

# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 1**

**Tossup 1: Science (Physics)**

It is necessary for rolling without sliding, and is due primarily to electromagnetic interactions. This force is usually approximated as being proportional to the normal force between two surfaces, an assumption called the Coulomb approximation. Coming in static and kinetic varieties, name this force caused by objects rubbing against each other.

Answer: **Friction**

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

Identify these facts related to a certain 1968 assassination.

A: This presidential candidate, the brother of a former president, was assassinated.

B: This man was the assassin.

C: The assassination took place at this diplomatically named hotel.

D: Earlier that day, the candidate had won the primary in this state.

Answers: A: **Robert "Bobby" Francis Kennedy** (*prompt on Kennedy*) B: **Sirhan Bishara Sirhan** C: **Ambassador Hotel** D: **California**

**Tossup 2: Literature (Mythology)**

He is usually depicted with a sickle, a tool that he used to castrate his father. The husband of Rhea, he was the leader and the youngest of the first generation of Titans, and was later overthrown by his own son, and imprisoned in Tartarus. In an attempt to avoid that fate, he had taken to the habit of swallowing his children whole as soon as they were born. The father of Hestia, Demeter, Hades, Poseidon, Hera, and Zeus, identify this Titan, usually equivocated with the Roman deity Saturn.

Answer: **Cronus**

**Bonus 2: Math (Other)**

You have two six sided dice and one ten sided die. Give all answers in reduced fractional form.

A: When rolling only the six sided dice, this is the probability of getting a sum smaller than six.

B: If you toss all three dice, this is the probability of getting a sum of five.

C: If you roll only the six sided dice, this is the probability of getting a sum one smaller than a prime number.

D: When tossing all three dice, this is the probability of getting a sum that is a multiple of three.

Answers: A: **5/18** B: **1/60** C: **13/36** D: **1/3**

**Tossup 3: Social Studies (Geography)**

When this structure was suggested to Napoleon, engineers believed it would cost one million pounds. However, war and a lack of necessary technology postponed its construction, which would not begin until 1881. Construction was stopped when it was only partially completed, as the British were wary it would allow the French to easily invade their country. Finally completed in 1994, it allows for users to travel from London to Brussels in less than two hours. Identify this structure, connecting Folkestone, England to Coquelles, France by passing underneath the English Channel.

Answer: **Channel Tunnel** (*accept Chunnel*)

**Bonus 3: Fine Arts (Music)**

Identify these famous works by Beethoven.

A: This was his only opera. The title character is actually a woman, dressing up as a man to save her husband.

B: This is the nickname of his 14th and most famous piano sonata.

C: This is the nickname of his third symphony, which was originally dedicated to Napoleon.

D: This is the name of his seventh, eighth, and ninth string quartets, after the count who commissioned them.

Answers: A: **Fidelio** B: **Moonlight Sonata** C: **Eroica Symphony** D: **Razumovsky string quartets**

**Tossup 4: Math (Geometry) -- Computational (30 Seconds)**

Find the area, in square inches, of a triangle with sides that measure two and a half feet, 26 inches, and 28 inches.

Answer: **336 square inches** (*Prompt units*)

**Bonus 4: Social Studies (U.S. History)**

Would you be able to pass the US Citizenship Test? Answer these questions that one might find on it.

A: How many stripes are on the United States flag?

B: Who is the Chief Justice of the Supreme Court?

C: How many members sit on the US Supreme Court?

D: How many voting members are there in the House of Representatives?

Answers: A: **13** B: **John Roberts** C: **9** D: **435**

**Tossup 5: Fine Arts (Music)**

This Baroque composer was born in Venice during an earthquake. He studied to become a priest, but had to withdraw because of ill health. He later became master of violin at a Venetian orphanage. Name this composer, also known as "The Red Priest," who is best known for his work "The Four Seasons."

Answer: **Antonio Vivaldi**

**Bonus 5: Miscellaneous (Entertainment)**

Aussie, Aussie, Aussie, Oy Oy Oy! Identify the following Australian actors from some of their memorable roles.

A: He starred as Aelius Maximus in Gladiator and as mathematician John Nash in the movie adaptation of A Beautiful Mind.

B: He starred as William Thatcher aka Ulrich von Lichtenstein in A Knight's Tale and as Ennis Del Mar in Brokeback Mountain.

C: He plays the titular outback hunter in the series of Crocodile Dundee movies.

D: He played a betrayed career criminal in Payback and starred as Max Rockatansky in Mad Max.

Answers: A: **Russell Crowe** B: **Heath Ledger** C: **Paul Hogan** D: **Mel Gibson**

**Tossup 6: Social Studies (World History)**

Divided into three segments, this Ecumenical meeting transpired over a period of eighteen years and resulted in seventeen decrees. Convoled by Pope Paul III, it was the first major step in Counter-reformation. Among other accomplishments, this standardized Catholic Mass and reaffirmed both Indulgences and the Sacraments. Name this 16th century council, held in an Italian city once known as Tridentum.

Answer: **Council of Trent**

**Bonus 6: Math (Calculus)**

Find the following indefinite integrals. Include a constant of integration with your answers.

A: Sine squared of x times cosine of x dx.

B: Three x times e to the six x squared power dx.

C: Three over x squared dx.

D: Four x squared minus six x plus eight dx.

Answers: A: **One-third sine cubed of x plus c** B: **One-fourth e to the six x squared power plus c**

C: **Negative three over x plus c** D: **Four-thirds x cubed minus three x squared plus eight x plus c**

**Tossup 7: Miscellaneous (Interdisciplinary)**

It is used to designate the US Navy operation to bring home troops from Europe and the Pacific after World War II. Solomon had one that was supposedly made out of green silk. Super Mario Bros. 2 features an enemy named Pigit riding on top of one; and the title of a 1968 Steppenwolf song mentions one of these. Identify this special type of textile, the most famous of which is probably Aladdin's.

Answer: **Magic Carpet** (*accept Flying Carpet*)

**Bonus 7: Literature (Literature)**

Answer these questions about some literary ghosts.

A: Perhaps the most famous ghost in literature appears in this Shakespeare play where he asks his son to avenge his death by killing King Claudius.

B: In addition to the ghosts of Christmas Past, Present, and Yet to Come, Ebenezer Scrooge meets this former partner in A Christmas Carol.

C: The Canterville Ghost, a comedic story about an American ambassador who moves into a haunted castle, was the first popular work by this author who followed up with The Picture of Dorian Gray.

D: This classic Henry James novella deals with a governess watching over two children who may or may not be threatened by ghosts.

Answers: A: **Hamlet, Prince of Denmark** B: **Jacob Marley** C: **Oscar Wilde** D: **The Turn of the Screw**

**Tossup 8: Math (Algebra) -- Computational (30 Seconds)**

It takes Alex 4 minutes, Bob 8 minutes, and Charlie 12 minutes to paint a wall. You want to find the amount of time it would take for all three to finish the wall working together. This can be done by considering the fraction of the wall completed by each painter in one minute, then finding the total number of minutes required to make the sum of the fractions equal one. What is the total amount of time for all three to paint the wall together?

Answer: **24/11 minutes**

**Bonus 8: Science (Chemistry)**

Identify these regions of the periodic table.

A: This is a vertical column of the periodic table.

B: This is the term applied to elements in the leftmost column of the periodic table.

C: The column one left of the rightmost column of the periodic table has elements called this, which form ions with charge -1.

D: This term refers to elements 57 through 71, the topmost row of elements usually displayed below the periodic table.

Answers: A: **Group** B: **Alkali metal** C: **Halogen** D: **Lanthanide series**

**Tossup 9: Literature (Literature)**

After he spent three years at Tuskegee Institute on a music scholarship, this author moved to New York. He wrote his first novel there in 1952, about a young African-American man trying to find his place in society. After a first attempt at writing a second novel was destroyed in a house fire, his second novel, "Juneteenth," was published in 1999, five years after his death. Identify this author of "Invisible Man."

Answer: **Ralph Ellison**

**Bonus 9: Math (Geometry)**

Identify these formulas of geometry.

A: a squared plus b squared equals c squared.

B: The area of a triangle equals the square root of the quantity s, times s minus a, times s minus b, times s minus c.

C: Side a over sine of angle a, equals side b over sine of angle b, equals side c over sine of angle c.

D: The number of vertices minus the number of edges plus the number of faces equals two.

Answers: A: **Pythagorean theorem** B: **Heron's formula** (*accept Hero's formula*) C: **Law of sines** D: **Euler's formula**

**Tossup 10: Science (Biology)**

It comes after the G2 phase, and in many plants, takes place without centrioles. Primarily regulated by centrosomes, this process relies on microtubules creating a spindle across the metaphase plate. Usually but not always followed by cytokinesis, this process is very similar to the second half of meiosis. Name this cellular process through which non-sex cells duplicate.

Answer: **Mitosis**

**Bonus 10: Literature (Literature)**

Given a Shakespearean character, identify his or her spouse.

A: Claudius

B: Oberon

C: Desdemona

D: Katerina

Answers: A: Gertrude B: Titania C: Othello D: Petruchio

**HALFTIME**

**Tossup 11: Literature (Literature)**

After opening at Barrymore Theatre in 1959, it won a New York Drama Critic Circles award for Best Play of the Year. Walter Lee, a chauffeur to wealthy whites, is Mama's oldest child and frequently mistreats his wife Ruth. The opening involves the central family anxiously awaiting a life insurance check for Mama Younger after her husband's death. Name this play by Lorraine Hansberry.

Answer: **A Raisin in the Sun**

**Bonus 11: Miscellaneous (Technology)**

Name these programs in the Microsoft Office suite.

A: This is the text editor in Microsoft Office.

B: This program handles databases.

C: This program is used to store information as a notebook with two layers of tabs, and was first released in 2003.

D: This discontinued program was the website-authoring program included with Office from 1995 to 2003.

Answers: A: **Microsoft Word** B: **Microsoft Access** C: **Microsoft OneNote** D: **Microsoft FrontPage**

**Tossup 12: Math (Algebra)**

Bezout's identity states that it is possible to write this as a linear combination of its parameters. If it is equal to one, then the two numbers it is based upon are relatively prime. It is computed using the Euclidean Algorithm, and the product of itself and the least common multiple of  $x$  and  $y$  is equal to the product of  $x$  and  $y$ . Name this number that represents the largest positive integer that divides two given numbers evenly, commonly abbreviated gcd.

Answer: **Greatest Common Divisor** (accept Greatest Common Factor and Highest Common Factor before the end)

**Bonus 12: Science (Biology)**

Identify these organelles.

A: This organelle is named after an Italian scientist. Shaped like a series of flattened sacs, it helps manufacture proteins.

B: This organelle synthesizes lipids and other molecules. The rough kind has ribosomes attached to it.

C: This spherical organelle within the cell nucleus manufactures ribosomes.

D: This organelle contains enzymes that break lipid molecules down, creating the namesake  $H_2O_2$ .

Answers: A: **Golgi apparatus/body/complex** B: **Endoplasmic reticulum** (accept ER) C:

**Nucleolus** D: **Peroxisome**

**Tossup 13: Miscellaneous (Sports)**

This man averaged a double-double a game during his senior season at Lawrence North High School, where he was a teammate with Mike Conley. Conley followed him to the same college, where they lost in the 2007 National Championship game to Florida. Shortly after being drafted, it was disclosed he was injured and would miss his entire rookie season. Name this former Ohio State Buckeye who was drafted first overall in 2007 by the Portland Trailblazers.

Answer: **Greg Oden**

**Bonus 13: Fine Arts (Visual Art)**

Identify the following facts related to Surrealism.

A: This Spanish painter of "Still Life Moving Fast" is the most well known of all the Surrealists.

B: The answer to part A painted this work, which depicts a number of melting clocks.

C: This Belgian surrealist painted "The Treachery of Images," which contains the caption "This is not a pipe."

D: This French artist, who was actually born in Belarus, painted "I and the Village."

Answers: A: **Salvador Dali** B: **The Persistence of Memory** C: **Rene Magritte** D: **Marc Chagall**

**Tossup 14: Science (Chemistry)**

Heterogeneous ones often function through adsorbing reactants, allowing the reactants to more easily break or form other bonds. Biological ones fit their substrates perfectly, and are called enzymes. In general, they combine with reactants to create intermediates with lower activation energy. Name this type of substance which increases the rate of a reaction, like iron in the Haber process.

Answer: **Catalyst**

**Bonus 14: Social Studies (Geography)**

Given a description, identify the U.S. Military base.

A: William T. Sherman began a school at this Kansas base, which is known for its use as a prison.

B: Named after the first Secretary of War, this Kentucky base houses most of the U.S.'s gold supply.

C: Camp Mackall is located near this North Carolina Army fort.

D: This base is actually on an island between the Quad Cities of Illinois and Iowa, and is named for one of the cities.

Answers: A: **Fort Leavenworth** B: **Fort Knox** C: **Fort Bragg** D: **Rock Island Arsenal**

**Tossup 15: Fine Arts (Visual Art)**

His works have often inspired controversy for not conforming to the pre-existing natural and architectural landscape, such as Dancing House in Prague and his own residence. Heat given off by the steel used in one work has been proven to melt plastic and cause sunburns. That work, the Walt Disney Concert Hall, is one of many works that use curved metal, a feature so common to his works that many consider his recent work to be simple derivatives of his most famous work. Identify this architect whose European works include the Guggenheim Museum in Bilbao, Spain.

Answer: **Frank Gehry**

**Bonus 15: Science (Earth Science)**

Identify these types of weather fronts.

A: This front is caused by a cool air mass moving into a warmer one.

B: This front is caused by a warm air mass moving into a cooler one.

C: This front is caused when a cool air mass moves faster than a warm air mass, overtaking it.

D: This front is caused when a cool and a warm air mass meet, but they don't move.

Answers: A: **Cold front** B: **Warm front** C: **Occluded front** D: **Stationary front**

**Tossup 16: Social Studies (Current Events)**

This man entered politics in 1969, working as a White House intern before spending two years under Donald Rumsfeld. After spending ten years in appointed positions, he was elected to the House of Representatives in 1978, representing Wyoming. He left Congress in 1989, becoming George H. W. Bush's Secretary of Defense. When Bush lost the 1992 election, this man became CEO of Haliburton, a position he held until he was nominated for a more prestigious position in 2000. Name this man, the 46th Vice President of the U.S.

Answer: **Richard "Dick" Bruce Cheney**

**Bonus 16: Math (Algebra)**

Given the matrix with top row 1, 2, and bottom row 3, 4, give the following numbers or matrices.

A: The determinant of the matrix.

B: The trace of the matrix.

C: The transpose of the matrix.

D: The inverse of the matrix.

Answers: A: **-2** B: **5** C: **Top row: 1, 3; bottom row: 2, 4** D: **Top row: -2, 1; bottom row: 3/2, -1/2**

**Tossup 17: Science (Astronomy)**

With a mass about a fifth of that of the Earth's moon, it is now thought to be the largest Kuiper belt object. Two of its moons, Nix and Hydra, were discovered in 2005. First discovered in 1930 by Clyde Tombaugh, this object became classified as a dwarf planet in 2006. Name this dwarf planet that was formerly the ninth planet in the solar system.

Answer: **Pluto**

**Bonus 17: Literature (Literature)**

"Enumerate" the following "cardinal" works of Literature.

A: This collection features Scheherazade relaying many stories to her husband to avoid being executed.

B: This work by Luigi Pirandello details the story of the titular group.

C: In this Dumas work, the main characters abide by the motto "One for all, and all for one".

D: This Gabriel García Márquez work outlines the history of a fictional town by the name of Macondo.

Answers: A: **The Book of One Thousand and One (Arabian) Nights** B: **Six Characters In Search of an Author** (accept *Sei personaggi in cerca d'autore*) C: **The Three Musketeers** (accept *Les Trois Mousquetaires*) D: **One Hundred Years of Solitude** (accept *Cien años de soledad*)

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

Using two fair six-sided dice, what is the probability you roll a sum of 10 or greater?

Answer: **1/6**

**Bonus 18: Social Studies (Other)**

Identify these facts related to November 17th.

A: This legislative building was first used on this date in 1800.

B: This canal linking the Red and Mediterranean Seas opened in 1869.

C: In 1973, this man gave his famous "I am not a crook" line regarding Watergate.

D: In 1558, this English monarch took over for Mary I.

Answers: A: **U.S. Capitol Building** B: **Suez Canal** C: **Richard Milhous Nixon** D: **Elizabeth I**

**Tossup 19: Literature (Literature)**

Originally published in three parts in Blackwood's Magazine, a famous quote from this this frame narrative appears in an epigraph to T.S. Eliot's "The Hollow Men." Many of the details of the story come from the author's life as captain of a steamboat on the Congo River, which, along with Belgium and the river Thames, serves as the setting of this novella. Identify this 1902 story, which details Marlow's travels on the Congo and his encounter with Mr. Kurtz, written by Joseph Conrad.

Answer: **Heart of Darkness**

**Bonus 19: Science (Physics)**

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

A: Temperature

B: Capacitance

C: Resistance

D: Radioactivity

Answers: A: **Kelvin** (*NOT degrees Kelvin*) B: **Farad** C: **Ohm** D: **Becquerel**

**Tossup 20: Social Studies (Geography)**

The answer is NOT a country. It is bordered by Iran and Turkey to the south, Russia to the north, the Black Sea to the west, and the Caspian Sea to the east. All three of its central nations were one part of the USSR. Name this mountainous region that contains Mount Elbrus and is generally considered a dividing line between Europe and Asia.

Answer: **Caucasus** (*accept Caucasia or the Caucasus Mountains*)

**Bonus 20: Literature (Language Arts)**

Identify the following about the "universal" language Esperanto.

A: The name Esperanto stems from the same root as the Spanish "esperar" and the Latin "sperare," which all translate to this English word.

B: If an Esperanto speaker were to approach you and say "Saluton," (*sa-LOO-ton*) this would be the English translation of their word.

C: Esperanto uses an alphabet with this number of letters, the same number as the Arabic alphabet.

D: This Warsaw eye doctor is credited with the creation of Esperanto in 1887.

Answers: A: **To Hope** B: **Hello** (*accept close equivalents*) C: **28** D: **Ludvic Lazarus Zamenhof** (*accept Lejzer Ludwik Zamenhof*)

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

The main character of this novel finds herself deep in debt from gambling. She turns to Gus Trenor for investing advice, but after some success he makes sexual advances toward her. Her Aunt Julia bequeathes to her a small sum, only enough to cover her debts, after which she overdoses on sleeping pills. Identify this work centering around the socialite Lily Bart by Edith Wharton.

Answer: **The House of Mirth**

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

Find the value, when  $x$  equals one and  $y$  equals three, of the expression  $3x^2y^2 - 4xy^2 + x^3y^2$ , close quantity. Plugging in the values for  $x$  and  $y$  will work, but there may be a simpler version by collecting like terms.

Answer: **18**

**Bonus: Science (Chemistry)**

Name these record holding elements from the Periodic Table.

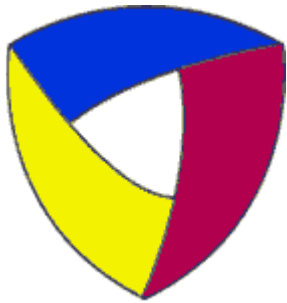
A: This transition metal, number 74, has the highest melting point of any element at standard pressure, making it ideal for light bulb filaments.

B: Along with cesium, this noble gas has the most known isotopes, 36, of which several can form compounds with fluorine and oxygen.

C: Depending on the method of calculation used, either Iridium or this neighboring element with symbol Os has the highest density.

D: Useful as a catalyst and hardening agent for alloys, this element with symbol Rh is the most expensive metallic element, trading at over \$6000 per ounce.

