the one country that both of them border.

1. Chile and Ecuador

Answer: **Peru**

2. Mongolia and Pakistan

Answer: **China**

3. Egypt and Niger

Answer: **Libya**

Tossup 13: Science (Astronomy)

Each member of one of these has gravitational control of everything within its Roche lobe.

Categorized as astrometric, eclipsing, visual, or spectroscopic, the trajectories of one of these can be calculated by solving the Kepler problem. Famous examples include Algol and Sirius. Name this type of stellar system consisting of two stars orbiting around their barycenter.

Answer: **Binary star** (accept multiple stars or binary system)

Bonus 13: Math (Geometry)

Answer the following questions about a triangle with internal angles of ninety degrees and fifteen degrees and a hypotenuse of length one unit.

1. What is the measure of the other angle in degrees?

Answer: **75 degrees**

2. What is the length of the side connecting the fifteen degree angle to the ninety degree angle?

Answer: **$(\sqrt{6} + \sqrt{2}) / 4$** (accept equivalents)

3. Find the area of the triangle, knowing that the other leg of the triangle has length quantity root 6 minus root 2, all divided by 4.

Answer: **1/8**

Tossup 14: Miscellaneous (Other)

In this specification, each column and row represent different frequencies which are combined in sinusoidal patterns, creating sounds that are later decoded using the Goertzel algorithm to determine what key was pressed. It includes provisions for largely-unused A, B, C, and D keys, besides the ten digits and two non-numeric buttons in common use today. Name this standard developed in the 1950s at Bell Labs to replace pulse dialing.

Answer: **Touch-Tone** (accept tone dialing or Dual-Tone Multi-Frequency dialing)

Bonus 14: Literature (Literature)

The bestseller lists have been topped recently with works doubting the existence of God.

1. This author's The God Delusion spent 51 weeks on the New York Times list.

Answer: **Richard Dawkins**

2. This author followed his book God Is Not Great with The Portable Atheist, a collection of essays.

Answer: **Christopher Hitchens**

3. When readers wrote to Sam Harris about this work, he responded with Letter to a Christian Nation.

Answer: **The End of Faith**

Tossup 15: Social Studies (World History)

They were assisted by typhoons in defeating two insurgencies of Mongol warriors in the 13th century. Many of them would go on to devote their lives to Zen Buddhism, and those who didn't survive became associated with the cherry blossom. Though they are also called bushi, their best-known title means "to serve," meaning they were contracted to fight for a daimyo. Identify these medieval Japanese warriors famous for their honor and their swords.

Answer: **Samurai**

Bonus 15: Science (Chemistry)

Acids can be defined in numerous ways.

1. This Swedish chemist defined acids as substances which donate hydrogen ions to solution.

Answer: **Svante Arrhenius**

2. According to this definition named after two chemists, acids donate protons, and bases accept protons.

Answer: **Bronsted-Lowry**

3. This American chemist broadened the definition of acids and bases, stating that acids accept electron pairs, and bases donate electron pairs.

Answer: **Gilbert Lewis**

Tossup 16: Math (Algebra) -- Computational (30 Seconds)

Find an expression for the quadratic function with the following properties using the format ax^2+bx+c . It has a y-intercept at 16 and goes through the points (1,30) and (-1,6). Its vertex is at (-3,-2), and its x-intercepts are at -4 and -2. Written in vertex form, its equation is $y=2(x+3)^2-2$.

Identify this quadratic whose derivative is $4x+12$ and whose antiderivative is $(\frac{2}{3})x^3+6x^2+16x+C$.

Answer: **$y=$ OR $f(x)= 2x^2+12x+16$**

Bonus 16: Fine Arts (Visual Art)

Answer a question about an artist, and then identify two facts related to him, given a clue.

1. This 17th Century Dutch artist completed many self portraits and a painting commonly referred to as Night Watch.

Answer: **Rembrandt Harmenszoon van Rijn**

2. This doctor was portrayed by Rembrandt demonstrating the muscles of the arm.

Answer: **Nicolaes Tulp**

3. Name the mother of Perseus who Rembrandt portrayed as welcoming Zeus into her bed.

Answer: **Danae**

Tossup 17: Literature (Literature)

Horatio Bridge offered \$250 if its publication failed. It includes "Lady Eleanor's Mantle," while another story tells of a minister who wore a veil that symbolizes sin. It was considered somewhat of an anthology, as all of its works had previously been published, including "Dr. Heidigger's Experiment." Identify this 1837 collection of stories by Nathaniel Hawthorne.

Answer: **Twice-Told Tales**

Bonus 17: Math (Algebra)

Answer the following about the function f of x equals $2x$ squared minus $8x$ plus 4 .

1. What is the discriminant of the function?

Answer: **32**

2. What is the x-coordinate of the vertex?

Answer: **2**

3. What is either one of the x-intercepts?

Answer: **2 plus $\sqrt{2}$ or 2 minus $\sqrt{2}$**

Tossup 18: Science (Physics)

Three laws bear this name. One states that the phase of a wave does not affect how the ear perceives it. Another states that sounds are perceived as a sum of pure harmonic tones. By far the most famous, however, was proposed in 1827, and can be written as J equals σE . While it does not apply to all objects, it is often used with Kirchoff's loop rule in DC to calculate the current running through each section of a circuit. Its analog for inductors states that L equals V over di/dt . Name this law of electrical circuits that states that voltage is equal to current times resistance.

Answer: **Ohm's Law**

Bonus 18: Social Studies (Current Events)

Identify these US House of Representatives Committees:

1. In charge of taxes, it is currently chaired by Charles Rangel.

Answer: **Ways and Means**

2. In charge of spending, it is currently chaired by David Obey.

Answer: **Appropriations**

3. This committee puts limits on the debate of bills passed by other committees. It is currently chaired by Louise Slaughter.

Answer: **Rules**

Tossup 19: Fine Arts (Music)

This man was blacklisted in the 1950s, but most of his major work was completed before then. One of his first works was Grohg, but he's better known for later pieces such as A Lincoln Portrait. He wrote Fanfare For the Common Man in 1942, and he completed Rodeo in the same year. Name this American composer of Appalachian Spring.

Answer: **Aaron Copland**

Bonus 19: Science (Biology)

Answer these questions about blood vessels.

1. This is a blood vessel that carries blood toward the heart.

Answer: **Vein**

2. Most veins carry deoxygenated blood. Besides the umbilical vein, this is the only vein which carries oxygenated blood toward the heart.

Answer: **Pulmonary vein**

3. This is a small vein which connects capillaries to veins.

Answer: **Venuole**

Tossup 20: Social Studies (U.S. History)

His first well known case was 1936's Murray vs. Peterson, which sought to strike down a ruling that had been given 40 years prior. He won 29 Supreme Court cases, including one in 1954 when he argued for the NAACP in Brown v. Board of Education that separate but equal was inherently unequal. Name this first black member of the Supreme Court.

Answer: **Thurgood Marshall**

Bonus 20: Literature (Literature)

Identify the following regarding War literature.

1. A part of a writing team that won the Pulitzer for reporting on electoral fraud in Chicago, this man also wrote a Rumor of War about Vietnam.

Answer: **Philip Caputo**

2. This work by Mark Bowden is the result of many interviews he conducted after an intense battle in Mogadishu.

Answer: **Black Hawk Down**

3. This James Jones novel is his fictional account of the Guadalcanal campaign.

Answer: **The Thin Red Line**

TIEBREAKERS/REPLACEMENTS:**Tossup: Math (Geometry) -- Computational (30 Seconds)**

Find the surface area of a cylinder with radius 5 and height 3.

Answer: **80 pi**

Bonus: Literature (Literature)

From a description, identify the following literary mothers.

1. The carrying of her corpse is the central action of William Faulkner's As I Lay Dying.

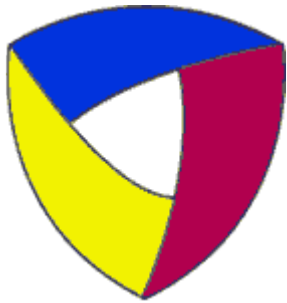
Answer: **Addie Bundren**

2. She is the morphine-addicted mother in Eugene O'Neill's Long Day's Journey Into Night.

Answer: **Mary Cavas Tyrone**

3. The mother of John the Savage, she dies from an overdose of soma.

Answer: **Linda**



Ægis Questions

**New Trier Varsity 2007
Round 3**

Tossup 1: Literature (Literature)

This author follows Hugh McVey's rise from poverty in *Poor White*, one of his few commercially successful novels. His four day disappearance, mental breakdown, and ensuing devotion to writing earned him respect from his peers. The collection he is most famous for starts with the story *Hands* and follows the denizens of the titular city asking George Willard for help and guidance. Name this literary figure and author of *Winesburg, Ohio*.

Answer: **Sherwood Anderson**

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

Identify these Illinoisans who have held important positions in the American government.

1. This man preceded Robert Gates as the Secretary of Defense.

Answer: **Donald Henry Rumsfeld**

2. This man was the Secretary of the Interior from 1933-1946.

Answer: **Harold LeClair Ickes**

3. This Republican served before Nancy Pelosi as the Speaker of the House.

Answer: **John Dennis "Denny" Hastert**

Tossup 2: Social Studies (Geography)

Its motto is "Forward, Upward, Onward Together," and its current Prime Minister is Hubert Ingraham. At one point home to the Lucayan people, in 1973 it achieved independence from the United Kingdom. Andros is its largest island, while the capital city is on New Providence Island. Located east of Florida, it is also north of Cuba, and its tropical location makes it a popular vacation spot. Name this archipelago that has its capital at Nassau.

Answer: **Commonwealth of the Bahamas**

Bonus 2: Miscellaneous (Interdisciplinary)

Identify the following things with something in common.

1. Founded as part of a Beatles project, this record company now owns the rights to all of The Beatles' videos and movie clips.

Answer: **Apple Records**

2. This company responsible for the famous "1984" Super Bowl ad directed by Ridley Scott has been involved in numerous lawsuits with Apple Records.

Answer: **Apple Computer Inc.**

3. These daughters of Atlas were responsible for tending to a tree filled with golden apples.

Answer: **Hesperides**

Tossup 3: Science (Physics)

In a vacuum without current or charge, solving them results in two perpendicular sinusoidal waves in phase. Two named after Gauss state that electric flux is proportional to contained free charge, and that magnetic flux is always zero. Yet another, named after Faraday, states that changing magnetic fields cause electric fields, and the final, named after Ampere, states that electric current induces a magnetic field. Name these four equations of electromagnetism whose name comes from the Scottish scientist who consolidated all four, though only contributing to one of them.

Answer: **Maxwell's equations**

Bonus 3: Literature (Literature)

Famous men like Wright and Gehry thoroughly explored the wide world of architecture, but many authors have dabbled in it, too. Answer the following related questions.

1. An orphaned girl is taken in by Matthew and Marilla Cuthbert and eventually marries Gilbert Blythe in this series by L. M. Montgomery.

Answer: **Anne of Green Gables**

2. At the end of this gothic novel by Nathaniel Hawthorne, the titular building is left empty as the Pyncheons leave to start a new life free from prejudice.

Answer: **The House of the Seven Gables**

3. Known theatrically as the female Hamlet, this Norwegian character is thought to be pregnant when she commits suicide to avoid scandal after the death of Eilert Lovborg, her husband's rival.

Answer: **Hedda Gabler**

Tossup 4: Math (Other) -- Computational (30 Seconds)

This is the smallest counting number which is the radius of a sphere whose volume is an integer multiple of pi. It is also the number of distinct real solutions to the equation $x^7 - 19x^5 = 0$. This number also gives the ratio between the volumes of a cylinder and a cone with the same heights and radii. Give this number equal to the log base four of sixty-four.

Answer: **3**

Bonus 4: Science (Physics)

Identify these laws of physics by name, given a formula.

1. F equals $m a$.

Answer: **Newton's second law of motion**

2. F equals $k q_1 q_2$ over r squared.

Answer: **Coulomb's law**

3. $n_1 \sin \theta_1$ equals $n_2 \sin \theta_2$.

Answer: **Snell's law**

Tossup 5: Fine Arts (Music)

It was published in two books, twenty-two years apart. It was made possible by technological advances that eliminated the wolf interval. One of its pieces was originally written in C major before the composer added accidentals to transpose it to C sharp major, which allowed it to become one of the first collections of works set in all twenty four major and minor keys. Identify this set of preludes and fugues written for a titular keyboard instrument by Johann Sebastian Bach.

Answer: **The Well-Tempered Clavier**

Bonus 5: Math (General)

This problem involves lining up five people named Alex, Bob, Catherine, David, and Xena. Your answers should be numbers -- do not use terms such as factorial, permutation, or combination.

1. How many ways are there to arrange all five people in a line?

Answer: **120**

2. How many ways are there to line all of them up if Alex and Bob must be next to each other?

Answer: **48**

3. How many ways are there to line all of them up if Alex and Bob have to be first and second in either order?

Answer: **12**

Tossup 6: Miscellaneous (Sports)

This driver was the Rookie of the Year in 1975, and the Winston Cup Champion a year later, making him the only driver to ever win those awards in consecutive years. He won his first Daytona 500 in 1998, three years before his death came on that same track in a crash that occurred while his son claimed second place. Name this NASCAR driver known as the Intimidator whose car bore the number three.

Answer: **(Ralph) Dale Earnhardt, Sr.**

Bonus 6: Social Studies (World History)

Identify the following about the Pacific theater of World War II.

1. Arguably the largest naval battle in history, this battle in the central seas of the Philippines saw the first use of kamikaze aircraft.

Answer: **Battle of Leyte Gulf**

2. The first attack on Japanese home islands took place on this island, made famous by an iconic photograph of a flag raising.

Answer: **Iwo Jima**

3. Three thousand Americans died in the attempt to Sugar Loaf Hill in the battle for this Japanese island.

Answer: **Okinawa**

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

A ball is dropped out of a window 50 feet above ground level. It falls vertically before hitting the ground and rebounding to three-fifths its initial height. If this pattern continues until the ball stops, find the total distance the ball will travel. An easy way to solve this problem would be to realize that the ball's path can be represented by the sum of two infinite geometric series, one corresponding to the ball's downward movement, and one portraying the ball's travels upward.

Answer: **200 feet** (*prompt units*)

Bonus 7: Fine Arts (Visual Art)

Identify these works by Botticelli.

1. The titular goddess is standing on a shell in this work.

Answer: **The Birth of Venus**

2. Venus, Cupid, Mercury, Zephyrus, and Chloris are depicted in the work, whose names means "Spring," that can be found in the Uffizi Gallery.

Answer: **Primavera**

3. Multiple Medicis can be found in this 1470s painting that shares its title with many other works of the Renaissance.

Answer: **Adoration of the Magi**

Tossup 8: Social Studies (World History)

Upon the death of her husband, Prasutagus, who was a Roman client ruler, Rome attempted to seize his former territory, rather than allowing it to be passed on to this woman and her daughters. Her anger only intensified when she was flogged and her daughters were raped at the hands of the Romans, leading her to revolt against their rule. Name this Queen of the Iceni tribe who led the last major opposition to Roman rule in Britain.

Answer: **Boudica**

Bonus 8: Science (Earth Science)

Identify these regions of the Earth's atmosphere.

1. The lowest region of the Earth's atmosphere, this extends about 10 kilometers up.

Answer: **Troposphere**

2. The ozone layer is located within this region above the troposphere, which extends to about 50 kilometers up.

Answer: **Stratosphere**

3. Between the thermosphere and exosphere is this upper part of the Earth's atmosphere which contains namesake charged particles.

Answer: **Ionosphere**

Tossup 9: Literature (Literature)

It includes stories such as Little Britain and Westminster Abbey, both of which related British culture, but it was not published in Britain. It includes five Christmas stories, as well as the author's two most famous works with characters such as Judith Gardenier and Bram Bones. Identify this work containing Rip Van Winkle and The Legend of Sleepy Hollow, written under a pseudonym of Washington Irving.

Answer: **The Sketch Book of Geoffrey Crayon**

Bonus 9: Math (Geometry)

Answer these questions about a regular hexagon with sides of length two.

1. How long is the apothem?

Answer: **Root Three**

2. How long is the radius?

Answer: **2**

3. What is the area?

Answer: **Six Root Three**

Tossup 10: Science (Chemistry)

Though they can be destroyed by a process called coagulation, they can otherwise remain in a stable state, unlike suspensions, which eventually settle. First recognized by Thomas Graham, they are susceptible to the Tyndall effect, and can be divided into eight separate categories, by the phases of the continuous and dispersed media. Name this category of homogeneous mixtures which include aerosols, foams, and emulsions.

Answer: **Colloid**

Bonus 10: Literature (Literature)

Identify the following plays by Aristophanes.

1. The namesakes for this play are encountered on the way to Hades, where Dionysus witnesses a battle of wit between Aeschylus and Euripides.

Answer: **The Frogs**

2. The titular characters in this play pretend to be the arbiters of true knowledge, but they really only exist to expose the insubstantiality of new philosophy.

Answer: **The Clouds**

3. A son cures his father of a nasty habit -- constantly acting as a juror for the Athenian court -- in this play.

Answer: **The Wasps**

HALFTIME

Tossup 11: Miscellaneous (Technology)

First released in 1996, this software initially required purchase, though starting in version 5.0, it offered a free version supported by advertisements. It has about 1% of the market share of similar products for PCs, but is used on many other devices, including cell phones, the Nintendo DS, and Nintendo Wii (*WE*). Now completely free, version 9.2 executes JavaScript much faster than competing products, and is boasted to be the "fastest web browser on Earth." The fourth most popular web browser, after Internet Explorer, Firefox, and Safari, name this browser from Norway.

Answer: Opera

Bonus 11: Literature (Literature)

Answer these questions related to the novel *The Maltese Falcon*.

1. This detective is the protagonist of *The Maltese Falcon*.

Answer: Sam Spade (*accept on either half of the name*)

2. This author of *The Thin Man* created Sam Spade for *The Maltese Falcon*.

Answer: Samuel Dashiell Hammett

3. Hammett had a long relationship with this author of *The Little Foxes*.

Answer: Lillian Florence Hellman

Tossup 12: Social Studies (Current Events)

This man has taught Theology at the Universities of Bonn and Munster, among others, and has argued the need for a decentralized papacy. He became the Archbishop of Munich and Freising in 1977, but since then his health has deteriorated and he has had two strokes. A member of the Hitler Youth as a child, his actual name is Joseph Ratzinger, and he succeeded John Paul II upon his death in 2005. Name this current Pope of the Roman Catholic Church.

Answer: Pope Benedict XVI (*prompt on Benedict; accept Joseph Ratzinger before mentioned*)

Bonus 12: Math (Calculus)

Answer the following questions about the graph of $y = 2 + 3 \cos 4x$. Assume that the angle is in radians.

1. What is the greatest value of y for the graph?

Answer: 5

2. What is the greatest value of the derivative of the graph?

Answer: 12

3. If you took the point where the value of y was greatest and the nearest point where the derivative was greatest, what would be the difference between the x -coordinates? Give the smallest possible positive answer.

Answer: Pi Over Eight (*accept One-Eighth Pi*)

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

A toy store has a wall of teddy bears. There are 7 red teddy bears, 6 green teddy bears, 6 blue teddy bears, and 3 purple teddy bears. If two children each select one teddy bear at random without replacement, what is the probability that the first one will pick a red teddy bear and the second will pick a purple one?

Answer: 1/22

Bonus 13: Science (Chemistry)

Identify these laws which govern how electrons fill up atomic orbitals.

1. According to this principle, electrons fill lower-energy orbitals before higher-energy orbitals.

Answer: **Aufbau principle**

2. According to this rule, fancifully known as the "bus seat rule," electrons do not pair up in equal-energy orbitals until each orbital has one electron.

Answer: **Hund('s) rule**

3. According to this rule, only two electrons can be in the same orbital, by having opposite spin.

Answer: **Pauli exclusion principle**

Tossup 14: Literature (Mythology)

Caravaggio's Amor Vincit Omnia depicts this god climbing down from a table. Most myths say he is the son of Ares, although Aristophanes says he is the son of Night and Darkness. A fertility cult worshiped him in Thespiae. He forced Apollo to fall in love with Daphne, and he himself fell in love with Psyche. Identify this god, whose Roman counterpart is Cupid, the Greek god of love.

Answer: **Eros** (*accept Cupid until mentioned*)

Bonus 14: Miscellaneous (Entertainment)

Identify these movies that have drag racing scenes.

1. This 2001 movie starring Paul Walker and Vin Diesel spawned multiple sequels.

Answer: **The Fast and the Furious**

2. Members of the T-Birds raced for pink slips in this movie starring John Travolta and Olivia Newton John that's set at Rydell High.

Answer: **Grease**

3. Michael J. Fox's character would have crashed into a truck had he raced, but fortunately he decided not to, in this movie.

Answer: **Back to the Future Part III** (*prompt on Back to the Future*)

Tossup 15: Science (Biology)

The organization Dor Yeshorim tries to warn two Jewish ones of these from bearing children. Queen Victoria was one, as were her daughters Alice and Beatrice, which is how hemophilia spread throughout the royal families of Europe. Ones for sickle cell anemia are resistant to malaria, which may explain the disease's prevalence in African populations. Because they are themselves asymptomatic, they often pass on their genes, which could be a problem if their partner is one too. Name this genetic state of having one recessive gene for a disease without actually having it.

Answer: **Heterozygote carriers** (*accept either or both*)

Bonus 15: Social Studies (Other)

Given a description, identify the type of economic market.

1. This market is characterized by a large number of buyers who produce very similar products for a high amount of sellers, and entry and exit from the market is completely unrestricted.

Answer: **Purely Competition (or Competitive)** (accept *Perfect Competition*)

2. Entry by new firms is prohibited in this type of market dominated by one firm that produces a distinctive product.

Answer: **Pure Monopoly**

3. Few sellers function in this type of market that features very few entries of new firms.

Answer: **Oligopoly**

Tossup 16: Fine Arts (Visual Art)

This figure has short hair, and a towel covering itself from the waist down. Made out of marble, it is currently found in the Louvre, and was sculpted by Alexandros of Antioch. Discovered in 1820 in the city it's now associated with, the statue's torso is completely bare, helped by the fact that there are no limbs to cover it. Name this sculpture whose arms were broken off.

Answer: **Venus de Milo** (accept *Aphrodite of Milos*)

Bonus 16: Math (Calculus)

Answer these questions about the function f of x equals one over the quantity x^2+1 :

1. Give an equation for its only asymptote.

Answer: **$y=0$**

2. Including the constant of integration, give its antiderivative.

Answer: **arctangent of x plus C** (accept *inverse tangent of x plus C*)

3. Evaluate its derivative when x equals one.

Answer: **$-1/2$** (accept *$-.5$*)

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

Simplify the following quantity. The log base 5 of 7, times the log base 3 of 5, times the log base 7 of 3, times the log base 5 of 25.

Answer: **2**

Bonus 17: Literature (Literature)

Identify the following related literary characters.

1. Abbe Faria teaches manners to this man in the Chateau d'If (*DEEF*) so that he can exact vengeance upon those responsible for his wrongful imprisonment.

Answer: **The Count of Monte Cristo** (accept *Edmond Dantes*)

2. Jonathan Harker negotiates the sale of a London house to this man, whose aversion to garlic is a cause for concern.

Answer: **Count Dracula**

3. This man falls in love with a married woman who reveals her love for him at a steeplechase. She later kills herself under a train.

Answer: **Count Alexei Kirillovich Vronsky**

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

After this man lost the 1912 Republican nomination, he ran on the Progressive Party ticket, also known as the Bull Moose Party. He won a Nobel Prize for meditating between the Japanese and Russians, which resulted in the Treaty of Portsmouth. Well known as a cavalry officer in the Spanish-American War, he was a member of the Rough Riders. Name this man who, upon the death of William McKinley, became president.

Answer: **Theodore "Teddy" Roosevelt Jr.** (*prompt on Roosevelt*)

Bonus 18: Science (Biology)

Identify these regions of the brain.

1. Meaning "little brain," this region at the base of the brain is responsible for motor coordination and sensory integration.

Answer: **Cerebellum**

2. On the opposite side of the brain from the cerebellum, this lobe of the brain controls impulses and plays a major part in maturity. It was often targeted by early lobotomy procedures.

Answer: **Frontal lobe**

3. This structure connects the left and right hemispheres of the brain, and is sometimes severed to treat very severe epilepsy.

Answer: **Corpus callosum**

Tossup 19: Science (Physics)

The "Planck" variety is equal to the square root of $h\text{-bar} \cdot c$ over G , while the "equivalent" variety of an unknown can be determined when titrating in acid-base chemistry. Reaching the "critical" amount of it results in a sustained fission reaction. While it is unclear what causes it, some proposals include the top quark and antiquark, or the Higgs boson. While three distinct varieties exist, the passive gravitational, active gravitational, and inertial, physicists have not yet detected any discrepancy between them. Name this physical quantity measured by the SI system in kilograms.

Answer: **Mass** (*do not accept weight*)

Bonus 19: Fine Arts (Music)

Given a description, identify the opera by Puccini.

1. This opera features Cio-Cio San, who commits ritual suicide after finding out her American husband has married another woman.

Answer: **Madama Butterfly**

2. Rodolfo, a poet, and Mimi, a seamstress, are the main characters in this opera.

Answer: **La Boheme**

3. This work set in an Asian royal court features the characters Timur and Ping.

Answer: **Turandot** (*TURR-ann-DOH*)

Tossup 20: Literature (Literature)

His second wife died of severe burns after her dress caught fire while attempting to melt sealing wax. The first American to be honored with a memorial bust in Westminster Abbey, this member of the Fireside Poets was a lifelong friend of Nathaniel Hawthorne. Responsible for the first American translation of Dante's Divine Comedy, identify this poet who penned such works as 'The Village Blacksmith' and 'Evangeline' but is best known for 'Paul Revere's Ride' and the 'Song of Hiawatha'.

Answer: **Henry Wadsworth Longfellow**

Bonus 20: Social Studies (U.S. History)

Identify these deals that helped shape U.S. borders.

1. This 1842 treaty defined the border between Maine and Canada.

Answer: **Webster-Ashburton Treaty**

2. In this 1853 deal with Mexico, the U.S. bought much of what is now southern Arizona and New Mexico.

Answer: **Gadsden Purchase**

3. In 1819, the future 6th president worked out a deal with a Spanish official that, among other things, gave Florida to the United States.

Answer: **Adams-Onis Treaty**

TIEBREAKERS/REPLACEMENTS:**Tossup: Literature (Literature)**

Written in 1793, this poem was originally put to the tune of Hey Tuttie Tuttie. An early editor preferred the tune Lewie Gordon, and the fourth line of every stanza was added to fit the new song. Written in honor of the revolutionary actions of Robert Bruce, name this radical poem that commemorated the march to Bannockburn and was written by Robert Burns.

Answer: **Scots Wha Hae Wi' Wallace Bled** (*Accept Robert Bruce's March to Bannockburn before Robert Bruce*)

Bonus: Science (Biology)

Identify the following about DNA.

1. DNA is a member of this class of biomolecules.

Answer: **Nucleic Acids**

2. This is the basic building block of a DNA molecule. It consists of a sugar, a phosphate group, a nitrogenous base.

Answer: **Nucleotide**

3. A DNA sequence is copied onto a strand of RNA in this process, the first step in the production of proteins.

Answer: **Transcription**



Ægis Questions

**New Trier Varsity 2007
Round 4**

Tossup 1: Literature (Literature)

A clock strikes three in Act II, and in Act III, Metellus Cimber brings a petition to the title character, who dismisses it, noting that he is "as constant as the northern star." The play ends at the Battle of Philippi, where Marc Antony proclaims the noblest Roman of them all to be Brutus. Identify this Shakespearean play, where the ambitious title character is assassinated by Brutus, Cassius, and other Romans.

Answer: **Julius Caesar**

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

Identify these actions that took place during the Benjamin Harrison Administration.

1. In 1890, this bill was passed to prevent people and groups from attempting to monopolize industries.

Answer: **Sherman Antitrust Act**

2. This name was given to the Tariff that charged money to almost every industry that competed with American products.

Answer: **McKinley Tariff**

3. This state admitted to the union in 1890 was the first to allow women the right to vote.

Answer: **Wyoming**

Tossup 2: Social Studies (Other)

The Classical school of Bentham and Beccaria was one of the first theories to study it, and Robert Merton's typology of strain theory looked at it in terms of the institutional means of attaining cultural goals. It commonly carries negative connotations, although it can also refer to positive actions in negative environments. Identify this sociological term which refers to actions that violate the cultural norms of society.

Answer: **Deviance or Deviant behavior** (*accept equivalents*)

Bonus 2: Miscellaneous (Entertainment)

Name these shows that can be found on the USA Network.

1. This hit show stars Tony Shaloub as a detective battling OCD.

Answer: **Monk**

2. James Roday and Dule Hill run the titular business that often works with the police in this Friday night comedy.

Answer: **Psych**

3. This new show in 2007 stars Jeffrey Donovan stars as Michael Westen, a former American agent trying to figure out why he is out of a job.

Answer: **Burn Notice**

Tossup 3: Science (Biology)

First diagnosed in Auguste Deter by its namesake physician in 1901, early-onset cases have been traced to three particular genes, though causes of late-onset cases are still unknown. Some hypotheses focus on the reduced production of acetylcholine, while others focus on the accumulation of misfolded tau and beta-amyloid proteins in the brain, which may explain why people with Down syndrome often get it. Name this condition whose classic neurofibrillary tangles and plaques cause neurodegeneration, a disease often characterized in older people by loss of memory and, eventually, dementia.

Answer: **Alzheimer('s) disease**

Bonus 3: Literature (Literature)

Everyone loves Jane Austen! Ok, that's not true, but you still need to answer these questions about her works.

1. This novel, originally titled First Impressions, tells the story of the Bennet girls, and their struggles to find husbands.

Answer: **Pride and Prejudice**

2. Marianne Dashwood marries Colonel Brandon in this Austen work.

Answer: **Sense and Sensibility**

3. Fanny Price is raised by the Bertrams at the titular location in this work.

Answer: **Mansfield Park**

Tossup 4: Math (Calculus) -- Computational (30 Seconds)

Find the derivative of the function f of x equals the natural log of the quantity $2x$ squared plus sine x .

Answer: **The quantity $4x$ plus cosine x divided by the quantity $2x$ squared plus sine x**

Bonus 4: Science (Physics)

In physics, rotating objects are similar to translating objects. Given a translational quantity, name its rotational analog.

1. Force

Answer: **Torque**

2. Mass

Answer: **Moment of inertia**

3. Linear momentum

Answer: **Angular momentum**

Tossup 5: Fine Arts (Visual Art)

Upon moving into one of his studios, he noticed several structural flaws, which he was quick to cover up with a host of both colorful and neutral rectangular placards. He would continue to do this throughout his life, and upon his death, these walls were faithfully reproduced for museum viewing as his "Wall Works." Famous for non-representational "compositions", identify this contributor to the De Stijl (*STYLE*) movement, who painted works such as Broadway Boogie Woogie, and was noted for his use of geometric figures and primary colors.

Answer: **Piet Mondrian**

Bonus 5: Math (Calculus)

Evaluate the following integrals.