Answers: A: **Tungsten** B: **Xenon** C: **Osmium** D: **Rhodium**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 2**

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

This city is now a ghost town, seventy years after train service to it was discontinued. While railroad tracks do not go through this city anymore, it is remembered as one of the most important locations in railroad history. Every year, on May 10, many people travel here to witness a re-enactment of a man driving a spike into the ground. Name this Utah location, the city where the Union Pacific and Central Pacific railroads met at the completion of the transcontinental railroad.

Answer: **Promontory Summit, Utah** (accept *Promontory Point*)

**Bonus 1: Literature (Literature)**

Identify the following short stories from a description.

A: General Zaroff's boredom with hunting leads him to hunt men on an uncharted island, until the acclaimed hunter Rainsford is able to outwit him.

B: This work is a stream-of-consciousness monologue of the thoughts of an eighty-year old woman. The title refers to the woman's wedding day.

C: This most famous work of Shirley Jackson ends with a member of the Hutchinson family winning the titular event.

D: In this Guy de Maupassant work, Madame Mathilde Loisel loses the titular object at a dance, and spends the next ten years of her life in debt after replacing it.

Answers: A: **The Most Dangerous Game** B: **The Jilting of Granny Weatherall** C: **The Lottery** D: **The Necklace** (accept *The Diamond Necklace*)

**Tossup 2: Math (Geometry) -- Computational (30 Seconds)**

An equilateral triangle is inscribed inside a circle. If the area of the circle is  $48\pi$  square centimeters, find the perimeter of the inscribed triangle. One way to accomplish this feat would be to notice that the triangle can be divided into six similar right triangles, all meeting at the orthocenter of the large triangle, where each has a sixty degree angle. You could then use a familiar ratio relating the lengths of the sides of these triangles. Using this or any other method, find the perimeter of the inscribed triangle.

Answer: **36 centimeters** (prompt for units)

**Bonus 2: Science (Physics)**

Answer these questions about light.

A: Light is made of particles called this.

B: Because light can behave like a wave, it is subject to this effect that causes redshift and blueshift.

C: When light enters another medium, it can bend, a phenomenon called this.

D: Light can undergo total internal reflection in a medium if it strikes the barrier between media at an angle greater than this.

Answers: A: **Photon** B: **Doppler effect** C: **Refraction** D: **Critical angle**

**Tossup 3: Literature (Literature)**

Hailing from Argamasilla, he saves Andres from a beating but when he thinks two friars are abducting a noblewoman, he attacks, with the result of the friars roughing up his partner. Referred to as "The Knight of the Sorrowful Countenance" by his squire, he falls in love with Aldonza Lorenzo of Toboso, who he refers to as Dulcinea. Identify this tilter at windmills from La Mancha who thinks he is a chivalric knight.

Answer: **Don Quixote** (accept *Alonso Quijano/a*)

**Bonus 3: Social Studies (Current Events)**

Identify these facts related to Chicago's bid for the Olympics.

- A: The Olympics Chicago is bidding on are to take place in this year.  
 B: In the final round of selection, Chicago beat out this other city to be the USA's bid.  
 C: Chicago is expected to get strong competition from this South American city, which recently hosted the Pan American Games.  
 D: This three-word motto appears on Chicago's official logo for the Olympics.

Answers: A: **2016** B: **Los Angeles** C: **Rio de Janeiro** D: **Stir the Soul**

**Tossup 4: Science (Biology)**

About one inch in diameter and about seven meters long, its opening is defined by the pyloric sphincter. The gall bladder releases bile into this organ which is lined with villi that help absorb nutrients. Composed of the duodenum, ileum, and jejunum, name this part of the digestive system where most of the nutrients in food are absorbed into the bloodstream.

Answer: **Small intestine** (*prompt intestine*)

**Bonus 4: Literature (Language Arts)**

Classify the following sentences as either simple, compound, complex or compound-complex.

- A: The pirate captain lost his treasure map, but he still found the buried treasure.  
 B: Laura forgot her friend's birthday, so she sent her a card when she finally remembered.  
 C: Because the soup was too cold, I warmed it in the microwave.  
 D: The Democrats proposed a new budget, but the Republicans opposed it.

Answers: A: **compound** B: **compound-complex** C: **complex** D: **compound**

**Tossup 5: Social Studies (Other)**

This economist's support for school vouchers led him to establish an advocacy group for them in the 1990's. He argued against FDR's New Deal while maintaining that political freedom is a function of economic freedom in his seminal work, *Capitalism and Freedom*. Identify this economist, strongly associated with monetary theory and the University of Chicago, who died in 2006.

Answer: **Milton Friedman**

**Bonus 5: Math (Calculus)**

Integrate the following expressions, including a constant of integration.

- A: One over the quantity  $x$  squared plus eight  $x$  plus seventeen.  
 B: Three tangent theta.  
 C: Ten  $e$  to the two  $x$  power.  
 D: Nine  $x$  squared minus four.

Answers: A: **Arctangent of the quantity  $x$  plus 4, plus C** (*accept "inverse tangent" for arctangent*)

B: **Negative 3 times the natural log of the absolute value of cosine theta, plus C** C: **5  $e$  to the 2x power, plus C** D: **3  $x$  to the third power minus 4x, plus C**

**Tossup 6: Fine Arts (Visual Art)**

The titular character looks directly at the audience while maintaining a somber expression, and she is wearing a blue and yellow head covering. Also sporting a beige cloak, she is set against a black backdrop, and the titular object is sparkling in front of her neck. Name this painting by Johannes Vermeer depicting a piece of jewelry.

Answer: **Girl With a Pearl Earring**

**Bonus 6: Science (Astronomy)**

Answer these questions about some interesting spots in our solar system.

A: This gigantic storm in Jupiter's upper atmosphere could hold three Earths and has 250 mph winds.

B: Similar to the hole in Earth's ozone layer, this planet's Great Dark Spot was a gap in the methane clouds but it disappeared in 1994.

C: This planet's Great White Spot appears roughly every 30 years and its color is the result of ammonia gas turning to crystals.

D: These dark looking regions of relatively low temperature and high magnetic activity vary in number on an 11-year cycle.

Answers: A: **Great Red Spot** B: **Neptune** C: **Saturn** D: **Sunspots**

**Tossup 7: Science (Chemistry) -- Computational (30 Seconds)**

Find the sum of the coefficients of both the reactants and resultants in a balanced chemical reaction depicting the combustion of hexane. To solve this problem, you might recall that if hexane undergoes a chemical reaction with oxygen gas, the resultants are carbon dioxide and water. You also would be helped by the knowledge that oxygen gas is diatomic and that the chemical formula for hexane is C Six H Fourteen.

Answer: **47** ( $2(C_6H_{14}) + 19(O_2) \rightarrow 12(CO_2) + 14(H_2O)$ )

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

Identify these facts related to the Gulf of Tonkin Resolution.

A: It occurred after an attack on the USS Turner Joy and this ship.

B: The Resolution boosted American involvement in this war.

C: The Resolution gave this president power to use military force without an actual Declaration of War by Congress.

D: This Secretary of Defense supported the Resolution.

Answers: A: **USS Maddox** B: **Vietnam War** C: **Lyndon Baines Johnson** (*prompt on Johnson*) D: **Robert Strange McNamara**

**Tossup 8: Miscellaneous (Entertainment)**

When he grows up, he wants to be either a proctologist or shaman, and after breaking up with a vegetarian girlfriend ate a 72-ounce steak in 37 minutes. He once sold Yakov Smirnoff a joke for \$20, which prompted him to run away to Branson, Missouri, and was once sent to Fort Berk, the same military academy attended by his grandfather, Cotton. Identify this teenage son of Hank and Peggy Hill.

Answer: **Robert Jeffrey Bobby Hill** (*prompt for Hill before the end*)

**Bonus 8: Fine Arts (Music)**

Answer these questions about some musical Dons.

A: This Broadway musical is set in a dungeon where Miguel de Cervantes and his fellow prisoners act out his Don Quixote play.

B: This Mozart opera is based on the legend of Don Juan and ends with the title nobleman dragged to Hell by a statue of the man he killed.

C: In a four hour opera by Giuseppe Verdi, this son of Spain's Philip II falls in love with his father's new bride and then narrowly escapes the Inquisition.

D: In an opera buffa by Gaetano Donizetti, this Don tries to force his nephew Ernesto into marrying a woman he doesn't love, so Ernesto tricks the Don into a miserable fake marriage.

Answers: A: **Man of La Mancha** B: **Don Giovanni** C: **Don Carlos** D: **Don Pasquale**

**Tossup 9: Math (Algebra) -- Computational (30 Seconds)**

Find the sum of the sines of the following angles: pi over two radians, pi over four radians, 270 degrees, 135 degrees, and four pi radians. It may help you to know that sine of the quantity x plus 180 degrees, close quantity, equals negative sine of x, and that therefore the sines of two angles with that relationship will cancel each other out.

Answer:  $\sqrt{2}$

**Bonus 9: Science (Biology)**

Answer these questions about the metamorphosis of insects.

A: Grasshoppers, which undergo incomplete metamorphosis, show this life stage between egg and adult.

B: The immature forms of dragonflies and mayflies are called naiads (*NYE-ads*) because they only live in this kind of environment.

C: The hormone ecdysone stimulates this process in which the exoskeleton is shed and a larger one regrows.

D: The pupal stage of a butterfly is specifically called one of these.

Answers: A: **Nymph** (*prompt juvenile*) B: **Aquatic** (*accept water, freshwater*) C: **Molting** (*accept ecdysis*) D: **Chrysalis** (*accept nymph, do not accept cocoon*)

**Tossup 10: Literature (Literature)**

He suffers a nervous breakdown in a restaurant bathroom upon recalling the episode of his eldest son discovering his infidelity to his wife. After leaving the restaurant, he attempts to plant a garden but is interrupted by a confrontation with his son, Biff. Eventually killing himself in a car crash, identify this protagonist of Arthur Miller's *Death of a Salesman*.

Answer: **Willy Loman** (*accept Willy*)

**Bonus 10: Miscellaneous (Interdisciplinary)**

Four important men died on November 22, 1963.

A: On that day, this 35th President of the United States was assassinated.

B: Also dying on that day was this British philosopher and author of *The Doors of Perception* and *Brave New World*.

C: Also dying was this Irish author of *The Screwtape Letters*, and close friend of J.R.R. Tolkien.

D: Also dying was Dr. Wilhelm Beiglböck, who had served a ten-year sentence for contributing to Nazi human experimentation. That experimentation was performed at this concentration camp, the first to be opened by the Nazis and second to be liberated.

Answers: A: J(ohn) F. Kennedy B: Aldous Huxley C: C(live) S(taples) Lewis D: Dachau

**HALFTIME**

**Tossup 11: Science (Earth Science)**

This scale is ordinal, though exact values can be measured on a sclerometer. Created in the early nineteenth century by its namesake German scientist, this scale places copper between 3 and 4, hardened steel between 7 and 8, and a few artificial substances above 10, meaning they can scratch diamond. Name this scale of mineral hardness that ranks talc 1 and quartz 7.

Answer: **Mohs scale of mineral hardness**

**Bonus 11: Math (Algebra)**

Given that the log of 2 is approximately 0.30 and the log of 3 is approximately 0.48, find the following logarithms to two significant digits. Round your answers:

A: log of 6

B: log of 32

C: log of 81

D: log of 216

Answers: A: **0.78** (accept .78) B: **1.5** C: **1.9** D: **2.3**

**Tossup 12: Literature (Literature)**

In her first appearance, she is bidding her brother farewell as he departs for France. Later she is spurned by her beloved, and instructed to "get thee to a nunnery." Her final appearance sees her passing out flowers to various members of Denmark's nobility. Ultimately, she is announced to have drowned after falling out of a tree into a brook. Identify this Shakespearean daughter of Polonius, sister of Laertes, and love interest of Hamlet.

Answer: **Ophelia**

**Bonus 12: Fine Arts (Visual Art)**

Identify these works of Pablo Picasso.

A: This 1907 work features five young Spanish prostitutes.

B: This most famous work of Picasso's Blue period is actually painted on top of a picture of a woman.

C: This painting done during Picasso's Rose period depicts a child holding the titular object.

D: This dark painting features shrouded figures mourning a dead body, as well as a white horse flying through the sky, and was painted for Picasso's recently deceased friend.

Answers: A: **Les Femmes d'Alger (O.J.)** (accept The Young Ladies of Avignon) B: **The Old Guitarist** C: **Garçon à la Pipe** (accept Boy with a Pipe) D: **Evocation** (L'enterrement de Casagemas)

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

Find the fully simplified second derivative of the function  $f$  of  $x$  equals the quantity  $2x$  plus 4, quantity squared, times the quantity  $x$  minus 1. Both the product and chain rules will need to be applied to solve the first derivative, and algebra can be used to simplify that result for an easy computation of the second derivative.

Answer: **24x plus 24**

**Bonus 13: Science (Chemistry)**

Give the oxidation state of the specified atom in each of the following species.

A: An oxygen ion.

B: Sulfur in sulfuric acid.

C: Oxygen in potassium superoxide, KO<sub>2</sub>.

D: Sodium in sodium hydroxide.

Answers: A: **-2** B: **+6** C: **-1/2** (accept -5) D: **+1**

**Tossup 14: Miscellaneous (Interdisciplinary)**

Some members of the ska band Streetlight Manifesto were originally members of a group with this name, which released albums such as *Alone in a Crowd* and *Keasbey Nights*. Most well known as the title of a book whose sequel was *Closing Time*, this phrase can also be used to denote a situation where whatever is chosen will not result in a good outcome. Name this phrase, most famous for being the title of a book about Yossarian by Joseph Heller.

Answer: **Catch-22**

**Bonus 14: Literature (Mythology)**

Zeus fathered more children than anyone, but some stand out. From a description, identify some of them.

A: Among his victims were the Nemean Lion, the Lernaean Hydra, and Diomedes, who was fed to his own horses.

B: When he was one day old, he had already become a thief and inventor by both stealing Apollo's cattle and getting out of punishment by giving Apollo his lyre.

C: His mother Danae was impregnated via a golden shower, and Hermes, Hades, and Athena lent him the tools needed to slay Medusa.

D: According to one legend, he became lame from being thrown down from Mt. Olympus by his father after siding with his mother in an argument.

Answers: A: **Heracles** (accept *Hercules*) B: **Hermes** (accept *Mercury*) C: **Perseus** D: **Hephaestus** (accept *Vulcan*)

**Tossup 15: Social Studies (World History)**

This man's autobiography, "My Life," was published while he was in exile in Turkey, where he was sent by his rival Joseph Stalin, who had outmaneuvered him to take over control of the Soviet Union after Lenin died. After Turkey, he went to Mexico, where he died, though not before he had an affair with painter Frida Kahlo. His most famous theory was that of permanent revolution, which pushed for workers' rights all across the world. Name this Russian revolutionary, at one point the leader of the Red Army, who in 1940 was murdered by a Soviet agent with an ice pick.

Answer: **Leon Trotsky** (accept *Lev Davidovich Bronstein*)

**Bonus 15: Math (General)**

Answer the following related math problems.

A: Given a right triangle with legs 7 and 24, what is the length of its hypotenuse?

B: Given a vector (13, y) with length 85, what is y?

C: Given a complex number  $a + 15i$ , whose modulus is 17, what is a?

D: What is the distance between the points (4, -2) and (7, 2)?

Answers: A: **25** B: **84** (accept *-84*) C: **8** (accept *-8*) D: **5**

**Tossup 16: Fine Arts (Music)**

When this man was five years old he wrote his first composition for piano. It did not include B Flat because he did not like to touch the black keys. After studying under Rimsky-Korsakov, he moved to America to protect himself from the Russian Revolution. Upon returning to the Soviet Union he became a state-sponsored composer, where he would compose seven symphonies, including his "Classical Symphony," based off of the work of Haydn. Name this composer best known for composing the "Lieutenant Kije Suite" and "Peter and the Wolf."

Answer: **Sergei Prokofiev**

**Bonus 16: Social Studies (Geography)**

Identify the Canadian province given a clue, and in the fourth part answer a question about them.

A: This province's capital is Fredericton, and it touches the American state of Maine.

B: Halifax is the largest city and capital of this province.

C: Named after Queen Victoria's father, this province's capital is Charlottetown.

D: Collectively, these three provinces are all known as this.

Answers: A: **New Brunswick** B: **Nova Scotia** C: **Prince Edward Island** D: **Maritime Provinces**

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

What is the area of the triangle with the vertices (0,0), (2,3), and (1,5)? This problem can be solved quickly by remembering that the area of a triangle is half the magnitude of the cross product of the two vectors which bound it, which in this case are (2,3) and (1,5). Using this or any other method, find the area of a triangle bounded by (0,0), (2,3), and (1,5).

Answer: **3.5** (accept 7/2)

**Bonus 17: Miscellaneous (Entertainment)**

Given lyrics and the artist, identify the song with a geographical place in the title.

A: By Lynyrd Skynyrd (*lin-erd skin-erd*): 'Now Muscle Shoals has got the Swampers / And they've been known to pick a song or two'

B: By The Charlie Daniels Band: 'I bet you didn't know it, but I'm a fiddle player too / And if you'd care to take a dare, I'll make a bet with you'

C: By Bruce Springsteen: 'I walked the avenue till my legs felt like stone / I heard the voices of friends vanished and gone'

D: By The Clash: 'The ice age is coming, the sun's zooming in / Meltdown expected, the wheat is growing thin'

Answers: A: **Sweet Home Alabama** B: **The Devil Went Down to Georgia** C: **Streets of Philadelphia** D: **London Calling**

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

The most famous depiction of her also shows her son, Jean Baptiste, slung around her back. She met her most famous companions at Fort Mandan in 1804 because they hired her husband, Toussaint Charbonneau, as an interpreter. Name this Shoshone Indian, recently featured on a gold dollar coin, who aided the travels of Lewis and Clark.

Answer: **Sacagawea**

**Bonus 18: Literature (Literature)**

Given a quote from a poem penned by a British Romantic era poet, name the author.

A: "Beauty is truth, truth beauty, - that is all / Ye know on earth, and all ye need to know."

B: "Tyger! Tyger! Burning bright, / In the forests of the night,"

C: "Ah! well-a-day! what evil looks / Had I from old and young! Instead of the cross, the Albatross / About my neck was hung."

D: "She walks in beauty, like the night / Of cloudless climes and starry skies;"

Answers: A: **John Keats** B: **William Blake** C: **Samuel Taylor Coleridge** D: **George Gordon, Lord Byron**

**Tossup 19: Science (Physics) -- Computational (30 Seconds)**

You have resistors of 6 ohms, 9 ohms, and an unknown number of ohms, all in parallel, creating a circuit with potential difference of 12 volts and current of 4 amperes. To find the unknown resistance, you will first need to use Ohm's law to find the total resistance in the circuit. What is the resistance, in ohms, of the unknown resistor?

Answer: **18 ohms**

**Bonus 19: Math (Other)**

Given a description, name the sorting algorithm.

A: Often taught as an introductory sort, this algorithm typically runs in  $n^2$  time and works by comparing two adjacent items in a list and swapping them if the first item is greater than the second item.

B: This sort invented by Tony Hoare has a worst case of big-O  $n^2$ , but is frequently used because it is faster than most big-O  $n \log n$  sorting algorithms.

C: Created by John von Neumann, this recursive sort uses a divide-and-conquer method to achieve an big-O  $n \log n$  runtime efficiency.

D: This algorithm, named after a specific type of tree, always sorts in big-O  $n \log n$  time.

Answers: A: **Bubble sort** B: **Quick sort** C: **Merge sort** D: **Heap sort**

**Tossup 20: Literature (Literature)**

In this story, we are never told exactly what the main character did to befall his circumstance, but he finds himself in quite the predicament nonetheless. Unlike many of the author's other works, this story lacks a supernatural element, instead focusing on sensory descriptions. Father Time is on the ceiling, and there are rats and red hot moving walls within the cell to accompany the titular objects. Identify this short story, in which the main character is eventually rescued from The Spanish Inquisition, written by Edgar Allen Poe.