1. The integral from zero to one of $x^5 dx$.

Answer: 1/6

2. Rounded to the nearest tenth, the integral from x equals zero to π over four, of $\sin x dx$.

Answer: .3

3. The integral from negative one to positive one of the absolute value of $x dx$.

Answer: 1

Tossup 6: Miscellaneous (Entertainment)

The Dirty Vegas song 'Simple Things Part 2' covers a section of this song, and Class of '99 covered a portion of it for the soundtrack for the movie 'The Faculty'. It opens with the narrator noting his father's absence, and by the end he doesn't need a hug or drugs. At the end of its most famous section, one can hear an older man asking how one can have any pudding without eating your meat. Name the Pink Floyd song with three parts that in one chorus equates education to thought control.

Answer: Another Brick in the Wall (accept *Another Brick in the Wall Part 2 up until 'portion'*)

Bonus 6: Social Studies (World History)

Identify the following related to attempts to kill Czar Alexander II.

1. While in this port city, Dmitry Karakozov attempted to shoot Alexander.

Answer: St. Petersburg

2. Alexander's life was possibly saved when he was late to dinner in 1880 in the dining room of this St. Petersburg building.

Answer: Winter Palace

3. In 1881, this terrorist group almost failed again, but then one man threw a bomb at the feet of the czar, and he was killed.

Answer: People's Will (accept *Narodnaya Volya*)

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

What is the perimeter of a regular polygon with side length 5 units and interior angle measure of 150 degrees?

Answer: 60 units

Bonus 7: Fine Arts (Music)

Name these symphonies that aren't quite symphonies.

1. This so-called symphony by Hector Berlioz subtitled "An Episode in the Life of an Artist" has five movements evoking different scenes.

Answer: Symphonie Fantastique

2. Gustav Mahler did not call this work based on Chinese poetry his ninth symphony, out of fear that he would die after writing his ninth symphony.

Answer: Song of the Earth (accept *Das Lied von der Erde*)

3. This work by Benjamin Britten consists of twelve songs for orchestra, vocal soloists, and choir, and celebrates animals, plants, and the sun as they come out in the title time.

Answer: Spring Symphony

Tossup 8: Social Studies (World History)

It resulted after the dictatorial rule of Fabias had ended. Fabias' strategy of fighting a war of attrition had worked, but the newly elected Gaius Varro planned a massive attack in the Apulian plain. Losses reached up to fifty thousand after being ambushed by the flanking armies when the Gallic allies in the center feigned retreat, but following the battle, Scipio convinced Rome to continue the war against Carthage. Identify this battle, held in 216 BCE, where Hannibal earned his greatest military victory in the Second Punic War.

Answer: **Battle of Cannae**

Bonus 8: Science (Astronomy)

Identify these astronomical objects.

1. These are regions of space with a gravitational field that cannot be escaped past a certain distance by anything, including light.

Answer: **Black hole**

2. This is a super-dense star with a large angular momentum, and about twice the mass of the sun, though only about 20 kilometers in radius.

Answer: **Neutron star**

3. This is a neutron star with a strong magnetic field that can be detected at very regular intervals as it rotates.

Answer: **Pulsar**

Tossup 9: Literature (Mythology)

Many aspects of this goddess' life were adapted from the Etruscan goddess Turan, as well as the Greek counterpart. Julius Caesar claimed to be a descendant of her through the warrior Aeneas, her son. Two famous poems, one by Ovid and one by Shakespeare, immortalized her love for Adonis. Identify this goddess, famously depicted by Botticelli, the Roman goddess of love.

Answer: **Venus**

Bonus 9: Math (Geometry)

Given a piece of string that is twelve inches long, find the area you get if you bend it into the following configurations. Give your answers in square inches.

1. Square

Answer: **9**

2. Circle

Answer: **36 / Pi²**

3. Equilateral Triangle

Answer: **Four Root Three**

Tossup 10: Science (Chemistry)

Helium has the highest of any element, at 2377 kilojoules per mole. Group 2A and 5A elements have higher ones than may be expected, but otherwise, increasing nuclear charge causes this to increase from left to right across a period, and shielding causes it to decrease as you go down a group. Name this quantity equal to the amount of energy that must be added to an element to remove an electron.

Answer: **First ionization energy** (accept *IE* or *ionization potential*)

Bonus 10: Literature (Literature)

Answer these questions about the Leatherstocking Tales.

1. This American author, who also penned No Steamboats, wrote the Leatherstocking Tales.

Answer: **James Fenimore Cooper**

2. This protagonist of the tales goes by multiple names, including the Trapper and Deerslayer.

Answer: **Nathaniel "Natty" Bumppo** (*accept "Hawkeye" or "Natty"*)

3. Natty Bumppo goes by the name Hawkeye in this member of the Tales.

Answer: **The Last of the Mohicans**

HALFTIME

Tossup 11: Miscellaneous (Sports)

He twice won the Pennsylvania High School Golf Championship, and won the 1954 U.S. Amateur while attending Wake Forest. His first win at the Masters occurred in 1958, and two years later he won eight tournaments, including the Masters again, as well as the U.S. Open. Currently, he operates a successful golf course design firm. Name this legendary golfer who won the 1964 US Open by 6 strokes over Jack Nicklaus.

Answer: **Arnold Daniel Palmer**

Bonus 11: Literature (Literature)

Identify these Dickens novels from clues.

1. Set in the fictitious industrial town of Coketown, this Dickens novel deals with the tribulations of Stephen Blackpool, a Hand working in one of Mr. Bounderby's mills.

Answer: **Hard Times**

2. Little Nell is a young girl living with her grandfather whose only friend is Kit, a worker in the title location in this novel.

Answer: **The Old Curiosity Shop**

3. Dickens used a long standing legal dispute over an inheritance in the case of Jarndyce and Jarndyce in this novel to attack the antiquated British legal system. Orphan Esther Summerson is its protagonist.

Answer: **Bleak House**

Tossup 12: Social Studies (Current Events)

This man is currently married to Judith Nathan. Now embroiled in controversy because she used public employees to walk her dog and have her friends and family driven around when she was his mistress, he sometimes interrupts speeches in order to take her phone calls. According to Joe Biden, the only three things this man mentions in a sentence are a noun, a verb, and 9/11. Name this Republican Presidential Candidate who used to be the Mayor of New York City.

Answer: **Rudolph "Rudy" Giuliani**

Bonus 12: Math (Other)

I'll give the equation for a graph. You should name the only quadrant that the graph does not enter. Your answer should be a number from one to four.

1. $y = x^2 + 10x + 15$

Answer: **4th**

2. $y = 5 - |x + 8|$ (*five minus the absolute value of the quantity $x + 8$*)

Answer: **1st**

3. $y = x^3 - 15x^2 + 75x - 125$

Answer: **2nd**

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

Find the rectangular equivalent of the cylindrical coordinate $(6, \pi/4 \text{ radians}, 5)$. It will help you to know that the cylindrical coordinate system uses a polar coordinate system taken with a vertical third dimension.

Answer: **$(3\sqrt{2}, 3\sqrt{2}, 5)$**

Bonus 13: Science (Chemistry)

The temperature of a substance is unaffected by how much of the substance is measured, but the heat contained by a substance is dependent on the amount of substance measured.

1. Temperature is an example of this sort of property which is unaffected by the quantity of substance.

Answer: **Intensive property**

2. Contrasted with intensive properties are these properties, like heat, which are dependent on the quantity.

Answer: **Extensive property**

3. Temperature is equal to the average kinetic energy of the molecules of a substance, multiplied by this simple fraction.

Answer: **2/3**

Tossup 14: Literature (Literature)

This author was a Marine during World War II, which was reflected in the work *A Tidewater Morning*. His first novel was *Lie Down in Darkness*, and later came *Set This House on Fire*. He wrote about an 1831 slave revolt in *The Confessions of Nat Turner*, and his most famous work includes the characters Nathan and Stingo. Name this recently deceased author of *Sophie's Choice*.

Answer: **William Clark Styron, Jr.**

Bonus 14: Miscellaneous (Entertainment)

Identify these critically acclaimed video games of 2007.

1. In this end to Bungee Studios' trilogy, Master Chief continues to fight the Covenant aliens to save humanity.

Answer: **Halo 3** (*prompt Halo*)

2. Valve Software released this pack of five games, including *Half-Life 2*, its two expansions, *Team Fortress 2*, and the surprise hit *Portal*.

Answer: **The Orange Box**

3. In this dystopian game set in the 1960s, Jack finds himself in the underwater city of Rapture, where plasmids allow genetic modification to grant superhuman powers.

Answer: **BioShock**

Tossup 15: Science (Astronomy)

The most recent one in the Milky Way was seen in 1604. This phenomenon can occur in a white dwarf when the dwarf's mass exceeds the Chandrasekhar limit. It can also occur for much more massive stars; in this case a neutron star or a black hole is the most likely result. Name this stellar phenomenon in which a star briefly reaches an apparent brightness comparable to that of an entire galaxy as it explodes.

Answer: **Supernova**

Bonus 15: Social Studies (Current Events)

Identify these enemies of Bill O'Reilly of Fox News:

1. O'Reilly has labeled this native of Hungary as public enemy number one.

Answer: **George Soros**

2. This host of MSNBC's Countdown often labels O'Reilly as The Worst Person in the World.

Answer: **Keith Olbermann**

3. This website has been described by O'Reilly as like the Ku Klux Klan and the Nazi Party.

Answer: **www.dailykos.com** ("*daily chaos.com*")

Tossup 16: Fine Arts (Music)

His influences include Zen Buddhism and teacher Arnold Schoenberg, who tutored him for free. The University of Illinois constructed a computer program that would automatically flip coins and consult the I Ching (*ee ching*) for information. His Music for Changes involved flipping coins, while the fourth work in the Imaginary Landscape series involved twelve radios. Identify this composer, famous for chance music and aleatory music, such as 4 minutes 33 seconds.

Answer: **John Cage**

Bonus 16: Math (Algebra)

Answer the following questions about an arithmetic sequence.

1. If the third number is 12 and the fifth number is 18, what is the first number?

Answer: **6**

2. What is the common difference for this sequence?

Answer: **3**

3. What is the 100th term for this sequence?

Answer: **303**

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

Give your answer as a fully simplified fraction. Find the probability of drawing a red face card from a standard deck of 52 cards. Note that face cards do not include aces.

Answer: **3/26**

Bonus 17: Literature (Literature)

Answer the following about an American play.

1. This 1949 play focuses on the crumbling world and eventual suicide of Willy Loman, who struggles to stay relevant and sane at retirement age in the title job.

Answer: **Death of a Salesman**

2. Name the author of Death of a Salesman, also famous for The Crucible and for being married to Marilyn Monroe.

Answer: **Arthur Asher Miller**

3. Like Death of a Salesman, this earlier Miller play was directed by Elia Kazan. Its plot centers on Joe Keller, who manufactured defective planes during World War II, which caused the death of his son Larry.

Answer: **All My Sons**

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

It was created in part in reaction to problems Americans had trading with the French West Indies. Some people point to it as a primary motivation for the formation of the Democratic-Republican Party, and it led to the stoning of Alexander Hamilton. Unfortunately, it did not prevent the impressment of Americans. Name this document signed by Lord Grenville and the man it is named after, who is better known as the First Chief Justice of the Supreme Court.

Answer: **Jay's Treaty**

Bonus 18: Science (Biology)

The second-largest organ in the body after the skin, it has four lobes.

1. Name this organ that converts ammonia to urea and metabolizes other toxic substances.

Answer: **Liver**

2. The liver also stores this polysaccharide that it manufactures. Similar to starch, it is broken down for energy by animals.

Answer: **Glycogen** (*not glucose or glucagon*)

3. The liver also produces and secretes this alkaline, green fluid that neutralizes stomach acid and emulsifies fats.

Answer: **Bile**

Tossup 19: Science (Physics)

Analytically, it follows the general equation a equals negative omega squared x , meaning that the acceleration of an object undergoing this phenomenon is directly proportional to its position, except in the opposite direction. Examples of systems which exhibit this include LC circuits, pendulums, and most simply, a mass on a spring. Name this type of motion in which an object oscillates back and forth in the form of a sine wave with constant amplitude.

Answer: **Simple harmonic motion** (*prompt "oscillation" or "periodic motion"*)

Bonus 19: Fine Arts (Visual Art)

Identify these paintings which can all be found in the Art Institute of Chicago.

1. This work by Grant Wood depicts a dreary looking man holding a pitchfork accompanied by his also dreary looking wife.

Answer: **American Gothic**

2. A man with his back turned to the viewer is sitting in a diner in this Edward Hopper painting.

Answer: **Nighthawks**

3. A monkey can be found amongst the people enjoying a beautiful day in the pointillist work by Georges Seurat.

Answer: **A Sunday Afternoon on the Island of La Grande Jatte** (*accept Un Dimanche après-midi à l'Île de la Grande Jatte*)

Tossup 20: Literature (Literature)

Works such as "The Furnished Room" and "The Skylight Room" appear in The Four Million, a collection by this author, which reflected how all New Yorkers had important stories to tell. Other famous stories include "The Ransom of Red Chief" and "The Last Leaf," and his most famous story involved Jim and Della Young's attempts to purchase Christmas presents for each other. Identify this American short story writer, famous for ironic twist endings.

Answer: **O. Henry** (*accept William Sydney Porter*)

Bonus 20: Social Studies (Geography)

Identify these Washington volcanoes.

1. This volcano famously erupted on May 18, 1980.

Answer: **Mt. St. Helens**

2. The land of the Yakima Nation borders this stratovolcano that is over 12,000 feet tall.

Answer: **Mt. Adams**

3. This volcano near Tacoma is the highest volcano in all of the Cascades.

Answer: **Mt. Rainier**

TIEBREAKERS/REPLACEMENTS:**Tossup: Science (Biology)**

In plants, this physiological response is the result of increased respiration in the leaves. In humans, it is regulated by the hypothalamus and usually induced by pyrogens. Constriction of the blood vessels sets it off while increased muscle tone and shivering exacerbate it. Because it kills or inhibits the growth of microbes, it is thought to be a useful adaptation, but a particularly high one can bring rapid dehydration, convulsions, and death. Name this response that raises the body temperature by 2-4 degrees in low-grade cases and more than 6 degrees in high-grade ones.

Answer: **Fever** (accept *Febrile response*, *pyrexia*, *ague*)

Bonus: Literature (Literature)

Adventure is where you find it! Identify the following about daring literary figures.

1. In this novel, a brave adventurer ventures into the far-off lands of Brobdingnag, Lilliput, and Japan, finally returning home with a contemptuous view of human society.

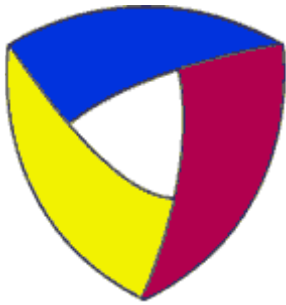
Answer: **Gulliver's Travels**

2. The titular character of this novel, in his many travels, discovers Buenos Aires, El Dorado, and the fact that everyone believes that they have suffered more than everyone else.

Answer: **Candide**

3. This adventurer, author of Barrack Room Ballads and Gunga Din, wrote Plain Tales from the Hills about his travels in Simla.

Answer: **Rudyard Kipling**



Ægis Questions

**New Trier Varsity 2007
Round 5**

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

It consisted of the area from the Altamaha to Savannah Rivers and west to the Mississippi River. It was chartered in 1732, and was intended for the worthy poor, English debtors, and felons, although none of them were actually original colonists. Name this state, founded by James Oglethorpe, the southernmost of the original thirteen colonies.

Answer: Georgia

Bonus 1: Math (Algebra)

Answer the following where x equals $4 - 3i$.

1. Multiply the x by its complex conjugate.

Answer: 25

2. Find x squared.

Answer: 7 minus 24 i

3. Find the complex modulus of x .

Answer: 5

Tossup 2: Miscellaneous (Interdisciplinary)

In botany, it is a subdivision of a genus, and ranks between sections and species. The mathematical variety is defined as the sum of a sequence of numbers. When inductors are placed in this configuration, the total inductance is equal to the sum of the individual inductances. The twelve-tone composition technique pioneered by Schoenberg has another name reflecting its use of these. The harmonic one doesn't converge, but geometric ones do if the common ratio is between negative one and one. Name this term referring to a set of things.

Answer: Series

Bonus 2: Literature (Literature)

Identify the following related literary characters.

1. The giant inhabitants of this country are fascinated by the small size of Lemuel, a British traveler who measures only one twelfth of their height.

Answer: Brobdingnagians

2. Francois Rabelais wrote of this father and son pair of giants whose size seems to vary from chapter to chapter.

Answer: Gargantua and Pantagruel

3. This resident of Doubting Castle from The Pilgrim's Progress tries to get two travelers to commit suicide, but his plans are thwarted by a key, called Promise, that unlocks his castle doors.

Answer: Giant Despair

Tossup 3: Literature (Literature)

When her house burned down on July 10, 1666, she wrote a poem on the subject. Despite the loss of her library of around 800 books the poem expressed her dedication to God and rationalized her loss by stating that "It was his own; it was not mine." This poem was not included in her collection "The Tenth Muse Lately Sprung Up in America", nor was her more famous "To My Dear and Loving Husband". Identify this first American female writer to have her works published.

Answer: Anne Bradstreet

Bonus 3: Science (Physics)

Identify these circuit components.

1. This refers to an electrochemical cell which supplies a voltage to a circuit. The first one was the Voltaic pile.

Answer: **Battery**

2. This device can store charge on itself as long as there is a voltage across it. It can be constructed out of two disconnected, parallel conducting plates.

Answer: **Capacitor**

3. This device opposes a change in current. It is typically a long wire wound around an iron core, which generates a magnetic field due to current passing through the wire.

Answer: **Inductor**

Tossup 4: Science (Biology)

Along with echinoderms (*ek-EYE-no-durmz*), they form the clade of deuterostomes (*doo-TARE-uh-STOHMZ*). While tunicates and lancelets lack a feature shared by almost all other members of this taxon, they are still considered members as well, because they have an endostyle, pharyngeal (*far-IN-gee-ul*) pouches, a post-anal tail, and perhaps most notably, a notochord. Name this animal phylum, whose roughly sixty thousand members are mostly composed of the subphylum Vertebrata.

Answer: **Chordates** (*accept chordata, do not accept or prompt vertebrates*)

Bonus 4: Social Studies (World History)

Identify the following about rulers of India.

1. This emperor of the Mauryan dynasty who ruled from 273 to 232 B.C. began by conquering most of India. He later became a Buddhist, pursued nonviolent policies, and promoted equality regardless of religion or caste.

Answer: **Ashoka the Great** (*accept Asoka*)

2. This dynasty ruled India from around 320 to 600 A.D. During its dominance, India experienced a Golden Age.

Answer: **Gupta Dynasty**

3. This Mogul ruler conquered much of northwestern India and Afghanistan. He was also famous for his religious tolerance and patronage of the arts.

Answer: **Akbar the Great**

Tossup 5: Math (Geometry) -- Computational (30 Seconds)

Find the area of a triangle whose vertices are located at (2,2), (5,6), and (3,5) on the coordinate plane.

Answer: **5/2** (*accept 2.5*)

Bonus 5: Fine Arts (Visual Art)

Given a description, identify an artist and then two facts related to him.

1. Three of this artist's works are Orange Disaster Number Five, which shows fifteen copies of an electric chair, Self Portrait in Drag, which shows him with a blond wig and make-up, and a Self-Portrait he completed in 1986 in which he is green.

Answer: **Andy Warhol** (accept *Andy Warhola*)

2. Those three pictures are all displayed in which museum in New York that also has branches in Berlin, Bilbao, Las Vegas, and Venice.

Answer: **Guggenheim**

3. A museum dedicated to Warhol is one of four Carnegie Museums in which city that was Warhol's birthplace?

Answer: **Pittsburgh**

Tossup 6: Social Studies (Current Events)

This country will celebrate its Independence Day tomorrow, commemorating the break-up of the Soviet Union. Its elections are dominated by the Nur-Otan Party, which has merged with other parties and now controls almost every legislative seat. The country's politics are also dominated by Nursultan Nazarbayev, who earlier this year was granted powers for the rest of his life. This nation has a long border with Russia, and its capital is Astana. Name this nation that once threatened legal action against Sacha Baron Cohen.

Answer: **Kazakhstan**

Bonus 6: Miscellaneous (Interdisciplinary)

Identify these people born on December 15th. None of the answers are the author of this question.

1. This DJ who broadcasted The Moondog Rock Roll House Party from Cleveland had his career ruined by Payola.

Answer: **Alan Freed**

2. This actor born in 1949 starred in Miami Vice and as the title character on Nash Bridges.

Answer: **Donnie "Don" Wayne Johnson**

3. This injury prone slugger who wore number 42 played from 1991-2003 and spent most of his years with the Red Sox, though he also played for the Angels and the Mets.

Answer: **Maurice "Mo" Samuel Vaughn**

Tossup 7: Fine Arts (Music)

This composer's first piano compositions were named Lyric Pieces; he would write ten books of Lyric Pieces total. He originally wrote his Holberg Suite for piano, and was called the "Chopin of the North." He earned a deal of fame for the incidental music for a play by Henrik Ibsen, the Peer Gynt Suite. Identify this man, well known for In the Hall of the Mountain King, the most famous Norwegian composer.

Answer: **Edvard Grieg**

Bonus 7: Math (Calculus)

Answer the following about the curve f of x equals 3 times the sine of the quantity $3x$ minus π over 2, close quantity, plus 1.

1. What is the slope of the curve at x equals π over two?

Answer: -9

2. What is the magnitude of the phase shift of the curve?

Answer: Pi over 6 or One-sixth pi

3. What is the height of the curve at x equals π over two?

Answer: 1

Tossup 8: Science (Chemistry)

Named after a German physicist, these explain why the freezing points of the noble gases increases dramatically from helium to xenon. They also explain why elemental fluorine and chlorine are gases, but bromine and iodine are not. Even though none of these molecules have permanent dipole moments, the heavier ones have large electron clouds that can acquire momentary dipoles. Name this type of intermolecular force caused by induced dipoles, which mainly affect non-polar molecules.

Answer: London dispersion forces (accept *dispersion forces*)

Bonus 8: Social Studies (U.S. History)

Identify these colonial people, given a description.

1. This man, who was later executed, obtained a charter to establish a colony on Roanoke Island. Unfortunately, the experiment didn't work.

Answer: Sir Walter Raleigh

2. In the 1730s, this man, also known as the 5th Baron of Baltimore, agreed to a map that actually shrunk the size of Maryland.

Answer: Charles Calvert, 5th Baron Baltimore

3. This pastor founded Rhode Island after he was banished from Salem, Massachusetts in 1636.

Answer: Roger Williams

Tossup 9: Math (Geometry) -- Computational (30 Seconds)

Find the distance between the polar coordinates $(8, \pi)$ and $(-6, \pi/2)$.

Answer: 10

Bonus 9: Literature (Mythology)

Identify the following from Norse myth.

1. He is the chief god, who trades an eye for wisdom and often sits alone, pondering the end of the world.

Answer: Odin (accept *Wodin*)

2. In another attempt to gain wisdom, Odin hangs for nine days on this tree, also known as the Tree of Life.

Answer: Yggdrasil

3. Odin's son, Thor, cares much less about wisdom. He prefers warring with this mighty hammer, made for him by the dwarves Eitri and Brokk.

Answer: Mjolnir (*MYOL-neer*)

Tossup 10: Literature (Literature)

The short story Revelation was included in this author's final collection of short stories, Everything That Rises Must Converge. Her works often include grotesque landscapes, such as the dark forest in her most famous short story where a family is killed by The Misfit. Identify this Southern Gothic author who died of lupus at age 39, most famous for A Good Man is Hard to Find.

Answer: **Flannery O'Connor**

Bonus 10: Science (Earth Science)

Identify these facts related to volcanic eruptions.

1. This large cloud is a mixture of ash and sulphuric gases.

Answer: **Pyroclastic flow**

2. Lava mixing with snow produces this type of volcanic phenomena that looks like wet concrete.

Answer: **Lahar**

3. This large collapse crater is generally formed after a large eruption; one is located at Yellowstone National Park.

Answer: **Caldera**

HALFTIME

Tossup 11: Literature (Literature)

Stories such as "Eli, the Fanatic" and "Epstein" appear in Goodbye, Columbus, the first book published by this man. Charles Lindbaugh defeats FDR as President in an alternate-history work, The Plot Against America. His alter ego, Nathan Zuckerman, appears in nine of his works, including the 1997 Pulitzer Prize winning American Pastoral, the 2000 work The Human Stain, and his most recent work, Exit Ghost. Identify this author, most famous for the novel Portnoy's Complaint.

Answer: **Philip Roth**

Bonus 11: Miscellaneous (Technology)

Name these scripting languages.

1. The most popular version of the ECMA-Script standard, this language mostly used in websites was developed by Netscape.

Answer: **JavaScript**

2. This relatively new language developed by Yukihiro Matsumoto is known for treating even primitives as objects, and has a framework, Rails, that eases web development.

Answer: **Ruby (on Rails)**

3. Originally a set of Perl scripts, this language for developing websites is on version 5, and allows embedding statements within HTML.

Answer: **PHP**

Tossup 12: Math (Other)

It was first conjectured by Guthrie in 1853, and a false proof by Kempe was commonly accepted until an 18-face counterexample was found for the proof. It was finally proved by Appel and Hanken in 1977 when they used a computer program to do a proof by exhaustion on over 1,000 different cases. Geographic maps do not necessarily obey this theorem because of non-contiguous countries like the United States. Name this theorem that dictates the minimum number of colors needed to color a map.

Answer: **Four-color theorem**

Bonus 12: Social Studies (Other)

Identify these facts related to the fall of an energy company in 2001.

1. This Texas company, once headed by Jeffrey Skilling, filed for bankruptcy in 2001.

Answer: **Enron Corporation**

2. This Chicago accounting firm was forced to dissolve because of its ties to the Enron scandal.

Answer: **Arthur Andersen LLP**

3. This act bearing the names of a Maryland senator and an Ohio congressman was passed in 2002 to help maintain accurate financial records of businesses.

Answer: **Sarbanes-Oxley Act** (accept *Public Company Accounting Reform and Investor Protection Act of 2002; prompt on SOX or Sarbox*)

Tossup 13: Science (Earth Science)

3M Company was originally incorporated to sell what they thought was this, but turned out to be anorthosite. Grown synthetically by the Verneuil process out of molten alumina, low-quality specimens of this gem are a major component of emery abrasives. While pure versions of it are clear, iron and titanium impurities can make it appear blue, while chromium is the cause of its red varieties. Composed of aluminum oxide, name this mineral whose colored gems are called ruby and sapphire, and which is defined on the Mohs scale to have a hardness of nine.

Answer: **Corundum** (*prompt on ruby or sapphire*)

Bonus 13: Math (Geometry)

Answer the following about the point (6, 4, 6).

1. What is the distance from it to the origin?

Answer: **$2\sqrt{22}$ units**

2. What is the area of a circle with diameter stretching between the point and the origin?

Answer: **22 pi square units**

3. What is the volume of a spheroid using the radius of this circle as the two equatorial radii and a value of 3 for the polar radii?

Answer: **352 pi cubic units**

Tossup 14: Miscellaneous (Technology)

Prototypes for up to ten-layer versions of these have been created, though only single- and dual-layer ones are on the market. They can be marked with one of three region codes, and are encrypted with the AACs algorithm. Supported by Dell, Apple, and Panasonic, in July 2007 Target announced that it would carry players for these optical discs but not their rival format. Read using a 405 instead of 650 nanometer laser, they can hold up to 25 gigabytes of data per layer. Name this new format of high-density optical disc championed by Sony.

Answer: **Blu-ray discs** (*do not accept DVD or HD DVD*)

Bonus 14: Literature (Literature)

He gained confidence in his writing after the success of his comedic play *The Inspector General*.

1. Identify this Ukrainian author, who burned most of the sequel to his most famous novel in 1852 and died nine days later.

Answer: **Nikolai Gogol**

2. Gogol's most famous novel, this book's name refers to the system of chattel slavery that governed Russian serfs.

Answer: **Dead Souls**

3. Gogol's most famous short story, this work follows Akakii Akakievich, a poor government copyist, who is mugged for the titular item.

Answer: **The Overcoat** (*accept The Cloak*)

Tossup 15: Social Studies (Geography)

Religious festivals brought their denizens together in the eighth century BCE, and the marshes between them were drained to provide land to join them together. Of them, the Viminal is the smallest, the Capitoline is the highest, and legend states that the city was founded on the Palatine. Identify these geographic features, located east of the Tiber River, upon which the city of Rome is located.

Answer: **Seven Hills of Rome** (*prompt on Rome or Hills*)

Bonus 15: Science (Chemistry)

Identify these properties of atoms.

1. Measured on a scale from 0.7 to 4.0, this is the tendency of an atom to attract electrons in bonds.

Answer: **Electronegativity**

2. This is the amount of energy required to add an electron to an atom.

Answer: **Electron affinity**

3. This is the approximate distance from the nucleus of an atom to its outermost electron shell.

Answer: **Van der Waals radius** (*accept atomic radius*)

Tossup 16: Math (Calculus) -- Computational (30 Seconds)

Find the area under the curve f of x equals $6x^2$ plus $4x$ plus 2 from x equals 0 to x equals 3 .

Answer: **78**

Bonus 16: Fine Arts (Music)

Name these musical works with a common theme that really counts.

1. This opera was written by Kurt Weill and Bertolt Brecht, after a work called The Beggar's Opera.

Answer: **Threepenny Opera**

2. This famous set of violin concerti written by Vivaldi in 1725 has a sonnet to go with each concerto.

Answer: **The Four Seasons**

3. This symphony by Beethoven sometimes nicknamed "Victory" is said to begin with Fate knocking at the door.

Answer: **Fifth Symphony**

Tossup 17: Literature (Literature)

He dedicated more than twenty of his works to a person whom he referred to by a name derived from the Latin for "pure light", Lux Casta. However, none of his works were published during his lifetime and, since he spent his fortune in aiding the Royalist cause, he died a poor man. Name this Cavalier poet, who penned the line, "Stone walls do not a prison make/Nor iron walls a cage." in "To Althea, From Prison."

Answer: **Richard Lovelace**

Bonus 17: Math (Other)

Answer the following about the word "football" - and yes, this is actually math.

1. In how many ways can the letters be arranged if the multiple O's and L's are counted as separate letters?

Answer: **40320**

2. In how many distinct ways can the letters be arranged?

Answer: **10080**

3. In how many distinct ways can the letters be arranged in the word foot?

Answer: **12**

Tossup 18: Science (Physics)

When storing extremely cold substances like liquid nitrogen, they need a pressurized valve to prevent them from shattering as the contents slowly boil. They are often used by scientists as cryostats to store gases in liquid form, which is the purpose for which they were invented by a Scottish chemist in 1882. They consist of a flask made of silvered glass surrounded by a vacuum inside an outer flask. Name this object which keeps cold things cold and hot things hot, which is often known by its genericized trademark.

Answer: **Dewar flask** (or vacuum flask or Thermos)

Bonus 18: Social Studies (Current Events)

Name either one of these pairs of female US Senators.