Answer: **The Pit and the Pendulum**

**Bonus 20: Social Studies (World History)**

Identify the following Popes. Give their Papal name, not their civilian name.

A: This man is the current Pope.

B: This man was Pope for barely more than a month in 1978.

C: This Pope, who died in 1878, clarified the doctrine of Papal Infallibility.

D: This man who served as Pope in the 19th and 20th centuries was the oldest man to ever hold the position.

Answers: A: **Benedict XVI** (prompt on Benedict) B: **John Paul I** (prompt on John Paul) C: **Pius IX** (prompt on Pius) D: **Leo XIII** (prompt on Leo)

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

This prolific inventor, despite his European birth, holds 112 American patents, including plans for arc lamps and the first radio. Among his unpatented ideas are anti-gravity airships and an electromagnetic "peace ray." Before settling down to invent, though, he spent a decade locked in a trade war with Thomas Edison over the merits of alternating current. Name this Serbian-American scientist, the namesake of the SI unit of magnetic flux density, who was widely regarded as a "mad scientist."

Answer: **Nikola Tesla**

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

Perhaps one of the most infamous moments in the history of the United States Congress, it occurred in 1856. This senator from South Carolina caned this other senator from Massachusetts so badly that it took the victim years of therapy to recover fully. Name either the South Carolina senator or the Massachusetts senator involved in this affair.

Answer: **Preston S. Brooks** or **Charles Sumner**

**Bonus: Literature (Literature)**

Given a description, name the following books in the Chronicles of Narnia by C.S. Lewis.

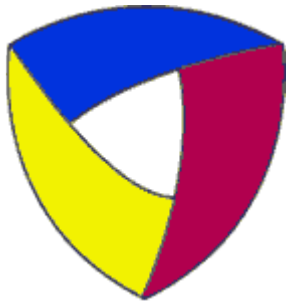
A: This chronologically first novel relates the story of the creation of Narnia.

B: Written first, this novel tells the story of the Pevensie children who battle an evil White Witch who declares Narnia will have eternal winter, but never Christmas.

C: Centering around an equine named Bree, this story is set at the same time as the novel in Part B.

D: This novel chronicles the end of Narnia. It was both the last to be published and the last chronologically.

Answers: A: **The Magician's Nephew** B: **The Lion, The Witch, and The Wardrobe** C: **The Horse and His Boy** D: **The Last Battle**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 3**

**Tossup 1: Science (Astronomy)**

In 250 thousand years, Voyager 2 is expected to come within three light years of this, which the Romans called Canicula. While it has been viewed by civilizations for thousands of years, scientists only recently discovered it is actually two stars orbiting each other. The ancient Romans believed that its heat combined with heat from the sun in the summer, creating the “dog days” of summer. Name this star in Canis Major, the brightest in the night sky.

Answer: **Sirius** (accept *Sirius A*, *Canis Majoris*, *Alpha Canis Majoris*)

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

Correctly answer the following about Chicago’s 1893 World’s Colombian Exposition.

A: Because of the Classical architecture and the streetlights constructed in Chicago for the first time, the fairgrounds were given this nickname.

B: The fair was held in this Woodlawn park, site of a missile defense system during the Cold War.

C: The first of these attractions was created for the fair; it was 250 feet tall and could carry two thousand passengers.

D: Built as the Palace of Fine Arts, one of the two buildings from the 1893 fair still in existence today is home to this Chicago attraction.

Answers: A: **White City** B: **Jackson Park** C: **Ferris Wheel** D: **Museum of Science and Industry**

**Tossup 2: Literature (Literature)**

It begins with the narrator inquiring about a friend of a friend. This sets up an internal frame story told by Simon Wheeler, which in fact has nothing to do with the inquired about Reverend Leonidas W. Smiley. The story concerns a man who would bet on anything from dog fights to how long it would take a straddle-bug to get where it was going. Identify this work, telling the story of gambler Jim Smiley and Daniel Webster, the titular amphibian.

Answer: **The Celebrated Jumping Frog of Calaveras County** (accept *The Notorious Jumping Frog of Calaveras County* or *Jim Smiley and His Jumping Frog*)

**Bonus 2: Math (Algebra)**

Give the prime factorizations of the following numbers, using exponents for repeated factors, and giving factors in ascending order.

A: 42

B: 105

C: 468

D: 9000

Answers: A:  **$2 \times 3 \times 7$**  B:  **$3 \times 5 \times 7$**  C:  **$2 \text{ squared} \times 3 \text{ squared} \times 13$**  D:  **$2 \text{ cubed} \times 3 \text{ squared} \times 5 \text{ cubed}$**

**Tossup 3: Social Studies (World History)**

His most famous victory was actually Pyrrhic in nature; although gaining a tactical success, he was forced to abandon Syria to the enemy forces. He renewed war against the Hittites two years later; this conflict ended in the first known peace treaty, which also bears the name of his great battle. Name this third pharaoh of the nineteenth dynasty who triumphed in the Battle of Kadesh and was said to have been the pharaoh during the Exodus.

Answer: **Ramses II** (accept *Ramses the Great*, *Ramesses II*, or *Ramesses the Great*, prompt *Ramses and Ramesses*)

**Bonus 3: Fine Arts (Visual Art)**

Given a building, identify the architect who designed it.

A: St. Paul's Cathedral in London after the Great Fire

B: The Louvre Pyramid

C: The Guggenheim in Bilbao, Spain

D: The Pyramid of Djoser (*YO-sur*), the first step pyramid

Answers: A: **Sir Christopher Wren** B: **leoh Ming Pei** C: **Frank Gehry** D: **Imhotep**

**Tossup 4: Math (General) -- Computational (30 Seconds)**

Find the volume of the solid of revolution formed by rotating the area bounded by the x axis, y axis, and the line  $y$  equals negative four-thirds  $x$  plus eight around the y axis from  $x$  equals zero to  $x$  equals six. Calculus will allow you to find this volume with some ease, as there is no empty space between the axis of revolution and the bounded area, but it may actually be easier to use geometry, as the solid formed is a right cone.

Answer: **96 pi cubic units**

**Bonus 4: Social Studies (Geography)**

Identify these South American capitals.

A: This capital of Guyana is named for a British king.

B: The natives of this Argentinian city are known as porteños (*por-TAYN-yohs*).

C: Alvaro Uribe rules from this capital of Colombia.

D: This Paraguayan capital's name means "Assumption."

Answers: A: **Georgetown** B: **Buenos Aires** C: **Bogota** D: **Asuncion**

**Tossup 5: Fine Arts (Music)**

This instrument has been in existence for more than three thousand years, with early versions found in King Tut's tomb and in China. In the classical era it was usually not used in a leading role. One exception is a famous concerto for this instrument by Joseph Haydn (*HIDE-in*) in E Flat Major. This concerto is also unique in that it was one of the first to be created for the valve version of this instrument. Name this brass instrument, played by Maynard Ferguson, Wynton Marsalis, and Louis Armstrong.

Answer: **Trumpet** (*not Cornet*)

**Bonus 5: Miscellaneous (Interdisciplinary)**

Identify the following things, places, or people.

A: It is located near Charlottesville, Virginia, and was the self-designed estate of our third President.

B: Independently joining the UN on June 28, 2006, this nation was formerly paired up with Serbia to make a state union.

C: This comedy troupe is responsible for such hilariousness as "The Dead Parrot Sketch" and "The Lumberjack Song".

D: This man composed one of the earliest works recognized as an opera, L'Orfeo.

Answers: A: **Monticello** B: **Montenegro** C: **Monty Python** D: **Claudio Monteverdi**

**Tossup 6: Social Studies (Other)**

This religion was first publicized in Britain in 1940 by Gerald Gardner. It is closest in nature to Native American spirituality, and is often referred to as "The Craft of the Wise." Name this neopagan religion, whose formal members are initiated into covens and many of whom use a pentagram within a circle as a symbol of faith.

Answer: **Wicca(n)**

**Bonus 6: Math (General)**

Given  $x$  equals  $3 + 4i$ , and  $y$  equals  $5 + 7i$ , where  $i$  is the square root of negative one, find the following quantities in  $a + bi$  form.

A:  $x$  plus  $y$

B:  $x$  minus  $y$

C:  $x$  times  $y$

D:  $x$  divided by  $y$

Answers: A:  **$8 + 11i$**  B:  **$-2 - 3i$**  C:  **$-13 + 41i$**  D:  **$43/74 - 1/74i$**  (accept  $(43-i)/74$ )

**Tossup 7: Miscellaneous (Entertainment)**

After spending time in the United States Air Force, this composer went to Juilliard to study film scoring. After writing scores for several minor movies, he began an association with Steven Spielberg, scoring his movies for the next three decades. His 45 Academy Award nominations are only second to Walt Disney. Name this composer of the scores for Schindler's List, the Star Wars trilogies, the Indiana Jones trilogy, and Jurassic Park.

Answer: **John Towner Williams**

**Bonus 7: Literature (Literature)**

Answer the following about dogs.

A: Buck is the main character in this Jack London novel about a domestic dog who becomes savage.

B: Bulls-eye is the dog of the head thief in this novel, which tells the story of a young orphan who is forced to steal to live on the streets of London.

C: This dog of Greek legend waited for twenty years for the return of his traveling master. He died after catching one last glimpse of that master.

D: This second Doyle novel makes use of the dog Toby to sniff out an Englishman and three Indians who conspired to steal a valuable treasure.

Answers: A: **The Call of the Wild** B: **Oliver Twist** C: **Argos** D: **The Sign of Four**

**Tossup 8: Math (Algebra) -- Computational (30 Seconds)**

Find the value of  $y$ .  $Y$  varies directly as the reciprocal of the sum of  $x$  squared and  $z$ .  $Y$  equals three when  $x$  equals two and  $z$  equals eight. Find  $y$  when  $x$  equals six and  $z$  equals twelve.

Answer: **0.75** or **Three-fourths**

**Bonus 8: Science (Biology)**

Identify the following animals, all of which are extinct.

A: This penguin-like bird of the northern hemisphere was hunted to extinction in 1844.

B: Extinct since 1883, there have been many attempts to recreate this animal by selectively breeding zebras.

C: Once numbering in the billions, the last of this North American bird died in 1914.

D: This 300 million year old invertebrate, with eyes positioned on antennae, is the state fossil of Illinois.

Answers: A: **Great Auk** (accept *Garefowl*) B: **Quagga** C: **Passenger Pigeon** (accept *Wild Pigeon*)

D: **Tully Monster** (accept *Tullimonstrum gregarium*)

**Tossup 9: Literature (Mythology)**

The first narrative account of him is found in a work by Geoffrey of Monmouth, and further exploits of his were popularized in works by Chrétien (*CRAY-tee-enn*) de Troyes. The rightful heir of Uther Pendragon, writings about him culminated in works by Sir Thomas Mallory and later in Alfred, Lord Tennyson's *Idylls of The King*. Identify this great British monarch who is commonly associated with the myth of The Sword in the Stone, the wizard Merlin, and his famed Round Table.

Answer: **King Arthur** (accept *Gwydion*)

**Bonus 9: Math (Algebra)**

Identify these terms related to set theory.

A: For two sets A and B, this is the set of elements in either A or B, or both.

B: For two sets A and B, this is the set of elements in both A and B.

C: For a set A, this is the set of all the subsets of A.

D: This is the number of elements in a set.

Answers: A: **Union** B: **Intersection** C: **Power set** D: **Cardinality**

**Tossup 10: Science (Physics)**

This term was first introduced by Kepler. This concept was first formalized by Galileo in his theory of mechanics, and was popularized by Newton in his first law of motion. Name this property of matter that causes it to remain in uniform motion unless acted upon by an external force.

Answer: **Inertia**

**Bonus 10: Literature (Literature)**

Identify the Shakespeare play each of these quotes are taken from.

A: "Good night, good night, parting is such sweet sorrow, That I should say good night until it be morrow."

B: "Neither a borrower or a lender be" and "This above all, to thine own self be true."

C: "If we shadows have offended, think but this and all is mended. Think you have but slumbered here, While these visions did appear."

D: "I am constant as the Northern Star, of whose true-fix'd and resting quality there is no fellow in the firmament."

Answers: A: **Romeo and Juliet** B: **Hamlet** C: **A Midsummer Night's Dream** D: **Julius Caesar**

**HALFTIME**

**Tossup 11: Literature (Literature)**

The protagonist of this work is set back financially from the very beginning of the novel, falling in debt to a barkeep after his wedding. The work details Mike Scully's corrupt electoral bid as well as Jurgis' plight as he works as a scab. While the author was primarily concerned with the work's socialist agenda, the American public was horrified by the unsanitary conditions it presented in Packingtown. Identify this novel that inspired Teddy Roosevelt's Meat Inspection Act of 1906, a work by Upton Sinclair.

Answer: **The Jungle**

**Bonus 11: Miscellaneous (Sports)**

Identify these teams that made the 2007 MLB playoffs.

A: This team, which represented the NL in the World Series, won 14 of their last 15 regular season games, including a wild card tiebreaker.

B: This team blew a 3-1 series lead, allowing the Boston Red Sox to claim the AL pennant.

C: Manager Joe Torre rejected a contract offer shortly after this team lost their divisional series to the team in part B.

D: This team, which hasn't won a World Series since 1908, made the playoffs for only the second time this decade, but lost to the Arizona Diamondbacks in the first round.

Answers: *(accept either location or team name)* A: **Colorado Rockies** B: **Cleveland Indians** C: **New York Yankees** D: **Chicago Cubs**

**Tossup 12: Math (Algebra) -- Computational (30 Seconds)**

A test to determine if a person has a disease is administered to 5000 people. If a person has this disease, the test correctly determines they are infected 98 percent of the time. It also incorrectly tells four percent of people without the disease that they are afflicted. If the test correctly identifies 245 people with the disease, then how many people does it mislabel? One way to solve this problem would be to first find the number of people that have the disease, and the number that do not. Find the number of people in each group that were incorrectly labeled, and add these together to find the total number of people given incorrect information by this test.

Answer: **195** *(5 with the disease and 190 without are mislabeled)*

**Bonus 12: Science (Earth Science)**

Identify these terms related to meteorology.

A: This is the temperature at which water vapor condenses, and is dependent on the amount of water vapor in the air.

B: This is the amount of water vapor in the air divided by the amount of water vapor that the air will hold at the current temperature, expressed as a percent.

C: This is how hot a given day is perceived, based on the temperature and amount of water in the air.

D: This is how cold a given day is perceived, based on the temperature and the wind speed.

Answers: A: **Dew point** B: **Relative humidity** *(prompt humidity)* C: **Heat index** D: **Wind chill**

**Tossup 13: Miscellaneous (Technology)**

The standards for the soon-to-be-released third version of this connection type will theoretically transfer data at 4.8 gigabits per second, making it ten times faster than the current specification. Devices that use this connection type are hot-swappable, daisy-chainable with up to 126 other devices, and do not usually require an external power supply. Name this type of connection commonly used for mice, printers, wireless cards, and flash drives.

Answer: **Universal Serial Bus**

**Bonus 13: Fine Arts (Music)**

The Mighty Five were a group of five contemporaneous Russian composers. Given a work composed by a member of The Mighty Five, name its composer.

A: Prince Igor

B: Islamey

C: Scheherazade

D: Pictures at an Exhibition

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

**Tossup 14: Science (Chemistry)**

They can take magnetic quantum numbers from -1 to 1, and are described by an azimuthal quantum number of 1. Unhybridized ones are responsible for pi bonds, and the three types of these are shaped like dumbbells. Name these atomic orbitals that hold six of the eight valence electrons of an atom, the orbitals which come after "s."

Answer: **p orbitals**

**Bonus 14: Social Studies (Current Events)**

Whether it's to launch a campaign or expound on their views, politicians write a lot of books. Given a description of a recent book penned by a current or former office-holder, name the author. Some of the works mentioned were ghostwritten.

A: This man wrote "The Audacity of Hope" as an expansion on an address he gave at the 2004 Democratic National Convention.

B: This Nobel Peace Prize winner speaks out against alleged human rights violations in Israel in his book "Palestine: Peace, Not Apartheid".

C: This woman wrote about the impact that groups outside of the family have on children in "It Takes A Village".

D: This former Senator from Pennsylvania countered "It Takes a Village" with his own book, "It Takes A Family", which promoted government intervention to promote family values.

Answers: A: **Barack Obama** B: **James "Jimmy" Carter** C: **Hillary Rodham Clinton** D: **Richard "Rick" Santorum**

**Tossup 15: Fine Arts (Visual Art)**

The dark sky in the background is said to be fallout from the Krakatoa explosion, which occurred 10 years before it was painted. It was stolen twice, in 1994 and 2004, the former of which occurring on the first day of the Winter Olympics at Lillehammer. Name this work depicting a scared looking man, painted by Edvard Munch (*MOONK*).

Answer: **The Scream** (accept *Skrik*, or *The Shriek*)

**Bonus 15: Science (Physics)**

Identify these concepts related to the four fundamental forces of nature.

A: Einstein created a theory interpreting gravitation as the curvature of this four-dimensional model.

B: The electromagnetic force is governed by this massless particle.

C: The strong force is governed by gluons, which hold together these particles which make up protons and neutrons.

D: The weak force is responsible for this type of nuclear decay, in which a neutron turns into an electron and a proton.

Answers: A: **Spacetime** B: **Photon** C: **Quark** D: **Beta negative decay**

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

Born in the Finger Lakes region of New York, this man was educated only in a one room schoolhouse, where he fell in love with his teacher, Abigail Powers. He was elected to the U.S. House of Representatives before becoming Comptroller of New York. As Vice President, he presided over the Senate when it debated the Compromise of 1850. Though later nominated on the ticket of the Know-Nothing Party, he was officially the last Whig president. Name this successor of Zachary Taylor, who, though never elected, became the 13th President of the United States in 1849.

Answer: **Millard Fillmore**

**Bonus 16: Math (Algebra)**

*(Read all sequences of 1's and 0's digit by digit - for example, 1101 is read "one-one-zero-one.")*

Answer the following about the binary numbers 1101 and 1110, giving your answers in the specified form.

A: What is their sum, expressed in base ten?

B: What is their product, expressed in hexadecimal?

C: What is the value of the Boolean expression 1101 AND 1110, in binary?

D: What is the value of the Boolean expression 1101 XOR (*exclusive or*) 1110, in base ten?

Answers: A: **27** B: **B6** (*read "one-one-six" - do not accept "one hundred sixteen"*) C: **1100** (*read "one-one-zero-zero" - do not accept "eleven hundred", etc.*) D: **3**

**Tossup 17: Science (Biology)**

About 36 of these are generated by the electron transport chain and glycolysis, the process called cellular respiration. In a cell, this molecule can release about 57 kilojoules per mole through hydrolysis of the gamma phosphate group. Mostly produced in the mitochondria, name this molecule commonly known as the "energy currency" of the cell.

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

**Bonus 17: Literature (Mythology)**

Name these mythological villains.

A: This Gorgon gained her head of snakes upon being raped in Athena's temple by Poseidon.

B: He tricked his brother Osiris into lying in a coffin, then nailed it shut, threw it in the Nile, and later cut up the body.

C: He was responsible for the death of Odin's son Baldur, and his endless tricks forced the other gods to chain him to a rock.

D: This Greek king served human flesh to Zeus at a banquet and as punishment was turned into a wolf.

Answers: A: **Medusa** B: **Set** (also accept *Seth*, *Sutekh*, *Setesh*, *Seteh*) C: **Loki** (also accept *Lopt*) D: **Lycaon**

**Tossup 18: Math (Geometry) -- Computational (30 Seconds)**

Find the area of a triangle with points at (0,0), (0,6), and (5,3). The shoelace theorem can be applied, or if you find the lengths of each side, Heron's formula can be applied, using the semiperimeter. By graphing these points, the graph can also show that the segment from (5,3) to the side co-linear with the y-axis forms an altitude of length 5. Using any method, what is the area of the triangle?