1. Name either Senator from California.

Answer: **Barbara Boxer** or **Dianne Feinstein**

2. Name either Senator from Maine.

Answer: **Susan Collins** or **Olympia Snowe**

3. Name either female Senator who was first elected to the position last year.

Answer: **Amy Klobuchar** or **Claire McCaskill**

Tossup 19: Fine Arts (Visual Art)

This architect designed Indiana University's Art Museum, a building which contains no right angles. In the 1960s he worked on the building for the National Center for Atmospheric Research, and in 1989 his Bank of China was completed. Five years after he retired in 1990, his design for Cleveland's Rock and Roll Hall of Fame came to fruition. Name this Chinese-American architect who designed the glass pyramid at the entrance to the Louvre.

Answer: **leoh Ming Pei**

Bonus 19: Science (Biology)

In the process of transcription, DNA is converted into mRNA.

1. With the help of ribosomes, mRNA is then turned into protein in this process.

Answer: **Translation**

2. This principle of molecular biology states that information flows from DNA to mRNA to proteins, in that order.

Answer: **Central dogma of molecular biology**

3. This type of virus violates the central dogma of molecular biology, because it has RNA which replicates through reverse transcription into DNA.

Answer: **Retrovirus**

Tossup 20: Social Studies (World History)

Some link its origins to the public auctioning of the royal jewels of the Nagpur family. Other potential causes include the British abolition of such customs as female infanticide, Sati, and child marriage. However, historians link it, above all, to the greasing of weaponry with pork and beef fat. Name this 1857 rebellion by insulted Muslims and Hindus against British officials, whose name comes from the Hindi word for "soldier", sepahi (*see-PAH-hee*).

Answer: **Sepoy Rebellion** (accept *Sepoy Mutiny*)

Bonus 20: Literature (Literature)

Identify the work, given the first line.

1. "Last night I dreamt I went to Manderley again."

Answer: **Rebecca**

2. "The primroses were over."

Answer: **Watership Down**

3. "Whether I shall turn out to be the hero of my own life, or whether that station will be held by anybody else, these pages must show."

Answer: **David Copperfield**

TIEBREAKERS/REPLACEMENTS:**Tossup: Science (Biology)**

This plant is a protected species in North Carolina because its wetland habitat is vulnerable to destruction. Issues with humidity make it difficult to grow the plant indoors but it is still widely available. It can be recognized by its 12 inch stem tipped with a cluster of small, white flowers, though it is better known for its unique leaves, which move with a speed unusual in plants. Like its relative the Sundew, this plant lives in nitrogen-poor environments where it must digest insect prey to survive. Name this popular carnivorous plant that can clamp down on a bug in a half a second, leaving behind an empty shell a few days later.

Answer: **Venus Flytrap**

Bonus: Literature (Literature)

Many literary titles are derived from Shakespeare's plays. Identify the Shakespearian origins of the titles of each of these works.

1. Frederick Forsyth's "The Dogs of War"

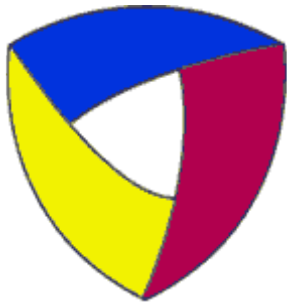
Answer: **Julius Caesar**

2. Isaac Asimov's "The Gods Themselves"

Answer: **King Lear**

3. Agatha Christie's "The Mousetrap"

Answer: **Hamlet**



Ægis Questions

**New Trier Varsity 2007
Round 6**

Tossup 1: Social Studies (Other)

He developed the saying "dare to know," representing rational thought free of external authority. Arthur Schopenhauer disagreed with this man's philosophy of understanding the world solely through experience. That philosophy incorporates both a priori and a posteriori concepts. Identify this German philosopher, famous for The Critique of Pure Reason.

Answer: **Immanuel Kant**

Bonus 1: Literature (Literature)

Identify these British authors of 20th century novels.

1. This author of often banned books such as Lady Chatterley's Lover and Sons and Lovers died at just 44.

Answer: **David Herbert Richards Lawrence**

2. This real name of this author of Shooting an Elephant was Eric Arthur Blair.

Answer: **George Orwell**

3. This Nobel Prize winner wrote The Forsyte Saga.

Answer: **John Galsworthy**

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

Make sure your answer is completely simplified. This number is equal to the eccentricity for the conic section given by the equation $9x^2+5y^2=45$. It also gives the eccentricity for the conic section with the equation r equals ten divided by the quantity three plus two cosine theta. It also equals the period of the function y equals the cosine of the quantity three pi x. Find this number equal to the slope of the line connecting the points (-3,2) and (12,12).

Answer: **2/3**

Bonus 2: Science (Chemistry)

Diethyl ether and butanol both have the formula $C_4H_{10}O$, but they have different structures.

1. Diethyl ether and butanol are examples of the structural type of these, molecules with the same formula but atoms are bonded to different atoms.

Answer: **Isomer**

2. In certain cases called these, all atoms can be bonded to the same atoms, but they are arranged differently in space. These isomers cannot be superimposed on each other.

Answer: **Stereoisomers**

3. Stereoisomers that are exact mirror images of each other are called these.

Answer: **Enantiomers**

Tossup 3: Literature (Mythology)

Married to the nymph Chariclo, he is the progeny of Cronus and the nymph Philyra. A great healer, astrologer and respected oracle, he was an immortal, given his Titanic lineage. He was eventually killed by Hercules when he accidentally hit him with an arrow dipped in the blood of the Hydra.

Identify this tutor of Asclepius, Jason, Patroclus and Achilles and most prominent of the Centaurs.

Answer: **Chiron** (KY-ron)

Bonus 3: Social Studies (Current Events)

Name these facts related to Hugo Chavez.

1. Chavez is currently the leader of this South American country.

Answer: **Bolivarian Republic of Venezuela**

2. In September 2006, Chavez made waves when he said this man was the devil.

Answer: **George Walker Bush** (*do not accept George Herbert Walker Bush*)

3. Chavez has threatened to cut off trade with this neighbor, with whom Venezuela enjoys billions of dollars in bilateral trade every year.

Answer: **Republic of Colombia**

Tossup 4: Science (Physics)

Richard Feynman once postulated a ratchet powered by this, which appears to contradict the second law of thermodynamics, because it would create useful work out of disorder. While that ratchet cannot exist, some protein pumps do seem to use this phenomenon to help propel particles. As was famously proposed in 1905, it can be closely approximated as a continuous-time stochastic (*stoh-KAS-tick*) process, and is modeled by the Langevin equation. Name this phenomenon first documented in 1827 by a namesake botanist who noticed the random motion of pollen particles suspended in water.

Answer: **Brownian motion**

Bonus 4: Literature (Literature)

Answer the following regarding literature and holidays.

1. Valentine Michael Smith is raised on Mars and returns to Earth as an adult in this Sci-fi work.

Answer: **Stranger in a Strange Land**

2. This character in Faulkner's *Light in August* identifies himself as both black and white, and has a relationship with the older Joanna Burden.

Answer: **Joe Christmas**

3. This poet wrote *Easter, 1916* to describe his ambivalent emotions towards the unsuccessful Easter Rising in Ireland.

Answer: **William Butler Yeats**

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

His first experience in the national political arena came when he was elected as the representative for Indiana's fourth district in 1976. Four years later, at just 33, he was elected to the Senate. In 2000 he failed in a bid to be the Republican presidential nominee, losing to his former running mate's son. Name this man who served as the Vice President to George H.W. Bush.

Answer: **James Danforth "Dan" Quayle**

Bonus 5: Math (Geometry)

Find the following for a three four five right triangle.

1. The area of the triangle.

Answer: **6**

2. The length of the median to the longer leg of the triangle.

Answer: **Root 13**

3. The length of the altitude to the hypotenuse of the triangle.

Answer: **12/5** (*accept 2 2/5 or 2.4*)

Tossup 6: Fine Arts (Visual Art)

Salvador Dali claimed that an X-ray of this artist's *Angelus* (*ahn-jel-us*) would reveal that the two figures were praying over a child's coffin. One of the founders of the Barbizon school, many of his works portray agricultural scenes, such as *The Sowers* and his most famous work, where the titular workers are shown in a positive light. Identify this French painter, most famous for *The Gleaners*.

Answer: **Jean-Francois Millet**

Bonus 6: Science (Physics)

Identify these concepts from fluid mechanics.

1. This is the resistance that a solid object experiences as it moves through a fluid, like air or water.

Answer: **Drag**

2. This is the resistance of a fluid to shear stress, experienced as the thickness of that fluid.

Answer: **Viscosity**

3. According to this principle, an object in a fluid is buoyed upward with a force equal to the weight of the fluid it displaces.

Answer: **Archimedes' principle**

Tossup 7: Science (Biology)

Amber, opal, and ochre are the names for three equivalent ones. Though there are 64 possible ones, many of them are redundant, because there are only 21 possible outputs which must be distinguished. Shifting the reading frame can cause almost all of these to be misread, as can deletion or addition mutations. A famous experiment involving translation of a string of uracils proved that the U U U one represents phenylalanine, though typically an A U G one is required to start translation. Name this group of three nucleotides which ribosomes translate into one of twenty amino acids.

Answer: **Codon**

Bonus 7: Social Studies (World History)

Answer these questions about Germany in between World Wars I and II.

1. This government, named after the city it convened in, attempted to write a new German constitution.

Answer: **Weimar Republic**

2. Rosa Luxembourg and Karl Liebknecht led this German movement, named after a Roman who led a slave revolt, that sought to turn the country into a Communist state.

Answer: **Spartacist League** (accept *Spartakusbund*)

3. This German president was 85 when he appointed Hitler as Chancellor -- a year later, Hitler would succeed him in his position.

Answer: **Paul von Hindenburg**

Tossup 8: Miscellaneous (Entertainment)

He attends Clark Secondary School, and he enjoys drinking Old Muskegon. He gets knocked out by a thief but he later inadvertently knocks out a suspect, and in the fall he will attend Dartmouth.

Though not actually a 25 year old Hawaiian organ donor, he was almost named Muhammad, as that is the most popular name in the world, but his real name is actually Fogell. Name this character from *Superbad* whose name comes from his poorly chosen fake ID.

Answer: **McLovin** (accept *Fogell until mentioned*)

Bonus 8: Fine Arts (Music)

Identify the following about George Handel.

1. He wrote numerous works, including Solomon and Israel in Egypt, in this genre, avoiding the papal ban on opera.

Answer: **Oratorio**

2. The most famous of his oratorios is this work, which contains the Hallelujah Chorus.

Answer: **Messiah**

3. Handel also wrote this orchestral work in 1717 to be played on the River Thames for King George.

Answer: **Water Music**

Tossup 9: Math (Calculus) -- Computational (30 Seconds)

Find the slope of the curve f of x equals sine squared of 2θ at θ equals π over eight.

Answer: **2**

Bonus 9: Science (Astronomy)

Identify these concepts related to astronomy.

1. This diagram plots the spectral class or temperature of stars on one axis, and the luminosity, or absolute magnitude, on the other.

Answer: **Hertzsprung-Russell diagram**

2. On the Hertzsprung-Russell diagram, most stars lie on a diagonal path called this.

Answer: **Main sequence**

3. This man's constant is the ratio between how fast galaxies are receding from us, and how far away they are.

Answer: **Hubble('s) constant**

Tossup 10: Literature (Literature)

It is a frame narrative involving Indian expatriates in Britain. One story contained inside the dream-like frame involves a peasant girl named Ayesha who leads a group of villagers into the Arabian Sea on foot. The second relates a revelation in support of old, polytheistic deities, and the subsequent retraction of that revelation. Beginning with the two main characters falling out of an airplane, identify this fatwa-worthy work by Salman Rushdie.

Answer: **The Satanic Verses**

Bonus 10: Miscellaneous (Technology)

Name these terms related to CPUs, or Central Processing Units, of computers.

1. CPUs store small amounts of information in their onboard cache memory, which is a very fast form of this type of memory which also comes in sticks to be inserted in the motherboard.

Answer: **(S)RAM**

2. The data bus of modern processors has increased from 8 bits, used in the 1970s, to this value only recently supported by operating systems.

Answer: **64 bits**

3. This processor architecture co-developed by IBM and used in the Playstation 3 is designed to work well in large groups.

Answer: **Cell**

HALFTIME

Tossup 11: Literature (Literature)

Originally portrayed as a stuck-up, pince-nez wearing Harvard-educated intellectual, after the first ten books or so, his mannerisms were toned down or disappeared completely. First appearing in *The Roman Hat Mystery*, he is famous for his "Challenge to the Reader". Not only a character, but also a pseudonym and a house name for other authors, identify this name used primarily by Frederic Dannay and Manfred Bennington Lee.

Answer: **Ellery Queen**

Bonus 11: Social Studies (U.S. History)

Identify these people associated with the Navy during World War II.

1. This Illinoisan was the Secretary of the Navy from 1940-1944.

Answer: **William Franklin "Frank" Knox**

2. This man, one of four to hold the rank of Fleet Admiral, led the forces of the Pacific fleet during the war.

Answer: **Fleet Admiral Chester William Nimitz**

3. This Rear Admiral was the highest ranking officer present at Pearl Harbor at the time of the attack.

Answer: **Husband Edward Kimmel**

Tossup 12: Science (Chemistry)

Now composed of polystyrene, benzene, and gasoline, its name comes from the original formula created by Harvard chemists in the early 1940s, a combination of two carbon-based compounds precipitated by aluminum. First used in World War II by the United States, the hydrophobic thickeners added to the gasoline in it make it both stickier and harder to extinguish. Its use in Vietnam was symbolic to many of the war, especially after a Pulitzer-winning photograph of a young girl running down the street after being burned by it. Name this incendiary weapon which, according to Colonel Kilgore, smells like victory.

Answer: **Napalm**

Bonus 12: Math (Other)

Out of a group of ten people, find the number of ways to:

1. Pick two of them if order matters

Answer: **90**

2. Pick nine of them if order does not matter

Answer: **10**

3. Split them into two teams. For this last part, it is helpful to know that ten combination five is 252, but the answer is not 252.

Answer: **126**

Tossup 13: Social Studies (World History)

Themistocles chose the location of this battle to provide additional naval support. Two days of battle passed before Ephialtes (*eff-ee-al-tees*) informed the invading commander of a pass to avoid the frontal defenses. This information led to the fall of the defenses, and Xerxes ordered the fallen King Leonidas to be decapitated and crucified. Identify this battle in the Persian War, where 300 Spartans were famously killed.

Answer: **Battle of Thermopylae**

Bonus 13: Literature (Literature)

Answer the following about French poetry.

1. This poet penned the Symbolist collection *The Flowers of Evil*.

Answer: **Charles Baudelaire**

2. Baudelaire influenced this poet of *The Afternoon of a Faun* and "A roll of the dice will never abolish chance."

Answer: **Stephane Mallarme** (*mal-ar-may*)

3. This poet was shot by Paul Verlaine in 1873; during his recovery, he wrote *A Season in Hell*.

Answer: **Arthur Rimbaud** (*rim-bo*)

Tossup 14: Math (Calculus)

John Wallis first introduced this symbol in his treatise on conic sections while Jakob Bernoulli found he could represent it graphically by modifying the equation for an ellipse. This mathematical symbol is sometimes called the lemniscate after the Latin word for ribbon. This symbol is quite useful when writing improper integrals and the limits for functions over the set of real numbers as it can be designated positive or negative. Name this symbol, jokingly called the "lazy eight," which denotes unbounded limits in calculus and in general stands for all numbers.

Answer: **Infinity symbol**

Bonus 14: Miscellaneous (Sports)

Identify these people related to the Chicago Bulls.