Answer: **15 square units**

**Bonus 18: Social Studies (World History)**

Answer these questions about the discovery of things no one knew were missing.

A: While excavating a hill in Turkey, Heinrich Schliemann discovered Priam's Treasure, the first evidence that this ancient city really existed.

B: Although local Quechua people always knew it was there, professor Hiram Bingham announced the discovery of this "Lost City of the Incas" in 1911.

C: In 1960, archaeologists proved that the Vikings reached North America before Columbus when they found the legendary Vinland settlement on this Canadian island.

D: The 1878 discovery of ruins at Knossos revealed the capital of this earliest Mediterranean civilization named after a mythic king who built a labyrinth.

Answers: A: **Troy** (accept *Ilium*) B: **Machu Picchu** C: **Newfoundland** D: **Minoan civilization**

**Tossup 19: Literature (Literature)**

The most famous original copies of it are the Hengwrt and Ellesmere Manuscripts. It is set up in a frame narrative, such that each element contained within is narrated in an attempt to win a prize as well as to entertain all involved. The author himself relates the story of Sir Topas as well as the Tale of Melibee. Following a group of pilgrims from The Tabard Inn to the shrine of St. Thomas à Becket, identify this work, the most famous of Geoffrey Chaucer.

Answer: **The Canterbury Tales**

**Bonus 19: Science (Chemistry) -- Three Parts**

Name these definitions of acids and bases.

A: According to this definition, an acid donates hydrogen ions in solution, and a base donates hydroxide ions.

B: According to this definition, an acid is a proton donor, and a base is a proton acceptor.

C: According to this definition, an acid is an electron-pair acceptor, and a base is an electron-pair donor.

Answers: A: **Arrhenius** B: **Bronsted-Lowry** C: **Lewis**

**Tossup 20: Social Studies (Geography)**

Rivers that feed it include Pigeon River and White River, and it is connected to another lake by the St. Mary's River. Isle Royal is the biggest island inside of its boundaries, and cities on its banks include Thunder Bay and Duluth. Name this fourth largest lake by surface area in the world, and the largest lake by surface area of the Great Lakes.

Answer: **Lake Superior**

**Bonus 20: Literature (Literature)**

Answer the following concerning feminist writers.

A: This author of *To the Lighthouse* also created the fictional Judith Shakespeare.

B: At the end of this Ibsen play, Nora Helmer leaves her husband Torvald after she realizes that he regards her as a plaything.

C: This 1985 novel by Margaret Atwood concerns the life of Offred, who serves as a concubine in a post-American theocratic society.

D: This author of *The Story of An Hour* also wrote about Edna Pontellier (*pont-eh-lee-AY*) in *The Awakening*.

Answers: A: **Virginia Woolf** B: **A Doll's House** C: **The Handmaid's Tale** D: **Kate or Katherine Chopin**

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

One of his works is set in the fictional African nation of Talgalla, centered on the civil rights movement, and featured a main character based on Louis Armstrong. That jazz musical, "The Real Ambassadors," co-written with his wife lola, has not been performed since 1963. More successful works include the platinum album "Time Out." Identify this jazz pianist, famous for songs such as "Pick Up Sticks," "Blue Rondo a la Turk," and "Take Five," recorded with his eponymous quartet.

Answer: **Dave Brubeck**

**Tossup: Literature (Literature)**

Name the family, whose members include a murderer, a bigamist, and a pedophile. They live in French Bend, Mississippi and show up in for than one novel by their creator. Name this family, members of which appear in "The Hamlet," "The Town," and "As I Lay Dying," all of which were written by William Faulkner.

Answer: **Snopes family**

**Bonus: Science (Biology)**

Identify the following terms from genetics related to test crosses.

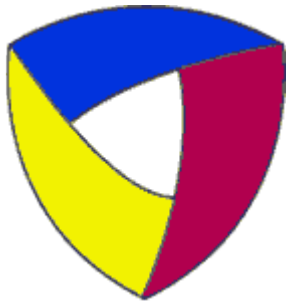
A: This monk who performed test crosses on pea plants is considered the father of genetics.

B: This square can be drawn to figure out the probability that the offspring of two parents will have particular genotypes.

C: The P generation is the first set of plants that undergo a test cross. Their offspring are called this generation, from the Latin for "son."

D: A genotype is the set of alleles that an organism has. In contrast, this refers to the physical traits of the organism.

Answers: A: **Gregor Mendel** B: **Punnett square** C: **F1 generation** (*from "filial 1"*) D: **Phenotype**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 4**

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

This man's 1854 speech before Governor Stevens had to be translated from Lushootseed into Chinook and then into English, so no one knows what he really said. The line, "Every part of this land is sacred to my people," may be authentic, but his references to "a thousand rotting buffaloes on the prairie" and "weaving the web of life" were created by a '70s science-fiction writer. Name this Suquamish chief who famously never said "the Earth is our mother" and for whom the largest city in Washington state is named.

Answer: **Chief Seattle** (accept Noah Sealth, Seathl, See-ahth)

**Bonus 1: Literature (Literature)**

People born in the year of the dragon are said to be successful and charismatic...but what about those who die in the year of the dragon? Answer the following concerning deceased authors.

A: He died on November 22, 1916 after writing *The Cruise of the Snark* and *The Call of the Wild*.

B: This science fiction author of *Red Planet* and *Stranger in a Strange Land* died in 1988.

C: He wrote of Arthurian legend in *The Once and Future King* and died in 1964.

D: This South African wrote *Cry, The Beloved Country*. He died in 1988.

Answers: A: **Jack London** B: **Robert A(nson) Heinlein** C: **T(erence) H(anbury) White** D: **Alan Stewart Paton**

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

What is the product of matrix A times matrix B if A is equal to a matrix with a top row of 8, 5 and a bottom row of 3, 2; and if B is equal to a matrix with a top row of 4, -10 and a bottom row of -6, 16?

Answer: **A matrix with a top row of 2, 0 and a bottom row of 0, 2** (accept *equivalents*)

**Bonus 2: Science (Physics)**

Identify these quantities in mechanics.

A: This quantity equal to the cross product of the lever arm and the force applied is the rotational analog of force.

B: This quantity equal to the dot product of force and direction is also equal to the change in energy of an object.

C: Equal to one half times the spring constant times displacement squared, this quantity represents the amount of energy stored in a spring.

D: This factor is equal to one over the square root of the quantity one minus v squared over c squared. When it is close to one, Newtonian mechanics holds.

Answers: A: **Torque** B: **Mechanical work** C: **Elastic potential energy** (*prompt potential energy*) D: **Lorentz factor**

**Tossup 3: Literature (Literature)**

Made into a propaganda piece shortly after being published, this poem is based on a poor decision made by Lord Cardigan. Referring to an event that happened in 1854, the poet asks "When can their glory fade?" The titular group had cannons to their right, left, and front, yet still they rode on. Name this poem in which Alfred, Lord Tennyson wrote "Into the valley of Death / Rode the six hundred."

Answer: **Charge of the Light Brigade**

**Bonus 3: Social Studies (World History)**

Identify these historical figures who really knew how to lay down the law.

A: This Athenian lawgiver's harsh code permitted debtors to be enslaved and prescribed the death penalty for most offenses.

B: This Byzantine emperor had all Roman laws and precedents compiled into a unified code that also made Orthodox Christianity the state religion.

C: Though it demanded "an eye for an eye" in criminal matters, the code of this Babylonian king outlawed blood feuds, private retribution, and stealing brides.

D: Among the innovations his 1804 code brought to Europe were an end to secret and ex post facto laws and the new possibility of divorce by mutual consent.

Answers: A: **Draco** B: **Justinian I the Great** C: **Hammurabi** D: **Napoleon I Bonaparte**

**Tossup 4: Science (Biology)**

First defined in 1977 by Carl Woese, this group of organisms is notable for its unusual biochemistry, including a lack of peptidoglycan, and the presence of glycerol molecules which are the mirror image of those found in other organisms. These are often classified by their environment, which may be extremely saline or hot. Once classified in kingdom Monera but now better grouped in their own domain, name this group of prokaryotes which are not bacteria.

Answer: **Archaea** (*accept archaeobacteria, do not accept bacteria*)

**Bonus 4: Literature (Literature)**

Identify the following epics.

A: This British epic poem details the titular character's battles against Grendel and a dragon.

B: This epic details the life of a Trojan hero, an ancestor to the Romans, as he travels to and conquers what is now modern Italy.

C: This Japanese epic, considered by some to be the first novel, tells of the romantic exploits of an emperor's cast-off son.

D: This French poem concerns the titular knight who bursts his temples while blowing a horn to warn Charlemagne of approaching enemy forces.

Answers: A: **Beowulf** B: **The Aeneid** C: **The Tale of Genji** D: **The Song of Roland**

**Tossup 5: Social Studies (Geography)**

This area is under constant pressure from the melaleuca tree, as well as the Brazilian Pepper. In addition, the Burmese Python is a threat to the area's most well known residents, another reptile. The area is part of the Kissimmee River system, and it is near Lake Okechobee. Name this area known for its alligators, a swampland in southern Florida.

Answer: **Everglades National Park**

**Bonus 5: Math (Calculus)**

Find the following limits.

A: Limit as  $x$  approaches infinity of the natural log of  $x$  all over  $x$  factorial.

B: Limit as  $x$  approaches infinity of the quantity  $2x$  minus 2, quantity cubed, over the quantity  $x$  squared minus 1.

C: Limit as  $x$  approaches 1 of the quantity  $2x$  minus 2, close quantity, over the quantity  $x$  squared minus 1.

D: Limit as  $x$  approaches 1 of the quantity  $2x$  minus 2, close quantity, over the quantity  $x$  squared plus 1.

Answers: A: 0 B: infinity (accept does not exist) C: 1 D: 0

**Tossup 6: Fine Arts (Visual Art)**

In 2004, this man was voted the 152nd Greatest Dutchperson, and was ranked 8th in terms of painters. Many of his paintings depict large, busy scenes, such as in Large Fish Eat Small Fish and The Triumph of Death. Name this painter of the Tower of Babel, the patriarch of a Dutch painting family.

Answer: **Pieter Bruegel the Elder** (prompt on *Bruegel*)

**Bonus 6: Science (Astronomy)**

Given a moon, name the planet it orbits.

A: Titan

B: Ariel

C: Phobos

D: Triton

Answers: A: Saturn B: Uranus C: Mars D: Neptune

**Tossup 7: Science (Chemistry)**

Many metal oxides have this property, as does aluminum hydroxide. Amino acids are because their amine groups can accept protons, and their carboxyl groups can donate protons. Likewise, water can become either hydronium ion or hydroxide ion. Name this phenomenon in which a substance can act either as an acid or a base.

Answer: **Amphoterism** (accept amphoteric)

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

Answer the following questions about a 1932 march of war veterans in Washington D.C.

A: The group was named this, named so because of what they were seeking.

B: The group was made up primarily of veterans of this war.

C: The group was showing support for this bill, that would have given them their compensation.

D: This future World War II general help put down the group.

Answers: A: **Bonus Army** (prompt on *Bonus Expeditionary Force* or *Bonus March*) B: **World War I**

C: **Patman Bonus Bill** D: **General Douglas MacArthur**

**Tossup 8: Miscellaneous (Entertainment)**

He was born on May 12, 1956, and spent his childhood living in a farmhouse on Rural Route 6. When he was still a child, his mother Mona left him and his father and went into hiding from the law. He attended the local high school, where he met and fell in love with his high school sweetheart. He has held a number of job titles, but currently holds the position of the Safety Inspector of the Springfield Power Plant. Name this cartoon legend, who lives at 742 Evergreen Terrace with his wife and three children.

Answer: **Homer Simpson**

**Bonus 8: Fine Arts (Music)**

Given an opera, name its composer.

A: The Barber of Seville

B: The Flying Dutchman

C: Porgy and Bess

D: The Queen of Spades

Answers: A: **Giachino Rossini** B: **Richard Wagner** C: **George Gershwin** D: **Pyotr Ilyich Tchaikovsky**

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

Find, in degrees, the sum of the measures of the interior angles of a regular 120-sided polygon. To solve this problem, you could realize that each pair of interior and exterior angles are supplementary, and the sum of the measures of the exterior angles of any regular polygon total 360 degrees. This problem could also be solved by recognizing the sum of all interior angles of a regular polygon equals 180 times the number of sides on the polygon, minus two. Either way, find the sum of the measures of the interior angles of a regular 120-sided polygon.

Answer: **21240 degrees**

**Bonus 9: Science (Chemistry)**

Given the number of lone pairs plus bonded atoms around a central atom, name the electron geometry predicted by VSEPR (*vesper*) theory. For example, 2 groups yields a "linear" geometry.

A: Three.

B: Four.

C: Five.

D: Six.

Answers: A: **Trigonal planar** (*do not accept trigonal pyramidal*) B: **Tetrahedral** C: **Trigonal bipyramidal** D: **Octahedral**

**Tossup 10: Literature (Mythology)**

One enemy of this Greek god, Lycurgus, imprisoned his followers, causing him to take refuge with Thetis. Another of his enemies, Pentheus, refused to recognize this god's divinity despite sharing the same grandfather, Cadmus. Yet another time of trouble came when his mother Semele was tricked by Hera into asking Zeus to prove his divinity, which resulted in her death while pregnant with him. Worshipped by the Maenads, identify this Greek god of vegetation, the grapevine, and of wine.

Answer: **Dionysus**

**Bonus 10: Miscellaneous (Sports)**

Identify the following sports figures who in their collegiate years attended North Carolina.

A: Scoring 103 goals in four years at UNC, this soccer legend got her first cap at age 15 and is the world's all-time leading scorer with 136 goals.

B: He won an NIT Title in 1973 while playing, and as a coach led the Seattle Supersonics to the 1996 NBA Finals.

C: As a sophomore, he set an ACC record with 93 blocks, but in the NBA, this Pistons power forward is known for racking up technical fouls, including 41 in the 2000-2001 season.

D: Playing at but rarely starting for the Tar Heels, he was signed as an undrafted free agent and a 75-yard TD run helped lead the Pittsburgh Steelers to a win in Super Bowl XL.

Answers: A: **Mia Hamm** B: **George Karl** C: **Rasheed Wallace** D: **Willie Parker**

**HALFTIME**

**Tossup 11: Science (Earth Science)**

A third of the land on Earth can be classified in this climate. Designated BW on the Köppen system, semi-arid ones of these can be classified as steppes. If it has a low potential evapotranspiration, this type of region may have snow, though it is usually thought of as hot and dry. Name this climate that receives less than ten inches of precipitation a year.

Answer: **Desert**

**Bonus 11: Math (Algebra)**

Identify these terms related to binary operations, using addition as an example.

A: This property states that  $a + b$  equals  $b + a$ .

B: This property states that  $a + (b + c)$ , close quantity, equals the quantity  $a + b$ , close quantity, plus  $c$ .

C: This property of some operations would be like if  $a + b$  equaled negative quantity  $b + a$ .

D: This is an element  $e$  such that  $a + e$  equals  $e + a$  equals  $a$ .

Answers: A: **Commutative** B: **Associative** C: **Anticommutative** (*accept antisymmetric*) D: **Identity element**

**Tossup 12: Literature (Literature)**

This man's grave lies immediately adjacent to the man who eclipsed him in popularity during the mid-1800's, Alfred, Lord Tennyson. He was a pioneer of the Dramatic Monologue as a poetic form, which he evidenced in works such as his "Fra Lippo Lippi". Also penning "Childe Roland to the Dark Tower Came", and a famous version of "The Pied Piper of Hamelin", identify this author of "My Last Duchess", who, in 1846, married Elizabeth Barrett.

Answer: **Robert Browning**

**Bonus 12: Fine Arts (Visual Art)**

Answer these questions about some masters of Mannerism, a style that favored complexity over the naturalism of the High Renaissance.

A: Late in his career, this artist took a Mannerist approach to sculpture with his Victory and to painting with his fresco The Last Judgement.

B: This man created a salt cellar, which featured a reclining Poseidon and Aphrodite.

C: Perhaps the greatest of the Mannerists, this Venetian painter won acclaim for his Last Supper, Miracle of the Slave, and Paradise, which may be the largest painting ever put on canvas.

D: Mannerism spread to northern Europe via this Flemish city where Jan Gossaert and Jan Mertens painted their Adoration of the Magi.

Answers: A: **Michelangelo Buonarroti** B: **Benvenuto Cellini** C: **Tintoretto** (*accept Jacopo Comin*)

D: **Antwerp**

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

A circle is circumscribed about a square. The perimeter of the square increases by 8 feet per second. As the square expands, the circle expands to maintain its points of intersection with the square. Find the rate at which the circumference of the circle is increasing. A knowledge of implicit differentiation will help you solve this problem, as well as realizing a diagonal of the square is a diameter of the circle.

Answer: **two pi times the square root of two feet per second** (same as  $2\pi \text{ root } 2$ ,  $2 \text{ root } 2 \text{ times } \pi$ ,  $2 \pi \text{ times } 2 \text{ to the } \frac{1}{2} \text{ power}$ )

**Bonus 13: Science (Biology)**

Identify the following parts of neurons.

A: These bushy fibers receive messages from other cells.

B: These fibers take messages from the cell and send them to other neurons.

C: This fatty tissue covers the many neuron fibers, increasing the rate of neural impulses.

D: This space between two neurons is less than one millionth of an inch wide.

Answers: A: **Dendrites** B: **Axons** C: **Myelin sheath** D: **Synaptic gap** (accept *synaptic cleft*, do not accept *synapse*)

**Tossup 14: Miscellaneous (Interdisciplinary)**

The name's the same. It is the name of a tutor of Achilles who tries to persuade the warrior to re-enter the Trojan War. It is the spacecraft launched to Mars on August 3rd, 2007, to research the history of water on the planet. The Venice Opera House is named for it, and it and the turtledove make the title of a poem by Shakespeare. The largest city named for it is home to several sports teams, including the AFL's Rattlers, the WNBA's Mercury, both owned by Jerry Colangelo, and the NHL's Coyotes. Name this mythical creature, an early codename for Mozilla Firefox, which dies in flames and is then reborn from the ashes.

Answer: **Phoenix**

**Bonus 14: Literature (Mythology)**

Identify the following people involved in the life of Hercules.

A: Hercules' first wife, after slaying Lycus, Hera drove Hercules into a rage during which he killed her and their children.

B: To atone for killing his first wife, Hercules performed his famous twelve labors for this king, his cousin.

C: As a bride of Hercules, she was tricked by Nessus into smearing poisoned blood on Hercules' tunic.

D: Before his death, Hercules gave his bow and arrow to Poeas (*PAY-us*), who gave them to this man, who would eventually fight in the Trojan War.

Answers: A: **Megara** B: **Eurystheus** (*yoo-rISS-thee-us*) C: **Deianeira** (*DI-un-era*) D: **Philoctetes**

**Tossup 15: Social Studies (Current Events)**

He won his second election by defeating Phil Angelides, three years after winning a special election. In the early 1990s he was a member of the President's Council on Physical Fitness and Sports, and he made headlines in recent years because he called some people "economic girlie men." Identify this man who in 2003 defeated Gray Davis to become the Governor of California.

Answer: **Arnold Alois Schwarzenegger**

**Bonus 15: Math (Algebra)**

Identify these groups of numbers.

A: These are the integers greater than zero, for example, 1, 2, 3, 4, etc.

B: These numbers cannot be written as the quotient of two integers.

C: These numbers can be the solutions to polynomials with integer coefficients.

D: These are numbers that can be written as the sum of a real and an imaginary number.