1. Right before the season started the Bulls were rumored to be trading for this player on the LA Lakers.

Answer: **Kobe Bryant**

2. This current GM for the Bulls has brought the team out of its mediocre period that followed the Jordan era.

Answer: **John Paxson**

3. Paxson was rumored to be unwilling to part with this former Duke small forward who was drafted the same year as Ben Gordon, which possibly led to a collapse of the deal.

Answer: **Luol Deng**

Tossup 15: Fine Arts (Music)

This composer played viola under Bedrich Smetana and was a professional zither player. His first symphony is subtitled *The Bells of Zlonice*, but his most famous one was influenced by his time in Spillville, Iowa and American folk music such as African American spirituals. His best-known opera is based on a Slavic mythological water sprite called Rusalka. Identify this Czech composer whose ninth symphony was titled *From the New World*.

Answer: **Antonin Dvorak** (*d'VOR-zhock*)

Bonus 15: Social Studies (Geography)

Identify these rivers on that border the United States.

1. This river that is over 1800 miles long that begins in Colorado separates Mexico from Texas.

Answer: **Rio Grande** (accept *Rio Bravo*)

2. This river connects the Atlantic Ocean to Lake Ontario.

Answer: **St. Lawrence River** (accept *St. Lawrence Seaway*)

3. The Bay of Fundy is the mouth of this river that forms part of the border between New Brunswick and Maine.

Answer: **Saint John River**

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

It involved the armies of the Mississippi, Ohio, and West Tennessee, and the Union was led by Major Generals Buell and Grant. Confederate commander Albert Johnston was killed during it, and he was succeeded by General Beauregard. Johnston began the attack on April 6, 1862 to surprise the slumbering Union troops, but this did not work. Name this Civil War battle, also known as the Battle of Pittsburg Landing, that was fought in southwestern Tennessee.

Answer: **Battle of Shiloh**

Bonus 16: Math (Geometry)

Simplify these trig identities.

1. Secant of the quantity pi over two minus x

Answer: **Cosecant (of) x**

2. Sine p cosine q minus cosine p sine q

Answer: **Sine (of the quantity) p minus q**

3. One half of the quantity one minus the cosine of the quantity 2x

Answer: **Sine Squared (of) x (or equivalent)**

Tossup 17: Miscellaneous (Interdisciplinary)

The name's the same. In England, this is the term for the compressible barriers at the end of railroad tracks that lessen the damage done to and by rogue railroad cars. For firearms, these reduce recoil and increase the life of parts. In computers, these are used as intermediate storage locations for data when the input and output operate at different rates. In chemistry, these solutions often consist of a weak acid and a salt of its conjugate base, and resist change in pH. Name this term that also refers to demilitarized territory between hostile factions.

Answer: **Buffer**

Bonus 17: Literature (Literature)

Answer the following about The Importance of Being Earnest.

1. This man turns out to be Algernon's brother and the only man in the play really named Ernest. A good thing, too, since Gwendolyn just couldn't marry anyone with a different name.

Answer: **John "Jack" Worthing**

2. As Jack's nursemaid, she misplaced him at a train station when she put a book in his pram and the baby in her handbag.

Answer: **Miss Prism**

3. This type of pastry causes Jack a lot of strife when Algernon invades his garden during tea and attempts to consume them all.

Answer: **Muffins** (*Do not accept scones, cakes, toast, or other pastries*)

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

Find the probability of rolling three consecutive rolls of either a three or a seven on a pair of fair six sided dice.

Answer: **8/729**

Bonus 18: Science (Biology)

Name these systems of the human body.

1. This system uses hormones to regulate the body's metabolism and growth.

Answer: **Endocrine system**

2. This system similar to the circulatory system has no central pump, instead using skeletal muscles to squeeze the fluid between its nodes.

Answer: **Lymphatic system**

3. This system comprises the skin, nails, hair, and other outer coverings of the body.

Answer: **Integumentary system**

Tossup 19: Literature (Literature)

Along with with Joe Orton and John Osborne this man was a member of the Angry Young Men, a group of British playwrights from the 1950s. One of his more famous plays depicts Ruth becoming a surrogate mother to Lenny, while another play features Stanley, a piano player. Name this winner of the 2005 Nobel Prize in Literature who penned "The Homecoming" and "The Birthday Party."

Answer: **Harold Pinter**

Bonus 19: Fine Arts (Visual Art)

Answer these related questions.

1. This early 20th century group was formed by Munich artists such as Albert Bloch and Arnold Schoenberg.

Answer: **The Blue Rider** (*accept Der Blaue Reiter*)

2. This Russian member of the Blue Rider painted On White II.

Answer: **Wassily Kandinsky**

3. Kandinsky worked at this school founded by Walter Gropius.

Answer: **The Bauhaus**

Tossup 20: Science (Physics)

Their name was first introduced by Kirchhoff in 1860. The emissivity of an object represents how closely it approximates one of these, as all real objects have an emissivity of less than one. Stefan's law states that their total irradiance is proportional to the fourth power of their temperature. While attempting to model their emission spectra, Planck made the assumption that light energy is quantized, an assumption that proved crucial in the development of quantum mechanics. Name this theoretical object that does not reflect any electromagnetic radiation, named after the color it would appear if it were not rather hot.

Answer: **Black body**

Bonus 20: Math (Calculus)

Given the curve y equals x squared minus x minus 2, determine the following.

1. Find the area under the curve between x equals 2 and x equals 4.

Answer: **26 over 3 or 8 and two-thirds**

2. Find the derivative.

Answer: **2 x minus 1**

3. Find the coordinates of the vertex.

Answer: **(1/2, -2 1/4) or (1/2, -9/4)**

TIEBREAKERS/REPLACEMENTS:**Tossup: Fine Arts (Music)**

This modern composer received no formal musical education before the age of 18, when he began to study with Virko Baley at UNLV. This experience convinced him to pursue music at Juilliard, and his first album, *Water and Light*, was a critical success. Since then, he has composed music for two more albums, "Winter" and "Cloudburst," featuring both choral and instrumental music. Name this composer, best known for his works "Ghost Train," "Sleep," and "October."

Answer: **Eric Whitacre**

Bonus: Science (Chemistry)

Identify the following concerning electron configurations.

1. This rule named after an Austrian physicist explains why only two electrons can occupy an orbital.

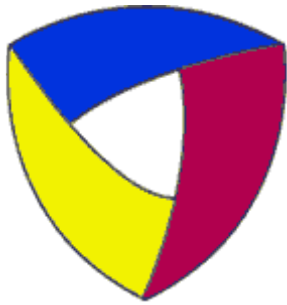
Answer: **Pauli exclusion principle** (*prompt exclusion principle*)

2. Give the ground state electron configuration for Oxygen. Noble gas configuration may be used.

Answer: **[He] 2s² 2p⁴** (*accept 1s² 2s² 2p⁴*)

3. This alternate way of showing electron configuration involves drawing boxes which are filled with upward or downward pointing arrows that represent electrons.

Answer: **Orbital box diagram**



Ægis Questions

**New Trier Varsity 2007
Round 7**

Tossup 1: Social Studies (Geography)

It was called the Riphean Mountains in Ancient Greece and Rome, and it extends from the Arctic Ocean to the northern border of Kazakhstan where its namesake river begins its path to the Caspian Sea. The city of Yekaterinburg is located on the eastern side of this range, and its highest peak is Mount Narodnaya. Identify this western Russian mountain range, the traditional boundary between Europe and Asia.

Answer: **Ural Mountains**

Bonus 1: Literature (Literature)

They expressed an American Bohemian culture in the 1950's and 60's.

1. Identify this literary group and cultural movement.

Answer: **Beat generation or Beat poets or Beats**

2. Naked Lunch, by this Beat author, found itself under scrutiny in an obscenity trial in 1962.

Answer: **William S. Burroughs**

3. Jack Kerouac's On the Road follows this character's exploits with Sal Paradise. He was based on Kerouac's friend, Neal Cassidy.

Answer: **Dean Moriarty** (*accept either half*)

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

Give your answer in simple radical form. A cube with a great diagonal of this length will have a surface area of eight-thirds. This value is the positive solution to the equation three x squared minus four equals zero. Give this value equal to the secant of the quantity pi over six radians, which also equals the cosecant of sixty degrees.

Answer: **Two Root Three Over Three**

Bonus 2: Science (Chemistry)

Name these industrial chemical processes, for ten points each.

1. This process produces ammonia out of nitrogen and hydrogen gas at high temperature and pressure.

Answer: **Haber(-Bosch) process**

2. This process reacts ammonia generated by the Haber process with oxygen and water, creating nitric acid.

Answer: **Ostwald process**

3. This process electrolyzes alumina in a cryolite bath to create pure aluminum; its invention in 1886 caused the price of pure aluminum to plummet.

Answer: **Hall-Héroult process**

Tossup 3: Literature (Literature)

The opening lines, which begin "To him who in the love of Nature holds Communion with her visible forms," were written after its original publication. It ends imploring the reader to live so that when death comes, one can lie down to pleasant dreams. Critics questioned its authenticity because it was mostly written when the poet was only 16. Identify this poem, whose title can translate as "Meditation on Death," written by William Cullen Bryant.

Answer: **Thanatopsis**

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

Answer the following questions about the Louisiana Purchase.

1. Who was the French leader at the time of the deal?

Answer: **Napoleon Bonaparte**

2. The French were willing to leave the Western Hemisphere after bad experiences in the colony that is now the nation of Haiti. What was the name of the colony at the time?

Answer: **Saint Domingue**

3. Which nation controlled the Louisiana Territory immediately before France?

Answer: **Spain**

Tossup 4: Science (Physics)

Detected through gravitational lensing and other observations of galaxies, it was first hypothesized in 1933, and provides an explanation for why observed kinetic energy is so much higher than otherwise predicted. A generic term, it may be comprised of neutrinos, dwarf stars, axions, MACHOs, or WIMPs. Thought to be 22% of the mass in the universe, name this so-called "missing mass," a poorly-understood type of matter which, as its name suggests, does not reflect or emit enough electromagnetic radiation to be directly observed.

Answer: **Dark matter** (*do not accept dark energy*)

Bonus 4: Literature (Mythology)

Identify these sunny characters, for ten points each.

1. This son of Daedalus flew too close to the sun with wax wings, and plummeted to his death when his wings melted.

Answer: **Icarus**

2. This son of the sun god Helios tried to drive his father's chariot across the sky, but lost control and was killed by Zeus.

Answer: **Phaeton**

3. The great-great-great-grandson of this Shinto sun goddess became the first Emperor of Japan.

Answer: **Amaterasu**

Tossup 5: Social Studies (World History)

After 1204, they boasted the title, "Lord of the fourth part and a half of the whole empire of Romania." The ones in Senarica ruled Italy's smallest republic, containing fewer than 300 people. Those in Genoa only had real power over city patronage and most stripped the palace of its wealth before leaving office. Some of the more infamous were Enrico Dandolo, who persuaded the crusaders to sack Constantinople; Francesco Foscari, who lead a series of ruinous wars against Milan; and Leonardo Loredan, who oversaw the segregation of Jews into Europe's first ghetto. Identify the title of these high officials, usually elected for life, who served as the chief magistrates of Venice and other Italian states until Napoleon brought their era to an end.

Answer: **Doges** (*accept Dogi, prompt on Duke*)

Bonus 5: Math (Geometry)

Answer the following about a rectangle with width 12 units and length 16 units, and a rectangular prism with height 1 unit and equal width and length.

1. What is the volume of the cube?

Answer: **192 square units**

2. What is the diameter of a circle circumscribed about the rectangle?

Answer: **20 units**

3. Rounded to the nearest whole number, what is the area inside that circumscribed circle but outside the rectangle?

Answer: **122 square units**

Tossup 6: Fine Arts (Music)

The Rake Punished is part of the title of this opera, which premiered in Prague in 1787. Franz Liszt composed a Reminiscence of this work, and a final ensemble was omitted from early performances. Donna Elvira, Donna Anna, and Zerlina are all unsuccessfully courted by the title character, who is dragged by a statue into Hell. Identify this opera buffa, based on the legend of a Spanish womanizer, composed by Wolfgang Mozart.

Answer: **Don Giovanni**

Bonus 6: Science (Biology)

Identify these autoimmune diseases.

1. This disease mainly affects women, and causes the body to attack its own organs.

Answer: **Lupus erythematosus**

2. This disease causes the degradation of myelin in the central nervous system, impairing nervous function.

Answer: **Multiple sclerosis** (accept *MS*)

3. This syndrome is caused by the immune system attacking peripheral nerves in response to antigens, causing paralysis. It is hypothesized that FDR had this rather than polio.

Answer: **Guillain-Barré syndrome**

Tossup 7: Science (Astronomy)

In his model of the solar system, the moon and sun rotate around the earth, while the other planets rotate around the sun. Founding the Uraniborg observatory, he used various instruments and techniques with the naked eye to measure the position of stars to incredible accuracy. After his death, his data was used by his assistant Kepler to derive Kepler's laws of planetary motion. Name this Danish nobleman and astronomer whose astronomical tables were the most accurate naked-eye observations ever made.

Answer: **Tycho Brahe** (accept *Brahe*)

Bonus 7: Social Studies (Current Events)

Answer the following questions about an important NIE report released to the public on December 3rd.

1. The acronym NIE stands for this.

Answer: **National Intelligence Estimate**

2. According to the report, this nation stopped trying to develop a nuclear weapon in 2003.

Answer: **Iran**

3. President Bush claims that this Director of National Intelligence told him in August that he had new information, but he didn't tell Bush what the information was.

Answer: **Vice Admiral John Michael "Mike" McConnell**

Tossup 8: Miscellaneous (Sports)

He played quarterback for Carroll College in his home state of Montana, and later, while he was the offensive coordinator there, its offense was the best in its division. His first D-1 job was at Weber State, but he later coached under John L. Smith at Utah State. He followed Smith to Louisville, where he would take over as head coach in 2003. In 2007 he became the head coach of the Atlanta Falcons, but he resigned only 13 games into the season to take the job Houston Nutt had left. Name this man, who just this week was announced as the new head coach at Arkansas.

Answer: **Bobby Petrino**

Bonus 8: Fine Arts (Visual Art)

A work from this series was famously taxed as mere metal as it passed through United States Customs in 1926.

1. Identify this work of sculpture which depicts movement rather than shape.

Answer: **Bird in Space**

2. Identify the artist of Bird in Space.

Answer: **Constantin Brancusi**

3. Brancusi was a colleague of this artist known as The Customs Officer, famous for The Snake Charmer.

Answer: **Henri Rousseau**

Tossup 9: Math (Other) -- Computational (30 Seconds)

This number is the positive geometric mean between 360 and 1440, and it equals the dot product of the vectors (10,40) and (52,5). It also equals the sum of the degree measures of the interior angles of a hexagon. It also equals six factorial. Identify this number which equals the number of degrees equivalent to four pi radians.

Answer: **720**

Bonus 9: Science (Physics)

If a wave is emitted from a moving source, its frequency and wavelength are perceived to be different than what they were at the source.

1. That effect is known as this, after the scientist who discovered it.

Answer: **Doppler effect**

2. When the Doppler effect causes light to be perceived with a longer wavelength, it is known as this.

Answer: **Redshift**

3. Redshift can be caused by motion, but it can also be caused by the warping of space-time due to this theory of Einstein's.

Answer: **General relativity** (*prompt relativity, do not accept special relativity*)

Tossup 10: Literature (Literature)

San Jose State University has named a unique writing contest in honor of him. Very popular during his lifetime, he penned such works as *Rienzi* (*ree-EN-zee*), after which a contemporary, Richard Wagner, based a famous opera of the same name. This English writer is better known today, however, for his almost humorously overwrought style of writing, especially in such passages as the beginning of his novel *Paul Clifford*. Name this author whose greatest contribution has been the coining of the phrases "pursuit of the almighty dollar," "the pen is mightier than the sword," and most famously, "It was a dark and stormy night."