Answers: A: **Natural numbers** (*accept counting numbers*) B: **Irrational numbers** C: **Algebraic numbers** D: **Complex numbers**

**Tossup 16: Fine Arts (Music)**

This 1888 work was dedicated to Vladimir Stasov, a countryman and friend of the composer. In the opening movement, two recurring themes appear, one played on a violin and one on a tuba. These two themes represent, respectively, the title character and her husband. Based on a well known collection of stories, this suite's four movements originally had names that corresponded to individual episodes, such as "The Kalendar Prince" and "The Young Prince and the Young Princess." Identify this orchestral suite composed by Nikolai Rimsky-Korsakov, modeled after "The Book of One Thousand and One Nights."

Answer: **Scheherazade**

**Bonus 16: Social Studies (Other)**

Identify the following structures in Chicago.

A: Designed by Anish Kapoor, this 110 ton sculpture is commonly referred to as "The Bean."

B: Built as Weeghman Park as home to the Chicago Whales, this structure housed Bears games from 1921 until 1970.

C: Originally called the Standard Oil Building, this structure, built in 1972, was the tallest building in Chicago at the time of its construction.

D: Built in 1893 as the World's Congress Auxiliary Building, this and the Museum of Science and Industry are the only two buildings built for the 1893 World's Colombian Exposition still standing.

Answers: A: **Cloud Gate** B: **Wrigley Field** C: **Aon Center** D: **Art Institute of Chicago**

**Tossup 17: Math (General) -- Computational (30 Seconds)**

What is the probability of rolling a sum of 6, 7, 8, or 9 using two fair six-sided dice?

Answer: **Five-ninths**

**Bonus 17: Miscellaneous (Entertainment) -- Five Parts**

Based on a short description, name the five longest-running Broadway musicals.

A: This Andrew Lloyd Webber musical opened in 1988, and is the longest running. It's based on a poem by T.S. Eliot.

B: This musical is the third longest-running musical. It's set in Paris during the French Revolution.

C: This musical is the longest-running musical in Broadway history. Its story centers around a theatre in Paris, and its music is widely known.

D: With 17,162 performances, the second longest-running musical of all time closed in 2002. It featured a "fantastick"-al fair that brought kids' dreams to life.

E: This Cole Porter musical is the fourth longest-running musical. Its varied characters and hit songs, including "I Get a Kick Out of You" and the title song, provide for an entertaining show.

Answers: A: **Cats** B: **Les Miserables** C: **The Phantom of the Opera** D: **The Fantasticks** E: **Anything Goes**

**Tossup 18: Social Studies (World History)**

The breakup of Austria-Hungary after World War I led to deputies of three regions in this area to attempt to claim allegiance to the Weimar (*Vy-mar*) Republic. Containing parts of Silesia and all of Moravia and Bohemia, much of the population of this area spoke German and was interested in seceding from its parent nation of Czechoslovakia. Identify this geographic region, which, in October 1938, was annexed by Nazi Germany.

Answer: **Sudentenland**

**Bonus 18: Literature (Literature)**

Answer the following about literary invalids.

A: "The Sea-Cook" of the Walrus, he is the brains behind a mutiny in Stevenson's *Treasure Island*.

B: He has his leg bitten off by Moby-Dick, and replaced it with a pegleg made of whale bone.

C: Possibly impersonated by Brom Bones, this character chases Ichabod Crane in Irving's "The Legend of Sleepy Hollow."

D: This protagonist of an Esther Forbes novel has his hand damaged in a silversmithing accident.

Answers: A: **Long John Silver** B: **Captain Ahab** C: **The Headless Horseman** D: **Johnny Tremain**

**Tossup 19: Science (Physics)**

Intended to illustrate a strange consequence of the Copenhagen interpretation, this thought experiment asks at what point a wavefunction fails to be a superposition, and will actually collapse. Related to the quantum suicide thought experiment, this thought experiment can be addressed by the many-worlds interpretation of quantum mechanics. Name this paradox in which a feline in a box stays both dead and alive.

Answer: **Schrodinger's cat**

**Bonus 19: Math (Other)**

A set of data points is modeled by the regression equation  $y$  equals negative  $2x$  plus  $12$ .

A: Give your answer in slope-intercept form. If all the data points were moved four units in the positive  $x$ -direction, this would be the new regression equation.

B: Give your answer in slope intercept form. This is the new regression equation if the  $x$ -coordinate of each data point was multiplied by four.

C: If the regression line has a coefficient of determination of  $.49$ , this value is the correlation coefficient for the line.

D: This is the standard deviation for the  $y$  values in this data set, if they are normally distributed with a mean of  $10$  and variance  $25$ .

Answers: A:  **$y$  equals negative  $2x$  plus  $20$**  B:  **$y$  equals negative one-half  $x$  plus  $twelve$**  C:  **$-.7$**  D:  **$5$**

**Tossup 20: Literature (Literature)**

Her second, and most famous work propelled her to win the Nobel Prize in Literature as a first year candidate, an award the Swedish Academy considers a failure. Consequently, a rule that bears her name has been enacted so that this never occurs again. Sometimes publishing under the pseudonym John Sedges, some of her other works include East Wind:West Wind and Dragon Seed, both of which focus on China. Identify this author, whose House of Earth Trilogy is made up of the works Sons, A House Divided and most famously, The Good Earth.

Answer: **Pearl Sydenstricker Buck**

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

Identify the following Amendments that can be found in the Bill of Rights.

A: The right to bear arms.

B: The right to trial by jury.

C: The right to not be subject to cruel and unusual punishment.

D: The right to not have to quarter troops.

Answers: A: **2nd** B: **6th** C: **8th** D: **3rd**

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

Find the area of a triangle with vertices at co-ordinates (2,3), (4,7), and (3,9).

Answer: **4 units squared**

**Tossup: Social Studies (Other)**

Oddly enough, this famous image was based on the naval semaphore signals for the letters N and D, which stood for "nuclear disarmament." It was the brainchild of English artist Gerald Holtom who was commissioned to create the logo for a 1958 anti-nuke march, and drew inspiration from an older anarchism badge. Bayard Rustin, a close friend of Martin Luther King, brought this design back to the U.S. where it was quickly adopted by civil rights marchers and later the entire counterculture movement. Name this symbol, mostly associated with antiwar demonstrators, that has been dismissively called "The Footprint of the American Chicken."

Answer: **Peace symbol** (accept CND logo, do not accept *Peace sign*)

**Bonus: Literature (Literature)**

Brains and logic ready! Identify the following works of literature that feature riddles:

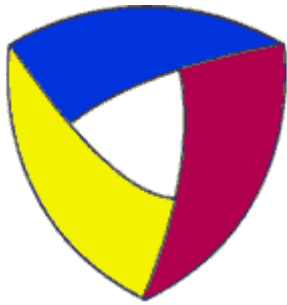
A: This Sophoclean character solves the riddle of a Sphinx to save the city of Thebes. In return, he is made king and marries Jocasta.

B: A logical puzzle is presented in the title of this book, set in World War II, in which Captain Yossarian can't leave the Air Force.

C: Charles Dickens died before completing this novel concerning a love triangle between John Jasper, Rosa Bud, and the titular character, leaving the ending unknown.

D: Dr. Albert reveals that Ts'ui Pen's labyrinth is actually a book in this short story by Jorge Luis Borges.

Answers: A: **Oedipus Rex or Oedipus the King** B: **Catch-22** C: **The Mystery of Edwin Drood** D: **The Garden of Forking Paths**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 5**

**Tossup 1: Social Studies (Current Events)**

Some of his first involvement in politics was as a state senator in the 1970s, and later as a county prosecutor. He was first elected to his current position in 1989 after beating incumbent Eugene Sawyer, and he is currently serving his sixth term. Despite the longevity of his reign, his tenure has been checkered with controversies, like the Hired Trucks scandal and the unorthodox demolition of Meigs Field. Name this man who holds the same position his father did, that of mayor of Chicago.

Answer: **Richard Michael Daley** (*prompt on Daley*)

**Bonus 1: Literature (Literature)**

Answer the following concerning seafarers in literature.

A: Robert Louis Stevenson wrote this book about young Jim Hawkins and his travels with pirates.

B: This nautical novel concerns the insatiable Captain Ahab and his search for an enormous seagoing mammal.

C: This novella deals with the capture and loss of an enormous marlin by the poor, old Santiago.

D: The narrator of this Poe short story helps William Legrand use the title object to discover a buried pirate treasure.

Answers: A: **Treasure Island** B: **Moby Dick** C: **The Old Man and the Sea** D: **The Gold Bug**

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

Find the  $x$  values, not the ordered pairs, of the points of inflection of the curve  $f$  of  $x$  equals  $x$  to the fourth minus six  $x$  cubed plus ten  $x$  plus seven. Remember that inflection points are found using the second derivative.

Answer: **0 and 3** (*must have both; do not prompt on partial answer*)

**Bonus 2: Science (Physics)**

Given a law from physics, identify it. All your answers contain a person's last name.

A: Force is equal to the product of the mass of an object and its acceleration.

B: All planets orbit the Sun in elliptical orbits, with the Sun at one focus.

C: The stress applied to any solid is proportional to the strain applied, inside the elastic limit.

D: Polarization is at a maximum when the reflected ray is at a right angle to the refracted ray.

Answers: A: **Newton's Second Law of Motion** B: **Kepler's First Law of Planetary Motion** C:

**Hooke's Law** D: **Brewster's Law**

**Tossup 3: Literature (Literature)**

He is sometimes credited with developing the first civilian hardhat for use in construction while he was employed at the Worker's Accident Insurance Institute for the Kingdom of Bohemia. Most of his works were published posthumously by his friend Max Brod, against this author's wishes as they were set out in his will. Quite a few of his novels, including Amerika, stand incomplete, but are regarded as classics nonetheless. Identify this author of "In the Penal Colony", The Castle, The Trial, and most famously, The Metamorphosis.

Answer: **Franz Kafka**

**Bonus 3: Social Studies (Other)**

Given a country, identify the currency it used immediately prior to the Euro.

A: Italy

B: France

C: Austria

D: Portugal

Answers: A: Lira B: Franc C: Schilling D: Escudo

**Tossup 4: Science (Biology)**

They all share a muscular foot, viscera, radula, and mantle, though the purpose and form of these organs vary drastically by the class. Of this phylum, some have mantles with shells, like the gastropods and bivalves, while the cephalopods do not. Name this phylum of animals that includes clams, snails, slugs, and squid.

Answer: Mollusks (accept *mollusca*)

**Bonus 4: Literature (Mythology)**

Identify these mythological monsters that are also seen by Dante in the Inferno.

A: Previously subdued by Hercules and Orpheus, this giant three-headed dog stands guard over the third circle and devours gluttons.

B: In the Inferno, this monster has wings and a long, stinging tail, but when Hercules stole his cattle, he had three heads to go with his three bodies and six arms.

C: Thousands of these creatures, half man-half horse, patrol a river of blood, including one, Nessus, who was, of course, slain by Hercules.

D: In myth, these creatures, half woman-half bird, prevented the seer Phineas from eating, and in the Inferno they gnaw on trees that were once sinners.

Answers: A: Cerberus B: Geryon C: Centaurs D: Harpies

**Tossup 5: Social Studies (World History)**

This short-lived European uprising was suppressed by forces under Adolphe Thiers (*tee-AY*). This uprising began when the National Guard began storing cannon on the hill Montmartre. Because of this, the Versailles Army was forced to invade their own capital barely a month after the Prussian invaders had left. Name this first successful workers' revolution, which took place in the capital of France.

Answer: Paris Commune

**Bonus 5: Math (Algebra)**

State whether the following functions are one-to-one, onto, both, or neither, where the functions are mapped from the real numbers to the real numbers, from  $x$  to  $y$ .

A:  $Y$  equals  $5x$ .

B:  $Y$  equals two  $e$  to the  $x$ .

C:  $Y$  equals the natural log of  $x$ .

D:  $Y$  equals the tangent of  $x$ .

Answers: A: Both B: One-to-one C: Both D: Onto

**Tossup 6: Fine Arts (Music)**

Like the santour, players of this instrument use a mezbab to strike the strings, but it is not a member of the zither family. It is most commonly found in combination with a stringed droning instrument, the tambura, and a combination of two pitched drums, the tabla. Identify this instrument whose name means "thirty strings," famously played by Ravi Shankar and brought into western popular music by the Beatles, the most prevalent stringed instrument of northern India.

Answer: **Sitar**

**Bonus 6: Science (Biology)**

Name these types of skeletons.

A: This type of skeleton surrounds the outside of an animal's body, and is present on insects.

B: This is the type of skeleton that humans have. It supports animals from the inside.

C: Jellyfish and starfish have this sort of skeleton that supports them by filling them with water.

D: This connective tissue often accompanies skeletons. The ear and nose have a lot of it.

Answers: A: **Exoskeleton** B: **Endoskeleton** C: **Hydrostatic skeleton** (*accept hydroskeleton*) D: **Cartilage**

**Tossup 7: Science (Chemistry)**

Equal to internal energy plus pressure times volume, this quantity is typically measured in kilojoules, or kilojoules per mole. Because it is a state function, according to Hess's law, it is directly additive. This quantity minus temperature times entropy yields Gibbs' free energy, and positive values of this quantity signify endothermic reactions. Name this quantity in thermodynamics symbolized delta H.

Answer: **Enthalpy**

**Bonus 7: Social Studies (Geography)**

Correctly identify the following mountain ranges.

A: Spanning 1500 miles, these mountains separate European Russia from Asian Russia.

B: At 4500 miles, this is the longest mountain range in the world.

C: This aptly named range passes near the south pole.

D: The Brenner Pass can be used to transverse this mountain range.

Answers: A: **Ural** B: **Andes** C: **Transantarctic** D: **Alps**

**Tossup 8: Miscellaneous (Entertainment)**

In one show by this composer, Act I follows traditional fairy tale protagonists to their happy end, but Act II challenges the audience's conceptions by asking what comes after "happily ever after." Another musical of his, Assassins, follows the lives of Assassins, and is considered a concept musical. Name this American composer of Into the Woods, Passion, and Sweeney Todd.

Answer: **Steven Sondheim**

**Bonus 8: Fine Arts (Visual Art)**

Identify these American artists.

- A: This painter of "Whaam!" was a leading figure of the Pop Art genre.  
 B: This abstract impressionist was famous for his "drip" technique where he threw paint at a canvas.  
 C: This other abstract impressionist painted "Slow Swirl on the Edge of the Sea."  
 D: This painter of "Four Freedoms" was known for his iconic scenes of American life that were often featured in magazines.

Answers: A: **Roy Lichtenstein** B: **Jackson Pollack** C: **Mark Rothko** D: **Norman Rockwell**

**Tossup 9: Math (General) -- Computational (30 Seconds)**

Include units and simplify. Find the area of a triangle with side lengths of 3 meters, 5 meters, and 6 meters.

Answer: **2 times the square root of 14, square meters**

**Bonus 9: Science (Earth Science)**

Identify these terms related to volcanoes.

- A: This is a large volcano with sides that slope up gradually, made from slow-flowing lava.  
 B: This is a volcano with much steeper sides, made up of small pieces of volcanic rock.  
 C: This is a type of rock made from cooled magma, either above or below the earth's surface.  
 D: This category of volcanoes is not currently active, but these volcanoes are considered likely to become active again.

Answers: A: **Shield volcano** B: **Cinder cone volcano** (*accept volcanic cone*) C: **Igneous rock** D: **Dormant volcanoes**

**Tossup 10: Literature (Literature)**

One character in this play uses a fake beard to disguise himself as a man named Caius in order to serve his liege after being banished. In the fourth act of this play, a disguised son convinces his father to jump off of an imaginary cliff. At the climax of the play, the title character wanders mad in a thunderstorm only to perish following the deaths of his three daughters. Identify this Shakespearean play that includes the title ruler and his daughters Regan, Goneril and Cordelia.

Answer: **King Lear**

**Bonus 10: Miscellaneous (Interdisciplinary)**

If you can identify the following, you deserve a gold star.

- A: Within ten, this is the number of contests that will award gold medals at the 2008 Beijing Summer Olympics.  
 B: This is the atomic number of gold.  
 C: This 1925 film features Charlie Chaplin's Little Tramp and is set in the Klondike.  
 D: This is a common term for the number, approximated as 1.618, that is sometimes referred to as phi.

Answers: A: **302** (*292-312*) B: **79** C: **The Gold Rush** D: **Golden Ratio** (*accept Golden Mean*)

**HALFTIME**

**Tossup 11: Literature (Literature)**

He had started a poem discussing the months of the Roman calendar and their religious festivals, but Augustus banished him to Tomis before he could complete the research. One of his works is a sexual satire that mocked Augustus Caesar's moral values. His most famous poem includes the story of Pyramus and Thisbe, Shakespeare's inspiration for Romeo and Juliet. Identify this poet, famous for detailing Greek and Roman myths from Prometheus to Julius Caesar, in the Metamorphoses.

Answer: Ovid

**Bonus 11: Social Studies (World History)**

Identify the following facts related to the Titanic.

A: The Titanic sunk in April of this year.

B: This man was captaining the Titanic when it sunk.

C: The Titanic was owned by this ship company.

D: The ship was originally built in this Irish city, which is currently planning a "Titanic Quarter" to honor the ship.

Answers: A: 1912 B: Edward Smith C: White Star Line D: Belfast

**Tossup 12: Science (Physics)**

The study of the motion of it and similar fluids is called magneto-hydro-dynamics, because it is highly susceptible to electromagnetic fields. It consists of positive ions, negative ions, and neutral particles, and has nearly infinite conductivity. It can be caused by lightning, lasers, and even by the namesake type of display device. Name this fourth state of matter, consisting of gaseous ions.

Answer: Plasma

**Bonus 12: Math (Geometry)**

Convert the following coordinates between coordinate systems as specified. Use degrees for all angles.

A: (2, 2) from rectangular to polar.

B: (6, 60 degrees) from polar to rectangular.

C: (4, 45 degrees, 2) from cylindrical to rectangular.

D: (4, 45 degrees, 45 degrees) from spherical to rectangular.

Answers: A: (2 root 2, 45 degrees) B: (3, 3 root 3) C: (2 root 2, 2 root 2, 2) D: (2, 2, 2 root 2)

**Tossup 13: Social Studies (Geography)**

Cities in this specific region include Fritch, Shamrock, and Sunray, and the Canadian River runs through it. The second largest canyon in the US, Palo Duro Canyon, gouges the landscape of this relatively flat area, of which the largest city is Amarillo. The county seat of Carson County, Texas shares its name with this region, which it resides in. Identify this rectangular region of Texas south and west and Oklahoma, which contains the state's twenty-six northernmost counties.

Answer: Texas Panhandle

**Bonus 13: Literature (Language Arts)**

Identify these Greek terms related to Greek tragedy.

A: An example of a hero's tragic flaw is this, the pride that brings forth his downfall.

B: This is the emotional climax of healing that purifies the hero. It is now a synonym for "purge."

C: This is the group of actors in a Greek tragedy that represent the general population in the play, or offer commentary to the audience at various points.

D: This term meaning "discovery" refers to the hero's realization of the truth in some form or another.

Answers: A: **Hubris** B: **Catharsis** C: **Chorus** D: **Anagnorisis**

**Tossup 14: Math (Algebra) -- Computational (30 Seconds)**

What is the point of intersection of the line  $y$  equals negative four  $x$  plus twelve and the line  $y$  equals six  $x$  minus 8?

Answer: **(2, 4)**

**Bonus 14: Miscellaneous (Technology)**

Identify these members of the iPod family.

A: This iPod comes in 8- and 16-gigabyte models, and has a large pressure-sensitive screen that can be used for watching videos and web browsing.

B: This is the only iPod without any sort of screen.

C: This flash-memory-based iPod comes in 4- and 8-gigabyte models, and can now play back videos.

D: This is the name recently given to the flagship iPod product, which used to not have any suffix.

Answers: A: **iPod touch** B: **iPod shuffle** C: **iPod nano** D: **iPod classic**

**Tossup 15: Fine Arts (Visual Art)**

He arrived in the city he is most associated with in 1577, not long after leaving Venice. His love for his new city was evidenced in View of Toledo, which was his adopted home. Painting such works as Veil of Veronica and Opening of the Fifth Seal, he was originally born Doménicos Theotokópoulos on the island of Crete. Name this painter of the Burial of Count Orgaz.

Answer: **El Greco** (accept *Doménicos Theotokópoulos* before mentioned)

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

Identify these legislative acts that targeted business.

A: John Calhoun wrote the South Carolina Exposition and Protest in response to it, and its passing caused the nullification crisis.

B: Passed in the wake of numerous financial scandals, including Enron and MCI WorldCom, among its provisions is a requirement that CEOs and CFOs sign off on financial statements.

C: It established a commission to oversee the hiring of government employees, and prevents the firing of employees based on politics, religion, race, or nationality.

D: Passed in 1935, it allowed workers to organize without employer interference and forced employers to bargain with the union so chosen by the majority of employees.

Answers: A: **Tariff of Abominations** (accept *Tariff of 1828*) B: **Sarbanes-Oxley Act** (prompt on *Sox* or *Sarbox*; accept *Public Company Accounting Reform and Investor Protection Act of 2002*) C:

**Pendleton Act** (accept *Civil Service Act*) D: **Wagner Act** (prompt on *NLRA*; accept *National Labor Relations Act*)

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

It occurred on March 16, 1968, and involved Charlie Company. In that company was Second Lt. William Calley, who would later be sentenced to life in prison for his crimes. Identify this massacre in which American soldiers executed hundreds of civilians, and helped turn the public against the Vietnam War.

Answer: **My Lai Massacre** (*accept Song My Massacre or Son My Massacre*)

**Bonus 16: Math (General)**

Given a description, name the theorem.

A: It states that an nth-degree polynomial has n solutions, if one accounts for multiplicity.

B: It states that every natural number greater than one can be expressed as a unique product of primes.

C: It states that the definite integral of f of x dx from a to b is equal to the indefinite integral of f of b minus the indefinite integral of f of a.

D: It states that the definite integral of f prime of t dt from a to x is equal to f of x.

Answers: A: **Fundamental Theorem of Algebra** B: **Fundamental Theorem of Arithmetic** C: **Second Fundamental Theorem of Calculus** D: **First Fundamental Theorem of Calculus**

**Tossup 17: Miscellaneous (Interdisciplinary)**

A mistranslation by Martin Luther is responsible for the commonly accepted name of this place. Outside of the Bible, the only ancient reference to it is in the Book of Jubilees, which says that it is located in the land claimed by Noah's son Shem after the Flood. Christopher Columbus thought he'd found it in Venezuela when he mistook the Orinoco delta for the mouths of four separate rivers. In Jan Brueghel the Elder's depiction, it is home to parrots, monkeys, and leopards frolicking with horses. Name this place famous for its Trees of Life and Knowledge, though the latter caused some problems for original occupants Adam and Eve.

Answer: **Garden of Eden** (*prompt on Paradise*)

**Bonus 17: Literature (Literature)**

Identify these long-suffering literary sidekicks.

A: He is a distinguished surgeon, but his friend Sherlock Holmes constantly points out his lack of insight and imagination by saying, "you see, but you do not observe."

B: He is the boatswain (*BOWS-un*) of the Jolly Roger and the Captain's "right-hand man," but this pirate isn't too upset when Hook gets eaten by the crocodile.

C: His first day on the job, this French valet discovers that he must accompany his employer in an attempt to travel the globe in 80 days, getting kidnapped by Sioux warriors along the way.

D: Charged by Gandalf with the task of escorting Frodo on his journey, this hobbit later saves Frodo from the Orcs and carries him up Mount Doom.

Answers: A: **Dr John H. Watson** B: **Mr. Smee** C: **Passepartout** D: **Samwise Gamgee**

**Tossup 18: Math (Geometry) -- Computational (30 Seconds)**

Give your answer in inches. Two chords of a circle, AB and CD, intersect at point G. Segment AG measures one foot, and segment BG measures one yard. If segment CG is one fathom long, what is the length of segment DG? One way to solve this problem would be to first convert all these measurements to a common unit, and then a theorem from geometry that relates intersecting chords. It may also help to know that a fathom is equal to six feet, or 72 inches.

Answer: **6 inches** (*prompt for units*)

**Bonus 18: Science (Chemistry)**

Identify these types of magnetic compounds.

A: These compounds are weakly attracted to external magnetic fields, due to their unpaired electrons.

B: These compounds are weakly repelled from external magnetic fields.

C: These compounds, like iron, are permanently magnetic.

D: For any permanently magnetic substance, this is the temperature above which the substance loses its magnetism.

Answers: A: **Paramagnetic** B: **Diamagnetic** C: **Ferromagnetic** D: **Curie temperature**

**Tossup 19: Literature (Mythology)**

Long before he ended up married to Circe, he was an infant who was placed before his father's plow, in an attempt to prove the father's sanity. Accompanied by Pisistratus and Mentor, he visited the swineherd Eumaeus, and there found his long-lost father. Together, they plot to kill the suitors that have been hanging around their house in the father's absence. The first four books of The Odyssey are usually named after him, since they tell the story of his progress toward manhood. Identify this man, the son of Odysseus by Penelope.

Answer: **Telemachus**

**Bonus 19: Fine Arts (Music)**

Name the following woodwind instruments found in an orchestra.

A: Like a saxophone, this single-reed instrument comes in soprano, alto, and bass varieties.

B: This instrument often replaces a flute in German orchestras.

C: The lowest pitched wind instrument in an orchestra, this instrument's lowest note is A, four octaves below middle C.

D: Pitched a perfect fifth lower than an oboe, this double-reed instrument was once called the *taille* (*TIE-yay*)

Answers: A: **Clarinet** B: **Recorder** C: **Contrabassoon** D: **English Horn** (*accept Cor Anglais*)

**Tossup 20: Science (Astronomy)**

Launched in 1990, its first servicing mission in 1993 corrected the spherical aberration in its mirror. It was first proposed in the 1940s, because its location makes it not subject to atmospheric turbulence, allowing for much more accurate observations. Orbiting about 366 miles above the Earth, name this telescope named after an astronomer.

Answer: **Hubble Space Telescope**

**Bonus 20: Math (Algebra)**

Given that  $z$  equals the complex number  $3+5i$ , solve for the following quantities. Give your answer as a fraction, if necessary.

A:  $z$  squared

B: The magnitude of  $z$ .

C: The complex conjugate of  $z$ .

D:  $z$  inverse.

Answers: A: **-16+30i** B: **square root of 34** C: **3-5i** D: **3 over 34 minus 5 over 34 i** (accept the quantity  $3 - 5i$ , all over 34; or equivalents)

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

Find the  $x$ -coordinates of the inflection points for the function  $x$  to the fourth minus  $2x$  cubed minus  $36x$  squared plus  $10x$  minus  $4$ .

Answer:  **$x$  equals -2 and 3** (in either order)

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

It was signed on November 30, 1908. It was necessary after the territorial acquisitions made in the aftermath of the Russo-Japanese and Spanish-American Wars. This document reaffirmed the messages of John Hay's Open Door Notes and the 1907 Gentleman's Agreement. In addition, it explicitly allowed the American annexations of Hawaii and the Philippines and implicitly granted Japan the rights to Korea and southern Manchuria. Identify this document negotiated by Theodore Roosevelt's Secretary of State and the Japanese ambassador to America that averted a war between the two countries and established specific spheres of influence in the Pacific.

Answer: **Root-Takahira Agreement**

**Bonus: Literature (Language Arts)**

Identify these Native American words that have passed into common English.

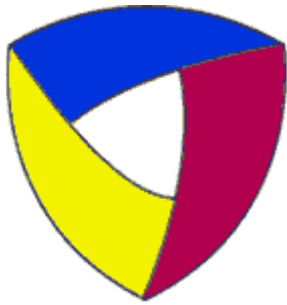
A: The name for this type of long, flat-bottomed sled that curves up in front comes from a Micmac word meaning "to drag."

B: This nut that is used to make pies and pralines has a Miami name that means "nut."

C: This Narragansett rhyming word originally referred to any Indian gathering with feasting and dancing but is now used informally for a conference or meeting of important people.

D: No one knows what this Algonquin name for the groundhog actually means or how much it can do.

Answers: A: **Toboggan** B: **Pecan** C: **Powwow** D: **Woodchuck**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 6**

**Tossup 1: Social Studies (World History)**

Unlike those who came before him, he was a patron of the arts, philosophy, and poetry. His notable deeds include implementing an oath of loyalty to him by all of his subjects and a restructuring of the legal system. He was widely influenced by his Christian boyhood friend Ibrahim and his harem girl Roxelana. A contemporary of Charles V and Henry VIII, he conquered Hungary at the Battle of Mohacs and also annexed portions of North Africa and modern-day Iraq. Name this 16th century Ottoman Sultan who is known in the Arabic world as “the Lawgiver” and in the Western world as “the Magnificent.”

Answer: **Suleiman the Magnificent** (*prompt on Suleiman; accept Suleiman I*)

**Bonus 1: Literature (Literature)**

Given a synopsis, identify the following works that won Pulitzer Prizes.

A: It depicts an unlucky Cuban fisherman who finally catches a marlin, only to have it eaten by numerous sharks.

B: The plot of this novel centers around the trial of Tom Robinson, a black man who is unfairly convicted of rape.

C: Troy physically attacks his son Cory twice and even challenges death after building one of the title objects in this August Wilson play.

D: Beatrice Hunsdorfer refuses to attend the science fair at which Tillie wins first place for the title experiment in this Paul Zindel work.

Answers: A: **The Old Man and the Sea** B: **To Kill a Mockingbird** C: **Fences** D: **The Effect of Gamma Rays on Man-in-the-Moon Marigolds**

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

Assume a value of  $e$  equal to 2.7. Solve for  $x$ : the natural log of the quantity  $3x$  plus 3 equals 2. It will help you to convert the natural log term into a term involving  $e$  to an exponent.

Answer: **1.43**

**Bonus 2: Science (Physics)**

Identify these theories of Einstein.

A: When light strikes a metal, it induces a current, an effect called this.

B: In 1905, he developed this theory predicting strange effects in inertial reference frames when traveling near the speed of light.

C: Einstein did work on this effect that causes particles to move randomly in a suspension.

D: Einstein also concluded the equivalence of mass and energy, summarized in this famous equation.

Answers: A: **Photoelectric effect** B: **Special relativity** (*prompt relativity, do not accept general relativity*) C: **Brownian motion** D:  **$E = mc^2$**  (*accept equivalents*)

**Tossup 3: Literature (Literature)**

Famous during his lifetime as a mathematician and astronomer, today, he is known for his poems. His most famous work of poetry is a collection of four line poems of which there are about one thousand. Edward FitzGerald provided the most famous translation of that collection from the original Persian, though he only translated about a hundred of them. The son of a tent maker, identify this man, most famous for his Rubáiyát.

Answer: **Omar Khayyám** (*accept Omar al-Khayyami*)

**Bonus 3: Social Studies (Current Events)**

Identify these facts related to headlines in October 2007.

- A: Fires were ripping through the southern part of this state, forcing many to evacuate.
- B: There was an explosion at this country's consulate in New York City.
- C: This Israeli Defense Minister allowed electricity to be cut off to the Gaza Strip.
- D: This latest Airbus plane made its first flight.

Answers: A: **California** B: **Mexico** C: **Ehud Barak** D: **Airbus A380**

**Tossup 4: Science (Physics)**

Although he was not an astronomer, this Prussian, who was inducted into the Royal Society of London in 1875, has a lunar crater named after him. He has three laws of spectroscopy, and with Robert Brunsen, he discovered cesium and rubidium. However, he is best known for two rules regarding current and voltage in a circuit. Identify this physicist, who stated that the sum of the currents directed into a junction is equal to the sum of the currents directed out of the junction.

Answer: **Gustav Robert Kirchhoff**

**Bonus 4: Literature (Mythology)**

Identify the following slayers of mythical beasts from Greek myth.

- A: This slayer of Medusa weds Andromeda before fulfilling a prophecy by killing his father Acrisius.
- B: This tamer of Pegasus slew the chimera before invoking the wrath of Zeus by demanding entrance to Mount Olympus.
- C: This grandfather of Dionysus and founder of the city of Thebes killed a dragon and sowed its teeth into the earth.
- D: When Thebes found itself plagued by a sphinx, this father of Antigone kills it.

Answers: A: **Perseus** B: **Bellerophon** C: **Cadmus** D: **Oedipus**

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

The defendant in this 1919 Supreme Court case was general secretary of the American Socialist Party. He was arrested for creating a flyer opposing the draft, in violation of the 1917 Espionage Act. The Supreme Court eventually, in this case, would declare this arrest to be constitutional, placing limits on free speech. Identify this landmark decision stating that free speech is limited when it would create a "clear and present danger," for example by "shouting fire in a crowded theatre."

Answer: **Schenck v. United States**

**Bonus 5: Math (Calculus)**

Find the fourth derivatives of the following functions.

- A: F of x equals the natural log of x.
- B: F of x equals  $x$  to the sixth minus  $12x$  to the third minus  $4x$  plus 2.
- C: F of x equals 3 times sine of  $3x$ .
- D: F of x equals 10 times  $e$  to the  $x$  power.

Answers: A: **Negative 6 times x to the negative fourth power or Negative 6 over x to the fourth power** B: **360 x squared** C: **243 times the sine of 3x** D: **10 times e to the x power**

**Tossup 6: Fine Arts (Visual Art)**

In his youth he was actually trained as a matador, but he would eventually study at the Prado. Later he studied in Paris where he focused on sculpting, and did works such as Roman Soldier and The Left Hand, but his true calling was painting. He mostly portrayed families, but he is most well known for the way the people in his paintings are depicted. Name this Colombian painter of Familia known for painting rather obese people.

Answer: **Fernando Botero**

**Bonus 6: Science (Chemistry)**

Answer these questions about the famous chemical production technique known as the Haber process.

A: In the Haber process, nitrogen and hydrogen gases combine to form this common disinfectant with the formula  $\text{NH}_3$ .

B: By performing this reaction under high pressure, chemists can shift the equilibrium toward the product to increase yield according to this man's principle.

C: The product of the Haber process can be combined with oxygen to create nitric acid, in this process.

D: Since the Haber process begins with two reactants and ends with one product, the reaction can be classified as this type.

Answers: A: **Ammonia** (accept *nitrogen trihydride*) B: **Le Chatelier('s) principle** C: **Ostwald process** D: **Synthesis reaction**

**Tossup 7: Science (Chemistry)**

Protic solvents are able to donate these. Guanine and cytosine make three, while adenine and thymine make two. This phenomenon occurs in hydrofluoric acid, though primarily it happens in molecules containing nitrogen or oxygen atoms bonded to the namesake element. Name this phenomenon a tenth as strong as covalent bonds, in which protons with low electron density are attracted to atoms with high electron density.

Answer: **Hydrogen bond(ing)**

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

Name these organizations, movements, and parties best known for opposing other groups.

A: Including politicians like Patrick Henry and James Monroe, it opposed strong central government in general and Hamilton's fiscal policies in particular.

B: Founded by Protestant evangelicals from Ohio in 1893, it quickly became the strongest voice lobbying Congress for a prohibition amendment.

C: It was the first American third party, which opposed the "conspiracies" of the nation's biggest secret society.

D: It sued to prevent Nazis from marching in Skokie, Illinois and its stated purpose is "to put an end forever to unjust and unfair discrimination."

Answers: A: **Anti-Federalist Party** (accept *Anti-Administration Party*) B: **Anti-Saloon League** C: **Anti-Masonic Party** D: **Anti-Defamation League** (accept *ADL*)

**Tossup 8: Miscellaneous (Sports)**

Old Tom Morris won four of the first eight incarnations of this tournament, and his son Young Tom Morris would also win four championships. Paul Lawrie won the 1999 tournament at Carnoustie in a playoff after watching leader Jean Van De Velde shoot a six on the 72nd hole. Other recent winners include relative unknowns Ben Curtis and Todd Hamilton, although Tiger Woods won in 2005 and 2006. Name this tournament, won in 2007 by Pdraig Harrington.

Answer: **The British Open** (*accept The British Open Championship*)

**Bonus 8: Fine Arts (Music)**

Name the following musical styles.

A: Johann Pachelbel and Johann Sebastian Bach wrote in this style, whose name is from the Portuguese for "irregular pearl."

B: This alliterative style was popular in the United States in the early 1920s. It is usually performed by a group of between 15 and 17 musicians.

C: While best known for waltzes, the Strauss family wrote many of these. They have roots in 19th century Bohemia.

D: Using static harmonies and repetition of brief motives, this style is associated with composers John Adams and Phillip Glass.

Answers: A: **Baroque** B: **Big Band** C: **Polka** D: **Minimalist**

**Tossup 9: Math (Algebra) -- Computational (30 Seconds)**

What is the sum of the coefficients of the expanded form of the quantity  $x$  plus 2 close quantity cubed?

Answer: **27**

**Bonus 9: Science (Biology)**

Answer these questions about genetic disorders caused by trisomy, or having three chromosomes instead of the normal two.

A: The most common chromosomal disorder, trisomy 21, is better known as this syndrome.

B: Edwards syndrome or trisomy 18 results in an abnormally small head, a condition with this medical name.

C: Cat Eye syndrome or trisomy 22 is characterized by coloboma or vertical gaps in this part of the eye.

D: Sterility and more feminine features are common in men with this syndrome resulting from XXY sex chromosomes.

Answers: A: **Down's syndrome** B: **Microcephaly** C: **Iris** D: **Klinefelter's syndrome**

**Tossup 10: Literature (Literature)**

At his death, he left *Queen*, a work about his grandmother, unfinished. He also wrote about a white southerner who joined the Underground Railroad in *A Different Kind of Christmas*. Gathering an impressive resume of interviews while working with *Playboy*, one of this writer's most famous works was derived from one of those interviews. Another work is a telling of a family tale passed down to the author himself from Kizzy to Chicken George and Tom Murray. Identify this author of *The Autobiography of Malcolm X* and *Roots*.

Answer: **Alex Haley**

**Bonus 10: Miscellaneous (Sports)**

Identify the following cities, all of which hosted the Olympic Games.

A: This 1904 host city was the first American city to hold the Games.

B: The 1968 Olympics, in this city, were the first to acknowledge East and West Germany as separate countries.

C: This city would have held the Games in 1940, but they were cancelled due to war; it would eventually hold the 1964 Games.

D: In this city, 11 Israeli athletes were kidnapped and killed, causing the host country to create the GSG 9 counter-terrorism unit.

Answers: A: **St. Louis** B: **Mexico City** C: **Tokyo** D: **Munich**

**HALFTIME**

**Tossup 11: Science (Biology)**

With plant roots, they form mycorrhizae, and with algae, they form lichens. Many can reproduce sexually or asexually, and they have a unique three-stage life cycle. These heterotrophs have chitin surrounding their cells. Some are unicellular, though most are composed of hyphae joining together into a mycelium structure. Name this kingdom of living organisms that contains yeast, mold, and mushrooms.

Answer: **Fungi** (accept *fungus*)

**Bonus 11: Math (Algebra)**

Expand the following algebraic quantities. Simplify your answer.

A: The quantity  $x$  minus 3 close quantity squared.

B: The quantity  $x$  minus 5 close quantity times the quantity  $x$  plus 5 close quantity.

C: The quantity  $x$  plus 4 close quantity times the quantity  $x$  squared minus 4  $x$  plus 16 close quantity.

D: The quantity  $x$  squared minus 2 close quantity cubed.