Answer: **Edward Bulwer-Lytton**

Bonus 10: Miscellaneous (Entertainment)

Identify the following facts related to the movie *Risky Business*.

1. The movie was the breakout role for this actor who also starred in *Top Gun*, but who is more famous now for being the creepy weirdo who brainwashed Katie Holmes.

Answer: **Tom Cruise**

2. The most famous scene in the movie is when Cruise's character dances in his underwear to this man's Old Time Rock and Roll.

Answer: **Robert "Bob" Clark Seger**

3. At one point, characters drive by this seven sided Wilmette religious landmark.

Answer: **Baha'i Temple** (*accept Baha'i House of Worship*)

HALFTIME

Tossup 11: Science (Chemistry)

This process turns its target material into a thermosetting polymer, preventing its constituent proteins from oxidation so it will not turn brittle, as well as assuring that it does not melt at higher temperatures. The process, which was first patented in 1843, creates extensive cross-linking of natural polyisoprene molecules, by adding sulfur at high temperatures. Name this process by which natural rubber is made more usable, which was discovered by Charles Goodyear.

Answer: **Vulcanization**

Bonus 11: Math (Algebra)

For this problem, pretend you are given a shuffled standard deck of 52 cards, pick one at random, then put it back in the deck and reshuffle, and then pick another card. Give your answers as simplified fractions.

1. What is the probability that you picked a spade both times?

Answer: **1/16**

2. What is the probability that you picked, in either order, one spade and one card that is not a spade?

Answer: **3/8**

3. What is the probability that the first card was a picture card and the second card was not a picture card? Aces do not count as picture cards.

Answer: **30/169**

Tossup 12: Literature (Literature)

Born Frederick Kittel, only fourteen days after his 2005 death the Virginia Theatre on Broadway was renamed in his honor. He won two Pulitzer Prizes for Drama, including one for The Piano Lesson. Aiming to portray the Black experience through the twentieth century, identify this man, most famous for his ten play Pittsburgh Cycle which included Fences and Radio Golf.

Answer: **August Wilson**

Bonus 12: Fine Arts (Music)

Identify these related musical works.

1. This Tchaikovsky piano piece subtitled "Song of the Lark" is third in a set of twelve pieces titled "The Seasons," based on different times of year.

Answer: **March: Song of the Lark**

2. This set of five marches by Elgar is best known for the trio in the first march, which is played at many graduation ceremonies.

Answer: **Pomp and Circumstance Marches**

3. This famous march by John Philip Sousa is the National March of the United States.

Answer: **Stars and Stripes Forever**

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

Find the sum of the major and minor axes of the hyperbola with equation quantity x plus 2, quantity squared, over 9, minus quantity y plus 1, quantity squared, over 25, equals 1.

Answer: **16**

Bonus 13: Science (Physics)

Identify these subatomic particles.

1. This particle comes in six flavors, including up and down.

Answer: **Quark**

2. Any particle composed of quarks is considered one of these, whose subtypes include baryons and mesons.

Answer: **Hadron**

3. Two up quarks and a down quark form this particular hadron, with a net charge of positive one.

Answer: **Proton**

Tossup 14: Miscellaneous (Other)

In Wicca, it is the unifying energy in nature. Originally introduced by Plato to correspond to the dodecahedron, in modern cosmology it refers to a hypothetical type of dark energy possibly responsible for the accelerating expansion of the universe. In classical times, however, Aristotle included it along with earth, air, fire, and water as the five constituents of the universe. Name this substance of pure energy thought to make up the heavens, whose name now more commonly refers to a pure, perfect embodiment of a quality.

Answer: **Quintessence** (*prompt on aether or fifth element*)

Bonus 14: Literature (Literature)

Answer the following questions about Les Miserables.

1. Hugo's story of this 1815 battle is considered both a masterful depiction of the fighting and a long digression.

Answer: **Battle of Waterloo**

2. That digression is somewhat important to the plot of the novel because this character's father is an officer who is wounded in the battle.

Answer: **Marius Pontmercy**

3. Marius falls in love with this woman under the care of Jean Valjean, while Eponine falls in love with him.

Answer: **Cosette**

Tossup 15: Social Studies (Current Events)

In many countries, this name is used for minor liberal parties, though it is a major conservative party in Jamaica. In Israel, where it is also known as Avoda, it is the party headed by Ehud Barak. After recent elections, this is now the ruling party in Australia. The best-known example of a party with this name is headed by Gordon Brown. Name the ruling party of the United Kingdom.

Answer: **Labour**

Bonus 15: Math (General)

Set A consists of the terms 1, 2, 3, 4, and 5. Set B consists of 2, 4, 6, and 8. Set C consists of 6, 7, 8, 9, 11, 13. Set D consists of all prime numbers less than 20.

1. What is D intersection B?

Answer: 2

2. What is A union B?

Answer: 1, 2, 3, 4, 5, 6, 8

3. What is the relative complement of C in D?

Answer: 6, 8, 9, 10

Tossup 16: Fine Arts (Visual Art)

The artist deemed this piece a "readymade," and he signed it with the name R. Mutt. Pierre Pinoncelli has vandalized this work twice -- once with a hammer, and once by using it the way most people do. Considered a masterpiece by many, it is one of the most classic works of Dadaism.

Name this work by Marcel Duchamp that he might have gotten the idea for after using the bathroom.

Answer: **The Fountain** (*do not accept The Urinal*)

Bonus 16: Social Studies (Geography)

Identify these African deserts.

1. This northern African desert is the second largest in the world.

Answer: Sahara

2. This desert home to the Bush people is located mostly in Botswana.

Answer: Kalahari

3. This third largest desert of Africa by area lies partly in Angola, and near the city of Windhoek.

Answer: Namib

Tossup 17: Math (Other)

The first was written in 1952 by Grace Hopper for A-0 (*a-zero*). In their first phase, they build an intermediate representation and symbol table, accomplishing this by tokenizing the input data, running the preprocessor, and parsing syntax. At this point, they optimize the intermediate representation through techniques like inline expansion and dead code removal, and then they output machine language equivalent to their original input. Name this type of computer program that processes code like C or Java, and turns it into an executable program.

Answer: **Compiler** (*do not accept assembler*)

Bonus 17: Miscellaneous (Technology)

Identify these related concepts from cryptography.

1. This type of algorithm, whose popular forms include MD5 and SHA-1, converts any input into an output of fixed length, providing a sort of checksum or fingerprint for the original file.

Answer: **Hash function** (*accept message digest*)

2. Hash functions are often strengthened by this saline-sounding input. Hashes are typically run on a password plus this random dummy input, making the hash harder to directly reverse.

Answer: **Salt**

3. Salted hashes are often stored in a password file generically called this, an apiary-like name for a set of files to store abstracted data. Examples in Windows include the SAM file and the registry.

Answer: **Hive**

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

He arrived in the United States at the age of 13, and he later learned his craft under William Bradford. His New York Weekly Journal was first published in 1733, and almost immediately began attacking William Cosby, the governor of the colony. Barely a year later he was arrested, but in 1735 he won his landmark court case with help from Andrew Hamilton. Name this German-American who, by winning a libel case brought against him, helped establish the freedom of the press in America.

Answer: **John Peter Zenger**

Bonus 18: Literature (Literature)

Given a clue, identify these related literary facts.

1. This German Romantic writer authored the work *The Sorrows of Young Werther*.

Answer: **Johann Wolfgang von Goethe**

2. This most well known work of Goethe features a man who sells his soul to the devil.

Answer: **Faust** (*do not accept Dr. Faustus or other variants*)

3. A speech by Mephistopheles in *Faust* lent its name to this Kurt Vonnegut novel about Howard W. Campbell, Jr.

Answer: **Mother Night**

Tossup 19: Science (Biology)

Inherited on the first chromosome, it was first discovered in 1937 by Landsteiner and Wiener. About 85% of Caucasians are positive for it, and it is even more prevalent among Asians and blacks. A condition called erythroblastosis fetalis can arise in the womb if a fetus has this antigen and its mother does not, as antibodies for this that the mother produces may cross the placenta. First discovered when blood was transfused into rabbits from the namesake animal, name this blood antigen designated "positive" or "negative."

Answer: **Rh factor** (*or Rh antigen or Rhesus factor or Rh(D) antigen*)

Bonus 19: Math (Calculus)

Find the number of possible passwords that can be made under the following restrictions.

1. There are two characters with repeats allowed. The first one can be any digit or capital letter, and the second one can be any digit.

Answer: **360**

2. There are two characters without repeats allowed. The first one can be any digit or capital letter, and the second one can be any digit.

Answer: **350**

3. There are three characters without repeats allowed. All three characters must be digits.

Answer: **720**

Tossup 20: Literature (Literature)

It requires years of study in music, mathematics, and cultural history and essentially is an abstract synthesis of all arts and scholarship. Mentioned in the citation for the 1946 Nobel Prize for Literature, it takes place several centuries in the future. Joseph Knecht is a member of a monastic order committed to both the education of young men and the title activity. Knecht is eventually given the title of "Magister Ludi," meaning "Master of the Game." Identify this last work and magnum opus of Hermann Hesse (*HESS-UH*).

Answer: **The Glass Bead Game**

Bonus 20: Social Studies (World History)

It lasted from 431-404 BC, and led to the downfall of Athens.

1. Identify this war, won by Sparta, which takes its name from the peninsula on which Athens is located.

Answer: **Peloponnesian War**

2. This Athenian politician planned a wall around Athens and stretching to the sea to allow access to the navy and supply lines.

Answer: **Pericles**

3. This agreement created a truce from 421 to 417, named for the Athenian general who brokered it.

Answer: **Peace of Nicias** (*ny-see-us*)

TIEBREAKERS/REPLACEMENTS:**Tossup: Fine Arts (Music)**

Composers of this musical form include Thomas Weelkes and Costanzo Festa, and it was first published by Phillipe Verdelot. They are first traced from Italy, and the English school continued to produce them after they had faded into obscurity in mainland Europe. It was chiefly inspired by the motet, but it was the first form to use music that mimics the lyrics, called word painting. Identify this musical form, often performed today in dinner theater settings.

Answer: **Madrigal**

Bonus: Fine Arts (Music)

Identify the following percussion instruments.

1. This is sometimes referred to as a kettle drum, and is usually played as a set of three or more.

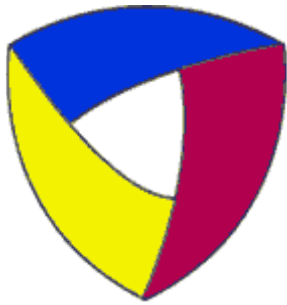
Answer: **Timpani**

2. This keyboard instrument is played by striking wooden bars with a mallet. It is pitched one octave lower than a xylophone.

Answer: **Marimba**

3. This instrument is named for the set of resonating cords stretched along its bottom.

Answer: **Snare Drum**



Ægis Questions

**New Trier Varsity 2007
Round 8**

Tossup 1: Science (Earth Science)

New observations of so-called PKJKP waves are further evidence of its state of matter. Those waves are named after the order in which those waves pass through various layers, where the letter J represents this layer. Its existence was first theorized by Inge Lehmann, whose namesake discontinuity once separated this layer from the one next to it. With a temperature of about 10,000 degrees Celsius, and subjected to pressure over three million times that of sea level, it is about 780 miles thick and mostly composed of nickel and iron. Name this solid sphere of metal at the center of the earth.

Answer: **Inner core** (prompt core, do not accept outer core)

Bonus 1: Social Studies (Geography)

Identify these cities that are passed through by the Danube River.

1. This city is by far the most populous in Austria, containing more than five times more people than any other.

Answer: **Vienna**

2. This city became a national capital in 1993 and contains a large castle overlooking the river. It borders Austria and Hungary.

Answer: **Bratislava**

3. This city was formed by the union of two cities on opposite sides of the river. In 1956, it was the site of a huge uprising eventually put down by Soviet forces.

Answer: **Budapest**

Tossup 2: Literature (Mythology)

His one-thousand names are outlined in the Mahabharata. Depicted with skin the same color as new clouds, he often is seen carrying a conch, a chakra, a mace, and a lotus. Within the Puranas, he is described as having ten avatars, nine of which lived in the past, with one still to come in the future. Identify this Hindu god who, within the Trimurti, is the god of preservation.

Answer: **Vishnu**

Bonus 2: Math (General)

Answer the following about the number 4, 6, and 9.

1. What is their arithmetic mean?

Answer: **6 and one-third or 19 over 3**

2. What is their geometric mean?

Answer: **6**

3. What is their harmonic mean?

Answer: **36/19 or 1 and 17-19ths**

Tossup 3: Social Studies (Other)

This phenomenon was possibly to blame during the murder of toddler James Bulger, when 38 people saw him being led by his two abductors, but none did anything about it. This incident reminded many of a 1964 case in New York, when about a dozen people witnessed Kitty Genovese being assaulted and stabbed to death, but none called the authorities until the attack was over. An example of diffusion of responsibility, identify this effect parodied in the finale of Seinfeld, which states that people are less likely to help in an emergency when others are present.

Answer: **Bystander effect**

Bonus 3: Fine Arts (Visual Art)

The five titular people sit around a table with a single lamp hanging above.

1. Name this 1885 painting where remarkably ugly models were used for the people.

Answer: **The Potato Eaters**

2. Name the artist who painted The Potato Eaters.

Answer: **Vincent Van Gogh**

3. The following year, Van Gogh met this artist of At the Moulin Rouge.

Answer: **Henri de Toulouse-Lautrec**

Tossup 4: Math (Other) -- Computational (30 Seconds)

Your answer must be a simplified fraction. This number is the only solution to the equation $338x^2 - 208x + 32 = 0$. In addition, an infinite geometric series that starts with the number one and has a ratio equal to this number will converge to the sum $13/9$. This number also equals the probability that a random card pulled from a standard deck is either an ace or a spade. Find this number equal to $27/130 + 1/10$.

Answer: **4/13**

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

Identify these people who are associated with sex scandals from American history:

1. When this man was appointed Secretary of War by Andrew Jackson, it upset many of the other cabinet members' wives, who accused him of having a relationship with his current wife when she was with her previous husband.

Answer: **John Henry Eaton**

2. This man was a strong contender for the 1988 Democratic Presidential Nomination until he was caught having an affair with Donna Rice.

Answer: **Gary Hart**

3. When this man was nominated for the US Supreme Court, his former assistant Anita Hill testified that he sexually harassed her.

Answer: **Clarence Thomas**

Tossup 5: Fine Arts (Music)

Written for double orchestra, double choir, and solo voices, this work tells a story which is often advanced by recitatives (*res-tuh-TEEVS*) sung by the Evangelist. Though this work was first performed in Leipzig in 1727, it was largely forgotten until a famous 1829 revival led by Felix Mendelssohn which led to an increased appreciation of its composer's works. Name this religious oratorio by J.S. Bach about the condemnation and death of Jesus.

Answer: **St. Matthew Passion** (accept *Matthäuspasion*)

Bonus 5: Miscellaneous (Entertainment)

Given a quote from a Bob Marley song, identify the song.

1. I remember when we used to sit in the government yard in Trenchtown.

Answer: **No Woman, No Cry**

2. Emancipate yourselves from mental slavery; None but ourselves can free our mind.

Answer: **Redemption Song**

3. Every time I plant a seed, he said kill it before it grow.

Answer: **I Shot the Sherriff**

Tossup 6: Social Studies (World History)

The architect Vladimir Tatlin designed a gigantic headquarters for this organization, though it was never built. When it was founded in 1919, the group's main purpose was to disseminate the plan for worldwide revolution spelled out in Lenin's pamphlet *What Is To Be Done?* Its Second Congress adopted 21 conditions for membership, requiring all Communist parties to end alliances with other socialist groups. Under Stalin, this position was reversed to create a united front against fascism, prompting Germany, Japan, and Italy to sign a Pact pledging mutual defense against this body. Name this Moscow-based organization originally dedicated to overthrowing the international bourgeoisie but later dissolved when the USSR joined the Allies.