Answers: A:  **$x^2 - 6x + 9$**  B:  **$x^2 - 25$**  C:  **$x^3 + 64$**  D:  **$x^3 - 8$**

**Tossup 12: Literature (Literature)**

Penning biographies on Baudelaire (*BAWD-eh-lair*), Genet (*jay-NAY*), and Flaubert (*flow-BEAR*), he argued that all of them made a crucial decision between the ages of seven and nine that made them into writers. A major promoter of communism, he attempted to reconcile Marxism and Existentialism in his last major philosophical work, Critique of Dialectical Reason. More famous for his plays, however, identify this French author of Dirty Hands, Nausea, and No Exit.

Answer: **Jean-Paul Sartre**

**Bonus 12: Fine Arts (Visual Art)**

Identify these works of Frank Lloyd Wright.

A: This 5 story red brick building built for a soap company in Buffalo was one of Wright's early designs.

B: Perhaps his most famous work, Wright designed this Pennsylvania house for the Kaufmann family.

C: This Springfield house, designed in the Prairie style, has a distinct Japanese feel.

D: Two of Wright's own homes, one in Wisconsin and one in Arizona, shared this name.

Answers: A: **Larkin Administration Building** B: **Fallingwater** C: **Dana-Thomas House** D: **Taliesin**

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

You want to find the limit as  $x$  approaches infinity of four  $x$  squared divided by  $e$  to the  $x$  power. By direct substitution, the indeterminate form of infinity over infinity is found, which requires the use of L'Hopital's (*low-PEE-tahlz*) rule to complete the problem. One iteration of L'Hopital's rule may not be enough, however.

Answer: **0** (do not accept anything else, such as "the limit does not exist")

**Bonus 13: Science (Astronomy)**

From a definition, identify the following terms from astronomy.

A: The main difference between Kerr and Schwarzschild varieties of them is that Kerr ones rotate.

B: This unit of distance is equivalent to 3.26 light-years.

C: About 1.4 times the mass of the Sun, this limit is the highest mass a white dwarf can obtain.

D: This is the term for the rotation of the earth's axis caused by the gravitational pull of the Sun and Moon.

Answers: A: **black holes** B: **parsec** C: **Chandrasekhar limit** D: **precession**

**Tossup 14: Miscellaneous (Interdisciplinary)**

In Stephen Crane's short story The Open Boat, the correspondent recalls a verse concerning one of these dying in Algiers. They were first created after the 1830 July Revolution, when foreign soldiers were excluded from the French foreign army. The American variety are veterans, originally of World War I. Identify this term that shares its name with a waterborne disease discovered at a Philadelphia convention.

Answer: **Legionnaire** (accept *Legionnaire's disease* after "Identify")

**Bonus 14: Literature (Literature)**

Answer the following about Edith Wharton.

A: Wharton was told to stick to writing about her native New York by this author of The Turn of the Screw.

B: Wharton was the first woman to win a Pulitzer Prize for Fiction in 1921 for this work featuring Newland Archer.

C: This work sees the titular oppressed husband become smitten with the youthful Mattie Silver.

D: This work, left unfinished at her death, was finished by Marion Mainwaring and published one year posthumously.

Answers: A: **Henry James** B: **The Age of Innocence** C: **Ethan Frome** D: **The Buccaneers**

**Tossup 15: Social Studies (Other)**

This man, after graduating from New York's Hamilton College as an English major, went on to pursue a postgraduate degree in psychology from Harvard. His work, mainly with pigeons in a box he called an "operant chamber," expanded on Edward Thorndike's law of effect. This is especially evident in his concept of reinforcement, the idea that rewards can significantly impact future behavior. Identify this 20th century behaviorist and author of "Walden Two."

Answer: **Burrhus Frederic Skinner**

**Bonus 15: Math (Algebra)**

Consider the list of the first six prime numbers greater than 2.

A: Find their median.

B: Find their arithmetic mean.

C: Find the geometric mean of the two largest, leaving your answer in simplified radical form.

D: Find the harmonic mean of the two smallest, leaving your answer as an improper fraction.

Answers: (The numbers are 3, 5, 7, 11, 13, 17, resulting in...) A: **9** B: **28/3** (accept *9 and 1/3*) C: **root 221** (the square root of 221) D: **15/4**

**Tossup 16: Fine Arts (Music)**

This man's second symphony, subtitled "To October," was only twenty minutes long; the author disliked it so much he compared it to the death of a child. His Western style led to a 1936 denunciation by the Soviet government, which caused him to compose strictly state-sponsored music. His fifth symphony was dedicated to Joseph Stalin and his 12th commemorated the 1917 Russian Revolution. Name this Russian, who composed 15 symphonies, the theme music for the 1980 Olympics, and music for more than 30 Soviet movies.

Answer: **Dmitri Dmitriyevich Shostakovich** (*shaw-stuh-KOHV-itch*)

**Bonus 16: Social Studies (World History)**

Identify these places where World War III was almost fought.

A: When Red China attacked territory controlled by this neighboring island in 1958, Eisenhower threatened to retaliate with nuclear weapons.

B: The Soviet deployment of nuclear missiles to this Caribbean island led Kennedy to order a naval blockade in 1962.

C: After the Egyptian government seized total control of this canal in 1956, Britain and France attacked and Khrushchev threatened to nuke London and Paris.

D: Though Russia had been informed that this Scandinavian country planned a test missile launch for January, 1995, radar operators still reported an attack and Yeltsin was asked to authorize a counterstrike.

Answers: A: **Taiwan** (*accept Formosa*) B: **Cuba** C: **Suez Canal** D: **Norway**

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

Scores on a test are normally distributed with a mean of 780 and standard deviation 75. If a person's standardized score is -1.2, what mark did this person receive on the test? To solve this problem, it may help you to know that a standardized score is also called a z-score, and it can be calculated by the equation  $z$  equals the quantity  $x$  minus the mean, end quantity, over the standard deviation, where  $x$  is a person's score on the test.

Answer: **690**

**Bonus 17: Miscellaneous (Entertainment)**

Identify the four most recent winners of the Tony Award for Best Musical given a description of the show.

A: 2006: This musical chronicles the rise of the popular 1960's rock 'n' roll group Frankie Valli and the Four Seasons. It uses many songs originally made popular by that group.

B: 2005: This musical was written by Eric Idle and is based on his 1975 film about a comedic quest for the Holy Grail.

C: 2004: This musical was a surprise winner over *Wicked*. Most of its main characters are hand puppets similar to those found on Sesame Street. It asks the question "What Do You Do With a B.A. in English?"

D: 2003: This musical is based on a 1988 John Waters movie of the same name. Set in 1960's Baltimore, it concerns a girl's quest to appear on an American Bandstand-type show and then racially integrate it.

Answers: A: **Jersey Boys** B: **Monty Python's Spamalot** (*prompt on Spamalot*) C: **Avenue Q** D: **Hairspray**

**Tossup 18: Social Studies (Geography)**

First explored in 1914, this body of water is named after a British rear admiral. Covered with ice for most of the year, it is fed largely by the Mackenzie River. To its east lie both the Queen Elizabeth Islands and Banks Island. The East Siberian Sea borders it to the west, while on its south is its largest settlement, Prudhoe Bay. Name this large body of water, with a southern bank formed by mainland Alaska and the Yukon territory.

Answer: **Beaufort Sea**

**Bonus 18: Literature (Literature)**

Identify the following about baseball in Literature.

A: Subtitled 'A Ballad of the Republic Sung in the Year 1888', it features the "Mudville Nine" and was written by Ernest Thayer.

B: This man wrote the classic baseball novel "The Natural".

C: This novel concerns the fictional New York Mammoths and their catcher, Bruce Pearson, who is afflicted by a terminal illness.

D: This 1910 poem by Franklin Pierce Adams describes a 6-4-3 double play turned by members of the Chicago Cubs.

Answers: A: **Casey at the Bat** B: **Bernard Malamud** C: **Bang the Drum Slowly** D: **Baseball's Sad Lexicon** (*accept Tinker to Evers to Chance, as it is sometimes anthologized under this title*)

**Tossup 19: Science (Earth Science)**

The second era of the Phanerozoic eon, this era contains three periods. During this era, the supercontinent Pangaea broke up into two continents. Birds and mammals evolved, dinosaurs became more advanced, and flowering plants began to appear, but this era ended with the K-T extinction. Name this era containing the Triassic, Jurassic, and Cretaceous periods, which was originally called the Secondary era because, as its name suggests, it is in between the first and third eras.

Answer: **Mesozoic era**

**Bonus 19: Math (Calculus) -- Three Parts**

(*2! is pronounced "two factorial."  $x^2$  is "x squared,"  $x^3$  is "x cubed," etc*) Name the function given the beginning of the Taylor Series expansion.

A:  $x - x^3/3! + x^5/5! - x^7/7!$ , etc.

B:  $1 - x^2/2! + x^4/4! - x^6/6!$ , etc.

C:  $1 + x + x^2/2! + x^3/3!$ , etc.

Answers: A: **sine of x** B: **cosine of x** C: **e to the x**

**Tossup 20: Literature (Mythology)**

Attached to an ox-cart, it was purportedly made of dogwood bark. That same ox-cart it was attached to was driven into the Phrygian capital of Telmissus by Ahmidas. After being crowned as King, Ahmidas anchored his father's ox-cart to a post, creating this notorious puzzle, which, when solved, would reveal the person who was to conquer all of Asia. Often featured as a metaphor for an intractable problem, solved by a bold stroke, identify this mythological tie, finally simply cut by Alexander the Great.

Answer: **The Gordian Knot**

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

Identify the following codenames related to the Manhattan Project.

A: This gun-type fission bomb was dropped on Hiroshima by the B-29 Enola Gay.

B: This implosion-type fission bomb was dropped on Nagasaki three days later.

C: The scientists initially planned on creating this plutonium gun-type device, but scrapped it when they realized that the bomb design was inherently flawed.

D: This was the codename for the bomb dropped during the Trinity test in July 1945.

Answers: A: Little Boy B: Fat Man C: Thin Man D: The Gadget

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

The titular characters are used in cigarette ads, and another character is stranded on the title locale. That character's people alter human history in an attempt to allow mankind to produce a small metal strip, rounded on one end with two holes punched in it, the replacement part to fix the ship of the stranded Salo. Identify this novel where Malachi Constant brings the strip to the titular moon of Saturn, the second novel by Kurt Vonnegut.

Answer: The Sirens of Titan

**Tossup: Social Studies (Other)**

Pyromania, cruelty to animals, and bedwetting at abnormally old ages are the so-called MacDonald triad of warning signs that a child may develop into one of these in adulthood. Categorized by the FBI as either "organized" or "disorganized," depending on their methods, they have many different methods and motives, and several have inspired commercial successes after their deaths, like the movie "Monster" based on Aileen Wuornos. Name this type of criminal whose common name gained popularity after the 1978 arrest of Ted Bundy for over thirty murders.

Answer: Serial killer (do not prompt partial answers)

**Bonus: Literature (Literature)**

Given a description of a Shakespearean character that dies offstage, name them:

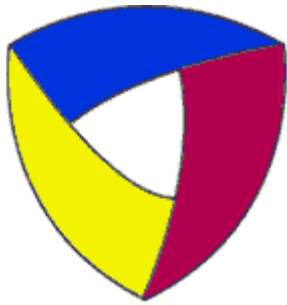
A: Gertrude announces that this character, Polonius' daughter and Hamlet's lover, drowned to death.

B: This daughter of Lear and wife to Cornwall is poisoned offstage by her jealous sister.

C: She convinces her husband to kill Duncan, but eventually becomes so overwrought with guilt that she begins to sleepwalk and hallucinate.

D: This Venetian senator warns Othello about how his daughter could betray the protagonist.

Answers: A: Ophelia B: Regan C: Lady Macbeth D: Brabantio



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 7**

**Tossup 1: Science (Physics)**

The Law of Dulong and Petit states this property of a material is independent of its temperature. Hydrogen has the largest, while radon has the smallest. It can be expressed as the derivative of energy in a material with respect to the material's temperature. Famously, water's is equal to one calorie, or 4.186 joules per gram-Kelvin. Identify this property, commonly symbolized by the letter c.

Answer: **Specific heat capacity**

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

Answer these questions about some treaties that didn't end wars.

A: This 1795 treaty, named for the chief negotiator, established the boundary between the U.S. and Spanish Florida and guaranteed free navigation on the Mississippi.

B: Still in force today, the 1817 Rush-Bagot Treaty between the U.S. and U.K. severely limited the number, weight, and weaponry of naval ships on these bodies of water.

C: The 1961 treaty governing this place strictly prohibits military activity on all land and ice shelves south of the 60th parallel.

D: In 2002, the U.S. withdrew from the 1972 ABM Treaty, which limited the construction of anti-ballistic or defensive types of these weapons.

Answers: A: **Pinckney's Treaty** (*accept Treaty of San Lorenzo*) B: **Great Lakes and Lake**

**Champlain** C: **Antarctica** D: **Missiles**

**Tossup 2: Literature (Literature)**

He wrote Surrealistic poems like "Walking Around" in Residence on Earth, and attacked the Spanish Fascists in "I'm Explaining a Few Things". His most famous collection contains the poem "Tonight I can write" as well as nineteen other poems about his desire for a woman, whose memory is mourned in its final section. The winner of the Nobel Prize for Literature in 1971, identify this Chilean poet of Twenty Love Poems and a Song of Despair.

Answer: **Pablo Neruda**

**Bonus 2: Math (Calculus)**

Differentiate the following functions with respect to x.

A: Tangent of the quantity  $3x$ .

B:  $4x$  plus the natural log of the quantity  $x$  squared plus 3.

C:  $12x$  cubed minus  $4x$  squared plus  $e$  to the  $2x$  power.

D:  $5x$  to the fifth plus  $6x$  to the fourth minus  $43x$  squared plus 19.

Answers: A: **3 times the secant squared of  $3x$**  B: **4 plus  $2x$  over the quantity  $x$  squared plus three** C:  **$36x$  squared minus  $8x$  plus  $2e$  to the  $2x$  power** D:  **$25x$  to the fourth plus  $24x$  cubed minus  $86x$**

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

Chauncey Goodrich and James Hillhouse led this 26 member meeting. It proposed five amendments, including a one-term Presidential limit and forcing each President to reside in a different state than his predecessor. However, none of these passed, and the group failed to achieve their original goal of Northeast Succession from the Union. Name this 1814 congregation, which resulted in the ruination of the Federalist Party.

Answer: **Hartford Convention**

**Bonus 3: Fine Arts (Visual Art)**

Answer these questions about the earliest artwork known to man.

A: Prehistoric cave painters used charcoal for black, hematite for red, and appropriately chose this other pigment for yellow.

B: One painting in the Lascaux (*lah-SKO*) Caves called The Crossed Bison shows this technique in which a small background creates the illusion of distance.

C: Paleolithic cave art frequently depicts reindeer and woolly rhinos, dating the paintings back at least 10,000 years to the last one of these Ages.

D: One of the most recent cave paintings in Valltorta, (*vie-TORE-tah*) Spain shows several men using one of these devices to climb a tree to obtain honey from a beehive.

Answers: A: **Ochre** B: **Perspective** C: **Ice Age** D: **Ladder**

**Tossup 4: Math (Algebra) -- Computational (30 Seconds)**

Solve for all values of theta in radians when zero is less than or equal to theta and theta is less than  $2\pi$  in the equation  $3 \sin^2 \theta - 1 = -\cos^2 \theta$ . It will likely help you to use a Pythagorean identity to simplify the equation.

Answer: **Theta equals 0 and pi** (*must have both, do not prompt on partial answer; do not accept 0 and 180 degrees*)

**Bonus 4: Social Studies (World History)**

Name these rulers of the ancient world.

A: This Akkadian king conquered Sumeria and is sometimes considered to have founded the first true empire.

B: This ruler founded the Persian empire by uniting Media, Lydia, and Babylonia. He ended the Babylonian Captivity in 539 B.C.

C: This Babylonian monarch ordered the Hanging Gardens of Babylon constructed, sacked Jerusalem, and initiated the Babylonian Captivity in 607 B.C.

D: Roughly 10 years later, this man ruled the same dynasty as the answer to part B, and during his reign his forces lost at Marathon.

Answers: A: **Sargon** (*accept Sargon the Great, Sargon of Akkad*) B: **Cyrus II** (*accept Cyrus the Great*) C: **Nebuchadnezzar II** D: **Darius I** (*prompt on Darius; accept Darius the Great*)

**Tossup 5: Fine Arts (Music)**

He composed and directed a jazz clarinet concerto for Benny Goodman in the late 1940's. The fourth movement of his third symphony uses a theme from his Fanfare for the Common Man. He composed music for Martha Graham without knowing the purpose - Graham took that music, including a work inspired by the Shaker tune "Simple Gifts," and created the ballet Appalachian Spring. Identify this American composer, also famous for Rodeo (*Row-DAY-oh*).

Answer: **Aaron Copland**

**Bonus 5: Miscellaneous (Entertainment)**

Identify the grunge rock band given a description.

A: This band's breakthrough album was "Nevermind," which was released three years before singer Kurt Cobain's death.

B: Eddie Vedder is the lead singer of this band, whose hits include "Black" and "Jeremy".

C: Before joining Audioslave, Chris Cornell fronted this band, which was known for songs such as "Spoonman" and "Black Hole Sun."

D: This band, which recorded the album "Purple," is best known for "Interstate Love Song."

Answers: A: **Nirvana** B: **Pearl Jam** C: **Soundgarden** D: **Stone Temple Pilots**

**Tossup 6: Social Studies (Other)**

It has over 70 million speakers, but over a fifth of them do not speak it as their native language. It's spoken on the southeastern portion of its continent, including near Lake Victoria and Lake Tanganyika. Identify this well known African language spoken in Rwanda and Uganda.

Answer: **Swahili** (accept *Kiswahili*)

**Bonus 6: Math (Algebra)**

Simplify the following complex numbers, expressing your result in the form  $a + bi$ .

A: The quantity  $2 + 4i$ , divided by the quantity  $3 + 4i$ .

B: The quantity  $3 + 5i$ , quantity squared.

C:  $8 + 15i$ , minus the quantity  $2 - 4i$ .

D: The quantity  $7 + 2i$ , multiplied by the quantity  $3 - 2i$ .

Answers: A:  **$22/25 + 4/25i$**  (accept  $22 + 4i$  all over 25) B:  **$-16 + 30i$**  C:  **$6 + 19i$**  D:  **$25 - 8i$**

**Tossup 7: Miscellaneous (Sports)**

When this man played for the San Jose Earthquakes in 2001, he led them to the MLS Championship game. Now playing for the Los Angeles Galaxy, he has gained more fame on the international stage. Tied for the all time lead in goals scored for the U.S. National team, he was criticized for his poor performance during the 2006 World Cup. Name this star American forward who played alongside Brian McBride.

Answer: **Landon Timothy Donovan**

**Bonus 7: Literature (Literature)**

Identify the following novels of the late Kurt Vonnegut.

A: This novel is based on Vonnegut's experiences in the firebombing of Dresden.

B: In this novel, Felix Hoenikker's work on the atomic bomb is the original point of interest, but his creation of ice-nine becomes more important.

C: In this novel, Winston Niles Rumfoord tells Malachi Constant that he will travel to Mars, Mercury, back to Earth, and to the titular celestial object.

D: Vonnegut's first novel, it follows Paul Proteus in a world of automated machines.

Answers: A: **Slaughterhouse Five, or The Children's Crusade: A Duty Dance with Death** B: **Cat's Cradle** C: **The Sirens of Titan** D: **Player Piano**

**Tossup 8: Math (Calculus) -- Computational (30 Seconds)**

Find the area from  $x$  equals 0 to  $x$  equals 3 between the curves  $y$  equals  $4x$  plus 3 and  $y$  equals negative  $3x$  squared.

Answer: **54 square units**

**Bonus 8: Science (Biology)**

Identify these parts of digestive systems.