Answer: **Comintern** (accept *Communist International*, *Third International*)

Bonus 6: Math (Calculus)

Answer whether the following curves have a positive, negative, undefined, or zero slope at x equals two pi.

1. Y equals $3x$ minus 7.

Answer: **Positive**

2. Y equals 3 times the cosine of $2x$.

Answer: **Zero**

3. Y equals negative x cubed plus $6x$ plus 10.

Answer: **Negative**

Tossup 7: Miscellaneous (Entertainment)

In 1956 this man met Elvis Presley in his hometown of Lubbock, Texas -- a year later he had his first hit, a song whose title was taken from a popular John Wayne line. He followed that up with many more hits, including *Rave On* and *Words of Love*. After losing money because of the shady practices of his manager, Norman Petty, he was forced to embark on a winter tour of the Midwest in 1959, along with stars such as Ritchie Valens and the Big Bopper. Name this singer of the hits *That'll Be the Day* and *Peggy Sue* who was killed in a plane crash, and is said to be the subject of Don McLean's song *American Pie*.

Answer: **Charles Hardin "Buddy" Holley** (Yes, 'Holley' is spelled with an 'e.')

Bonus 7: Literature (Literature)

In November 2007 an acclaimed American author passed away.

1. Name this author of *The Executioner's Song* and *The Naked and the Dead*.

Answer: **Norman Kingsley Mailer**

2. Six months before Mailer died, this author and creator of *Kilgore Trout* passed away.

Answer: **Kurt Vonnegut, Jr.**

3. Mailer's literary executor, J. Michael Lennon, curiously called Vonnegut an American version of this author of *Innocence Abroad*.

Answer: **Mark Twain** (accept *Samuel Langhorne Clemens*)

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

Find the inflection point of y equals x cubed minus $9x$ squared plus $2x$ minus 5. Give your answer as a coordinate pair.

Answer: **(3,-53)**

Bonus 8: Science (Earth Science)

Identify these sections of the Earth.

1. The outermost layer of the Earth, this is about 30 kilometers deep, and its rock is largely composed of oxides.

Answer: **Crust**

2. Below the crust is this discontinuity separating the crust from the mantle.

Answer: **Mohorovičić discontinuity** (accept Moho discontinuity)

3. This region of the Earth encompasses the crust and the upper mantle, in contrast with the asthenosphere, which lies between this region and the mesosphere.

Answer: **Lithosphere**

Tossup 9: Literature (Literature)

The first version of this novel was destroyed by its author, who burned it in a stove upon hearing that his play *The Cabal of Hypocrites* had been banned. The work features characters such as an enormous black cat named Behemoth; Berlioz, the head of the literary bureaucracy MASSOLIT; as well as Woland, a supposed "magician" sent to Moscow to perform "black magic and expose its machinations." Written about a visit by Satan to primarily atheistic Soviet Russia, identify this most famous novel of Mikhail Bulgakov.

Answer: **The Master and Margarita**

Bonus 9: Math (Geometry)

Find the volumes of the following solids. No units are necessary.

1. A solid formed by taking the vertical line x equals 1, from y equals 0 to x equals 2, and rotating it around the y axis, to form a cylinder.

Answer: **2 pi cubic units**

2. An isosceles triangular prism with length 10 and height $4\sqrt{3}$ - it will be best to construct a 30-60-90 right triangle half of the isosceles base.

Answer: **80√3 cubic units**

3. A sphere with radius 6.

Answer: **288 pi cubic units**

Tossup 10: Science (Biology)

It is one of the few diseases still treated with thalidomide (*thuh-LID-uh-mide*) despite the drug's dangerous side-effects. While the term today refers to a specific bacterial infection, it is likely that it has been confused in history with conditions now known as tinea capitis, favus, and psoriasis. The first human disease for which a causative bacterium was found, its method of transmission is still unknown, though it is clear that the colonies once used to segregate sufferers were unnecessary. Also known as Hansen's disease, name this disfiguring skin disease famously suffered by the beggar Lazarus.

Answer: **Leprosy** (accept Hansen's disease before mentioned)

Bonus 10: Literature (Literature)

Identify the following related to literature.

1. Scenes from private, provincial, and Parisian life are all demonstrated in this series of realist novels by Honore Balzac.

Answer: **The Human Comedy** (*accept Le Comedie Humaine*)

2. Araby, Eveline, and the Boarding House are short stories in this set detailing the life of the Irish middle class.

Answer: **Dubliners**

3. He created a series of twenty novels, Les Rougon-Macquart (*lay roo-GON ma-KART*) detailing life in France under Napoleon III.

Answer: **Emile Zola**

HALFTIME

Tossup 11: Literature (Literature)

Written in 1817 to compete against the poet's friend Horace Smith, this poem is thought to be inspired by a statue in the British Museum whose inscription stated, "If anyone would know how great I am and where I lie, let him surpass one of my works." That statue is supported by "two vast and trunkless legs of stone" and displays a "sneer of cold command." Name this most famous sonnet of Percy Shelley, about a titular king's statue that commands the beholder to "look on my works, ye mighty, and despair!"

Answer: Ozymandias

Bonus 11: Miscellaneous (Sports)

It soon will be one hundred years since the Cubs won their last World Series. Name these teams that are half as pathetic as the Cubs. (*accept either location or team name*)

1. This Ohio team last won the World Series in 1948. Their former greats include Bob Feller and Lou Boudreau, and they won the AL Central this year.

Answer: Cleveland Indians

2. This team last won the World Series in 1954, when they were located in New York and their star player made a famous play known as The Catch. They moved to the West Coast in 1958.

Answer: San Francisco Giants

3. This franchise was established in 1961 and has won one playoff game in its history. Like the Minnesota Twins franchise, they used to be the Washington Senators before they moved.

Answer: Texas Rangers

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

This number is the only negative solution to the equation $x^3 - x^2 - 4x + 4 = 0$. It is also the only negative solution to the equation $x^2 - 48x - 100 = 0$, and it is the x-coordinate of the hole in the graph $y = (x^2 + 8x + 12) / (x^2 + 10x + 16)$. Find this number that is the only solution to the equation $36x + 35 = 34x + 31$.

Answer: -2

Bonus 12: Science (Chemistry)

Identify these properties of substances.

1. This is the temperature and pressure at which a substance can exist as a solid, liquid, and gas at the same time.

Answer: Triple point

2. This is the angle at which a polarized plane of light is rotated as it is passed through one decimeter of a substance at a concentration of one gram per deciliter.

Answer: Specific rotation (*prompt optical rotation*)

3. This is the temperature at which a substance will spontaneously catch fire without a spark or flame to ignite it.

Answer: Autoignition temperature (*accept kindling point, do not accept flash point*)

Tossup 13: Miscellaneous (Technology)

Creeper and Reaper were the first two, created in the early 70s. First called by this name by Frederick Cohen in 1984, the first major one, Brain, was unintentionally released in 1986, and like most other early ones, affected the boot sector. Metamorphic and polymorphic ones avoid detection by their signatures, though they are still flagged by heuristic methods long common in McAfee, Norton, and similar software. Name this type of malicious program that infects computer files.

Answer: **Computer virus**

Bonus 13: Fine Arts (Music)

It was premiered in 1816 under the title "Almaviva, or the Useless Precaution."

1. Name this Rossini opera about a Count who woos Rosina, getting some help from his titular ex-servant.

Answer: **The Barber of Seville** (*Il barbiere di Siviglia*)

2. The Barber of Seville himself finds love in this Mozart opera, in which he ties the knot with Susanna.

Answer: **The Marriage of Figaro** (*Le nozze di Figaro*)

3. The Barber of Seville and The Marriage of Figaro are the first two parts of the Figaro trilogy by this French playwright.

Answer: **Pierre de Beaumarchais**

Tossup 14: Science (Physics)

For free space, it is the ratio of the magnitudes of the electric field strength and magnetic field strength, and is equal to μ_0/c . Another meaning was coined by Oliver Heaviside and is represented with a capital Z. The reciprocal of admittance, the imaginary reactance component of this is caused by inductors or capacitors. The ratio of the phasor voltage and phasor current through a circuit element, name this complex number measured in ohms, the analog of resistance for AC circuits.

Answer: **Impedance**

Bonus 14: Social Studies (World History)

His supposed five "Whitechapel murders" took place between August and November 1888, in the East End of London.

1. Name this alias of a Victorian murderer who killed and mutilated five prostitutes.

Answer: **Jack the Ripper**

2. There are many guesses as to the identity of Jack the Ripper, but perhaps none as absurd as Richard Wallace's theory about this mathematician and author of "Through the Looking-Glass."

Answer: **Lewis Carroll** (accept *Charles Dodgson*)

3. Jack the Ripper appears in this Alban Berg opera, about the title woman who goes through many husbands before becoming a prostitute and eventually being murdered by Jack himself.

Answer: **Lulu**

Tossup 15: Fine Arts (Visual Art)

Artists like Maurice Prendergast and Robert Henri made up The Eight, a part of this American art movement that was named for the dusty New York City scenes they painted. Not an organized group, they often presented portraits of daily life in poor urban neighborhoods. Identify this school of artists, the most famous of whom was George Bellows.

Answer: **Ash Can School**

Bonus 15: Science (Biology)

Identify these mammalian taxa.

1. Also known as prototheria, this type of mammal lays eggs, and only contains five species.

Answer: **Monotremes** (*accept monotremata*)

2. Also known as metatheria, this type of mammal initially keeps its young in a pouch, and includes opossums, koalas, and kangaroos.

Answer: **Marsupials** (*accept marsupiala*)

3. Also known as eutheria (*you-THARE-ee-uh*), this type of mammal is characterized by the namesake organ in which mothers keep their young during gestation. Elephants, rabbits, and humans are members of this group.

Answer: **Placentals**

Tossup 16: Social Studies (Geography)

Located in Saxony-Anhalt, this city in eastern Germany sits on the Elbe River. Its most famous but fictional ex-resident was disallowed by his uncle to return to his studies at this town's university after returning to Denmark for his father's funeral. The church in this city of 50,000 contains many works by Lucas Cranach the Elder, who in 1529 painted a well-known portrait of its most famous real inhabitant, wearing a black robe and hat. In 1520, that man had burned a papal bull outside this town's gate in defiance of the Church. Name this town where Horatio and Hamlet attended university, and where, in 1517, Martin Luther nailed his 95 Theses to the town church's door.

Answer: **Wittenberg**

Bonus 16: Math (Other)

Find the probability of the following events involving a deck of cards that features two suit-neutral jokers for a total of 54 cards.

1. Drawing a five, then another five, with replacement.

Answer: **4/729**

2. Drawing a face card that is not a spade. Remember that jokers are not face cards.

Answer: **1/6**

3. Drawing a club, a nine, or a ten.

Answer: **19/54**

Tossup 17: Science (Chemistry)

Tollens' reagent (*re-A-jent*) turns into a "silver mirror" solution when exposed to this type of compound, and Fehling's solution forms a red precipitate, as does Benedict's reagent. They can be formed by oxidizing primary alcohols or reducing esters, and can be themselves oxidized into carboxylic acids. The simplest one was discovered in 1867, and is used as a preservative. Created by formylation (*FOR-mul-A-shun*) reactions, name this class of organic compounds with a carbonyl group on the terminal carbon, whose name indicates that they are dehydrogenated alcohols.

Answer: **Aldehyde** (*do not accept formaldehyde*)

Bonus 17: Literature (Literature)

It takes place near a sardine fishery in Monterey during the Great Depression.

1. Name this novel where Dora Flood runs the Bear Flag Restaurant on the titular waterfront street.

Answer: **Cannery Row**

2. Identify the author of Cannery Row.

Answer: **John Steinbeck**

3. This river valley near Monterey's Cannery Row is the setting for many of Steinbeck's works, including East of Eden.

Answer: **Salinas Valley or River**

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

If you flip a coin six times, this is the probability of getting either exactly zero or exactly two heads. If x is a randomly chosen positive whole number, this number is also the probability that two raised to the x power ends with the digit two. Its also the probability of getting a sum of five or six when you roll two standard dice. If you flip two coins, it's the probability that both of them come up heads. Find this number that equals the probability that a randomly selected card from a standard deck is a club.

Answer: **1/4** (*accept .25 or 25%*)

Bonus 18: Social Studies (Current Events)

Identify these people associated with the controversy surrounding the destruction of two interrogation tapes destroyed by the CIA:

1. The CIA director who has said that he will fully cooperate with any investigation

Answer: **Michael Hayden**

2. The new Attorney General, whose Justice Department has launched an inquiry.

Answer: **Michael Mukasey**

3. The tapes allegedly show Abu Zubaydah, a former member of Al Qaeda who is mentally ill, admitting to knowledge to a lot of plots that did not exist after he was subjected to which technique that involves placing a rag in the prisoners mouth?

Answer: **Water Boarding**

Tossup 19: Literature (Literature)

This character's coworkers are fiery-tempered clerks nicknamed Turkey and Nippers. While they are generally good workers, their employer needs more help, and hires this character on the spot for his qualifications as well as his placid demeanor. It soon becomes clear that this man does not have a house or family, as he lives in the office. While initially a diligent worker, he soon begins declining to do work, stating simply that he "would prefer not to." Name this titular character of a short story by Herman Melville, a forlorn scrivener who dies out of starvation in jail because he would "prefer not to" eat.

Answer: **Bartleby, the Scrivener**

Bonus 19: Science (Physics)

Answer these questions about famous experiments in physics.

1. Galileo supposedly dropped balls off of this tower to show that objects fall at the same rate regardless of their mass.

Answer: **Leaning Tower of Pisa**

2. In 1798, this physicist measured the value of the gravitational constant using heavy lead balls on a torsion balance.

Answer: **Henry Cavendish**

3. In 1909, Robert Millikan used charged ones of these suspended in solution to determine the charge of an electron.

Answer: **Oil drop**

Tossup 20: Social Studies (U.S. History)

As a result of it, captured slaves were supposed to be returned to the United States, but a cash payment was arranged instead. Eleven days after it was ratified by the US Senate, Napoleon escaped from prison, causing France to again become a threat to Britain. It was signed on Christmas Eve, but news was unable to reach the Battle of New Orleans in time to stop the fighting. Name this treaty, which ended the War of 1812.

Answer: **Treaty of Ghent**

Bonus 20: Literature (Literature)

Identify the following Shakespearean villains.

1. This antagonist of Othello engineers a handkerchief heist.

Answer: **Iago**

2. This bad guy from Much Ado About Nothing employs a scheme to break up a wedding, simply because he is bored.

Answer: **Don John**

3. This scoundrel is the illegitimate son of Gloucester (*GLAU-ster*) enters into a love triangle with Regan and Goneril.

Answer: **Edmund** (*do not accept Edgar*)

TIEBREAKERS/REPLACEMENTS:**Tossup: Science (Physics)**

This definition is integral to the Lorentz transformation. It can be used an equation to determine the permeability of free space, and appears prominently in Maxwell's equations. Exceeding it violates causality, and causes Larmor's ratio to produce an imaginary number. Originally quantified using rotating mirrors on mountains, this quantity is often referred to as "C." Identify this, nearly equal to 3 times 10 to the eighth meters per second.

Answer: **Speed of light in a vacuum**

Bonus: Science (Physics)

Give the SI units for the following quantities. Fully simplify your units: your answer should be comprised of a combination of meters, seconds, and kilograms.

1. Acceleration

Answer: **meters per second squared**

2. Force

Answer: **kilogram meters per second squared**

3. Potential Energy

Answer: **kilogram meters squared per second squared**