A: This flap prevents food from entering the windpipe, by covering it whenever food is swallowed.

B: This is the term for the folds of the stomach.

C: Many birds have this specialized muscular stomach used to grind up food.

D: This small pouch is considered the start of the large intestine, and is much larger in herbivores than humans.

Answers: A: **Epiglottis** B: **Rugae** C: **Gizzard** D: **Cecum**

**Tossup 9: Literature (Literature)**

The malapropistic constable Dogberry's apprehension of Borachio and Conrade serves as a turning point in this work. It is because of this arrest that Don John's plot to break up the marriage of Claudio and Hero is foiled. A case of mistaken identity is revealed, and Claudio becomes remorseful of his now proven false accusations towards Hero, which resulted in her faking her death. All are merry when Hero is revealed to indeed be alive, and even Beatrice and Benedick give up their hatred toward the opposite sex and marry. Identify this work by Shakespeare.

Answer: **Much Ado About Nothing**

**Bonus 9: Math (Other)**

Given that set A equals  $\{1, 3, 4, 5\}$ , and set B equals  $\{2, 3, 5, 8\}$ , and that the universal set is A union B, find the cardinalities of the following sets:

A: A

B: A intersect B

C: The complement of B

D: The power set of A

Answers: A: **4** B: **2** C: **2** D: **16**

**Tossup 10: Science (Chemistry)**

This effect causes buffer solutions to be less acidic than their acid is alone. This can be explained by Le Chatelier's principle. Likewise, adding sodium sulfate to a solution of calcium sulfate will reduce the amount of calcium sulfate dissolved, because the solubility product is a constant. Name this effect in which an ion shared between two compounds causes the compounds to each become less soluble.

Answer: **Common-ion effect**

**Bonus 10: Literature (Literature)**

Answer the following concerning the year 1943.

A: In 1943, this man resigned from the BBC to become the literary editor of London's Tribune. While doing so, he worked on both *Animal Farm* and *1984*.

B: *The Fountainhead*, a book about Howard Roark's struggles as a young architect, was published by this author in 1943.

C: In 1943, this man published *The Abolition of Man* and a radio lecture series that eventually developed into the book *Mere Christianity*.

D: This man came under FBI surveillance in 1943 for his ties with the communist party. Two years later, he published the autobiography *Black Boy*.

Answers: A: **George Orwell** (Accept *Eric Arthur Blair*) B: **Ayn Rand** C: **C(live) S(taples) Lewis** D: **Richard Wright**

**HALFTIME**

**Tossup 11: Literature (Literature)**

Born in February of 1802, this man was the son of a general in Napoleon's army. Raised as an atheistic republican, he was a member of the Legislative Assembly under the Second Republic. Due to his pro-republican views, he spent the years of Louis-Napoleon's Second Empire in exile in Belgium, Luxembourg, and eventually the island of Guernsey. Name this Romantic philosopher and statesman, most widely known for penning works such as the play *Hernani* and the novel *Les Miserables*.

Answer: **Victor-Marie Hugo**

**Bonus 11: Miscellaneous (Interdisciplinary)**

Answer these questions about U.S. states and their official songs.

A: This state has two official songs: *Where the Columbines Grow* and the John Denver classic *Rocky Mountain High*.

B: Former governor Howard Dean made *These Green Mountains* this state's song in 2000.

C: Kansas native Dr. Brewster Higley wrote the lyrics for this song with the famous opening line, "Oh, give me a home where the buffalo roam."

D: This Land of Enchantment state has three official songs: an English one, a Spanish one, and a Bilingual one.

Answers: A: **Colorado** B: **Vermont** C: **Home on the Range** D: **New Mexico**

**Tossup 12: Math (Algebra) -- Computational (30 Seconds)**

Find the determinant of a matrix with a top row of 2, 4, 6; a middle row of 1, 5, 0; and a bottom row of 4, 2, 3.

Answer: **-90**

**Bonus 12: Science (Chemistry)**

Name these chemical properties of elements.

A: This is the amount by which an atom attracts the electrons in covalent bonds it forms. It is equal to 4.0 for fluorine.

B: This is the amount of energy required to remove an electron from a neutral atom. It is equal to 1312 kilojoules per mole for hydrogen.

C: This is the amount of energy required to remove an electron from an ion with charge -1. It is equal to 73 kilojoules per mole for hydrogen.

D: This is the name for the radius of an atom, based on its electron configuration.

Answers: A: **Electronegativity** B: **First ionization energy** (*accept ionization potential*) C: **Electron affinity** D: **Van der Waals radius**

**Tossup 13: Miscellaneous (Entertainment)**

Born Reginald Kenneth Dwight, this man was exposed to music at a very young age, as his father Stanley played trumpet in Bob Miller's big band. As a young man, he attended the Royal Academy of Music in London on a scholarship awarded because of his remarkable proficiency on piano. He would soon turn to rock and roll, and before long his song "Your Song" appeared in the Top Ten charts in both the US and UK. Name this knighted musician known for his songs "Levon" and "Tiny Dancer" as well as his music being prominently featured in "The Lion King."

Answer: **Sir Elton Hercules John**

**Bonus 13: Fine Arts (Music)**

How well do you know your modes? Find out with these questions.

A: This is the most common name for the Ionian scale.

B: The Aeolian scale is most commonly known by this name.

C: Using the same tones as the major scale, but starting on the dominant tone, will create this mode.

D: This mode was not used by the medieval Church because its first and fifth tones produced a tritone, considered the Devil's Chord.

Answers: A: **Major** B: **Natural Minor** C: **Mixolydian** D: **Locrian**

**Tossup 14: Science (Astronomy)**

General relativity predicts that it can be caused by time dilation near a massive object, though it can also be caused by the expansion of space and by moving objects. It is exhibited especially by galaxies and quasars, and comparing the amount of it at different distances led to Hubble's law. Name this phenomenon experienced by light-emitting objects moving away from us, in which we perceive wavelengths greater than those actually emitted.

Answer: **Redshift** (prompt *Doppler effect*)

**Bonus 14: Social Studies (Geography)**

In 2007, the Economist considered indicators like military expenditure, relations with neighbors, and respect for human rights when assessing a nation's level of peacefulness. Identify these countries that appear on the Global Peace Index.

A: At the bottom of the list, just above Iraq, is this African country engaged in a "quiet war" with Chad stemming from attacks by militias in the Darfur region.

B: The only Asian countries to make the top 20 are Japan and this mountainous nation that has a strong alliance with India and peacefully suffered incursions by China in 2005.

C: Aside from Russia, this is the lowest ranked European country due to its large refugee crisis, high crime rate, and continuing dispute over Kosovo.

D: At number 96, between Yemen and Iran, is this nation that enjoys good relations with neighbors, but is a major weapons exporter with the largest prison population.

Answers: A: **Sudan** B: **Bhutan** C: **Serbia** D: **United States of America**

**Tossup 15: Fine Arts (Visual Art)**

He is portrayed with flowing brown hair in Castagno's (*ca-STAN-yo's*) depiction of him on a leather shield. Donatello's bronze statue of this character is a freestanding nude with a feather running up his leg. Bernini's representation shows him in the middle of his swing. The most famous statue of this Biblical hero, however, is Michelangelo's, which came to symbolize the city of Florence. Name this oft-sculpted Jewish king who slew the Philistine Goliath.

Answer: **David**

**Bonus 15: Science (Physics)**

Identify these undiscovered physical phenomena.

A: This as-yet undiscovered particle is thought to be responsible for mass.

B: This undiscovered particle is thought to mediate the force of gravity.

C: Though magnetic flux has always been observed to be zero, it is hypothesized that these phenomena may exist, leading to a non-zero magnetic flux.

D: This form of energy thought to account for 70% of the energy in the universe has not been directly observed, and, as its name suggests, is not well-understood.

Answers: A: **Higgs boson/particle** B: **Graviton** C: **Magnetic monopole** D: **Dark energy**

**Tossup 16: Social Studies (Geography)**

The reason for their name is unclear, but it probably comes from a group of Berber tribes from North Africa, though some say their name comes from the Latin for 'dogs'. Explored by the ancient Greeks and Romans, they were taken over by the Spanish in 1402. They were then used by Conquistadors as a stop on their way to the New World. Forming an East-West line, they lie off the coast of Morocco and the Western Sahara in the North Atlantic. Identify this group of seven islands, southeast of the Azores.

Answer: **Canary Islands** (accept *Las Islas Canarias*)

**Bonus 16: Math (Calculus)**

Identify the following curves based on their descriptions.

A: This curve is a conic section with eccentricity greater than 1, defined by the locus of points for which the difference of the distances from two fixed points is a constant.

B: This curve with one cusp and a shape resembling a heart can be drawn by tracing a point on one circle as it rolls around another circle of the same radius.

C: The brachistochrone and tautochrone curves are specific examples of this type of curve produced by tracing a point on a circle as it rolls along a straight line.

D: Having the general equation  $r$  equals cosine of  $k$  theta, this polar curve takes its floral name from its resemblance to a blossom when  $k$  is an integer.

Answers: A: **Hyperbola** B: **Cardioid** (prompt on *roulette, epicycloid*) C: **Cycloid** D: **Rose curve** (accept *rhodonea curve*)

**Tossup 17: Science (Biology)**

It extends through the foramen magnum, and is located underneath the fourth ventricle of the brain. It contains the substantia nigra, and is connected directly to the spinal cord. From top to bottom, this region contains the pons, medulla, and midbrain. Name this lower region of the brain through which signals from the spinal cord reach the rest of the brain.

Answer: **Brain stem** (do not accept *brain*)

**Bonus 17: Literature (Literature)**

Identify the following Russian works of Literature.

A: Written by Leo Tolstoy, this work is based on Napoleon's invasion of Russia.

B: Based on Aleksandr Solzhenitsyn's (*sole-shen-EET-zin's*) own experience in a labor camp, it was published underground until 1989.

C: Chekov's last play, it concerns an upper-class family's estate being sold to pay the mortgage.

D: A novel in verse by Aleksandr Pushkin, it tells the story of a man's attempt to escape the fancy city life, and of his relationship with Tatiana.

Answers: A: **War and Peace** B: **The Gulag Archipelago** C: **The Cherry Orchard** D: **Eugene Onegin**

**Tossup 18: Math (Geometry) -- Computational (30 Seconds)**

Your answer will be an amount of time. The distance between city A and city B is 250 miles by flight in an airplane traveling at an average speed of 150 miles per hour, but driving in a car at an average speed of 60 miles per hour requires a stop in city C, where ABC is a right triangle with a right angle at C. The distance from city A to city C is 70 miles. How much more time does it take to drive from city A to city B via city C than it does to fly directly from city A to city B?

Answer: **3.5 hours or 210 minutes or 7/2 hours**

**Bonus 18: Social Studies (Current Events)**

Given a description of related politicians, give the surname shared by them.

A: This family of Louisiana Democrats contains Lieutenant Governor Mitch and U.S. Senator Mary, who once threatened to punch President Bush.

B: This family of Missouri Republicans contains governor Matt and House Minority Whip Roy.

C: This family of Republicans, one of the most famous in the country, contains former Florida Governor Jeb and two commanders-in-chief.

D: This southwestern dynasty of Democrats contains two U.S. Representatives: Tom, of New Mexico, and Mark, of Colorado, who is running for Senate in 2008.

Answers: A: **Landrieu** B: **Blunt** C: **Bush** D: **Udall**

**Tossup 19: Literature (Mythology)**

In the Epic of Gilgamesh, Silili is the divine mother goddess of them. Norse ones include Hofvarpnir, Skinfaxi and Gulltoppr as well as Arvak and Alsvið who help Sol escape Skoll. King Arthur had Llamrei and Sir Gawain had Gringolet. Kelpies are Celtic shape-shifting water ones. Greco-Roman ones include Arion, Balius and Xanthos and the Celtic goddess of them was Epona. Identify these animals, of which Slepnir, belonging to Odin, is an eight-legged example.

Answer: **Horses**

**Bonus 19: Science (Earth Science)**

Identify these geologic features of Yellowstone National Park.

A: The whole park actually sits in one these depressions left from a collapsed supervolcano over 600,000 years ago.

B: A rhyolite lava flow 180,000 years ago created an entire mountain of this dark, volcanic glass.

C: Draining into the Firehole and Snake Rivers simultaneously, Isa Lake is the park's largest body of water straddling this line.

D: Now a hot spring, Excelsior was once one of these features that could shoot to a height of 300 feet.

Answers: A: **Caldera** (*prompt on crater*) B: **Obsidian** C: **Continental Divide** (*accept Great Divide*)

D: **Geyser**

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

During it, Sergeant Stacey Koon believed that the defendant was high on PCP, and grew even more so after he got up after two hits with a TASER. The noise awoke George Holliday, who pointed a camcorder at the action, but the videotape was not enough to convict the officers on charges of excessive force. Identify the African-American whose trial and subsequent acquittals led to riots in Los Angeles.

Answer: **Rodney King beating** (*accept knowledgeable equivalents, but answer must have King*)

**Bonus 20: Literature (Mythology)**

Answer the following about the nine Muses.

A: The mother of the Muses, her name literally means "memory."

B: The mountain where they were said to reside.

C: This Muse was the only one to give birth to a son.

D: He opens his Theogony (*thee-AW-junee*) with a dedication to the Muses.

Answers: A: **Mnemosyne** (*ne-maw-se-nee*) B: **Mt. Helicon** (*accept Parnassus*) C: **Calliope** D:

**Hesiod**

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

It is mostly due to water vapor, and functions differently in the atmosphere from its namesake structures, which work by trapping air and preventing convection. This effect works because the atmosphere reflects infrared radiation both toward and away from the Earth's surface, and raises the Earth's surface temperature by about 90 degrees Fahrenheit. Name this effect that keeps the Earth warm through its namesake gases like carbon dioxide.

Answer: **Greenhouse effect**

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

Find the area between the x-axis and the curve  $y$  equals 4 times the sine of one-fourth  $x$ , from  $x$  equals zero to  $x$  equals  $4\pi$ . It may help you to know that the period of this curve is  $8\pi$ , and that therefore from  $x$  equals zero to  $x$  equals  $4\pi$  is completely within the first quadrant. Remember also that the integral of sine is negative cosine.

Answer: **32 square units**

**Bonus: Literature (Literature)**

Answer the following about Mark Twain.

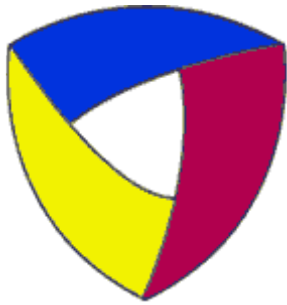
A: Mark Twain was a pen name, meaning water twelve feet deep. This was his given name.

B: Twain considered this novel about a boy and runaway slave on the Mississippi to be his greatest work.

C: He was born in 1835 and died in 1910, both as this celestial phenomenon was passing the earth.

D: His first major work was this short story about a amphibian in California and his owner Jim Smiley.

Answers: A: **Samuel Langhorne Clemens** B: **The Adventures of Huckleberry Finn** C: **Halley's Comet** D: **The Celebrated Jumping Frog of Calaveras County**



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 8**

**Tossup 1: Literature (Literature)**

After his death in 1962, some of his novels picked up new readers due to their association with the counterculture. Publishing under the pseudonym Emil Sinclair, this man took three weeks in October 1917 to pen his novel *Demian*. It was his last novel however, that garnered him the 1946 Nobel Prize in Literature. Identify this man, the author of such works as *The Glass Bead Game*, *Siddhartha* and *Steppenwolf*.

Answer: **Hermann Hesse**

**Bonus 1: Miscellaneous (Entertainment)**

Each part of this bonus will be a short sentence made up using song titles from an artist or band, and you supply the performer. For example, for 'Born to make you happy, she'd be lucky if she didn't go crazy', you'd answer 'Britney Spears.'

A: If you're awake, you can break on through to the other side, and after you escape the riders on the storm, come and light my fire.

B: Lucifer Sam gave me money, which I then gave the gnome, after which he laid another brick in the wall.

C: The substitute went with us on the magic bus, but Happy Jack, aka the Pinball Wizard, played a trick on him, after which he swore he won't get fooled again.

D: I'm up to my neck in you, but I have a stiff upper lip, so I won't be back in black.

Answers: A: **The Doors** B: **Pink Floyd** C: **The Who** D: **AC/DC**

**Tossup 2: Math (Geometry) -- Computational (30 Seconds)**

A roulette wheel that includes slots for zero and double-zero has a radius of 95 centimeters. Find the arc length of one slot of this wheel. It will help you to know that arc length is a fraction of the circumference of the entire wheel, and that roulette wheels have slots for all positive numbers from 1 to 36, along with, in this case, zero and double zero.

Answer: **5 pi centimeters**

**Bonus 2: Science (Physics)**

Identify these important books about physics.

A: This work by Newton laid the groundwork of Newtonian mechanics, including his laws of motion and gravitation.

B: This later work by Newton detailed his work on light phenomena.

C: Introductory physics lectures given by this Nobel Laureate at Caltech were compiled into his three-volume "Lectures on Physics."

D: This popular book by Stephen Hawking published in 1988 informally details the history of cosmology.

Answers: A: **Philosophiae Naturalis Principia Mathematica** (accept *Mathematical Principles of Natural Philosophy*) B: **Opticks** C: **Richard Feynman** D: **A Brief History of Time**

**Tossup 3: Miscellaneous (Technology)**

Designed by Bram Cohen, this protocol has recently generated controversy because some ISPs are trying to throttle its traffic. It splits a file up into small pieces, and users can get each piece from anybody who has it, including seeders, who have the entire file. A tracker website is required to moderate the file-sharing, though no file data passes through the tracker. Name this peer-to-peer file-sharing protocol whose famous trackers include The Pirate Bay and the recently-shut-down OiNK.

Answer: **BitTorrent**

**Bonus 3: Fine Arts (Music)**

Give the common names for each of these Mozart Symphonies.

A: Symphony 31, named after a capital city in Western Europe later invaded by the Nazis.

B: His final Symphony, 41, is named after this planet, visited by the Voyager missions in 1979.

C: Named after the capital city where it opened, Symphony 38 was popular among his Bohemian fans.

D: Written in four days, Symphony 36 is named after this small Austrian town.

Answers: A: **Paris** B: **Jupiter** C: **Praque** D: **Linz**

**Tossup 4: Science (Chemistry)**

Its structure was correctly determined by Kekulé in the 1860s, who claimed that it came to him during a dream of the Ouroboros, a snake eating its own tail. This structure is unusual because its bonds are 140 picometers long, longer than carbon's single bond, but shorter than its double bond, a fact now commonly explained by resonance structures. Name this six-carbon molecule with formula C<sub>6</sub>H<sub>12</sub> that serves as the basis for naphthalene and toluene.

Answer: **Benzene**

**Bonus 4: Social Studies (Geography)**

Identify these places in Europe where the native tongue is not an Indo-European language.

A: This autonomous region of northern Spain, which includes the town of Guernica, has a language closer to Chechen than to any European tongue.

B: Despite centuries of domination by Sweden and Russia, this country has a unique language that gave us the word "sauna."

C: The language of this country on the Danube was brought by Magyar nomads in the 10th century.

D: The language spoken in Valletta, this island nation's capital, probably came from Tunisia and not neighboring Sicily.

Answers: A: **Basque Country** (accept *Euskadi* or *Pais Vasco*) B: **Finland** C: **Hungary** D: **Malta**

**Tossup 5: Fine Arts (Visual Art)**

It stands over 6 feet tall, and it was initially made in bronze. Multiple copies exist, including one found at Hadrian's residence, as well as one owned by Adolf Hitler. It is completely nude, and the left hand is on the right knee while the right hand is in the air. Name this statue by Myron featuring a man getting ready to throw an object.

Answer: **Discobolus** (accept *Discus Thrower*)

**Bonus 5: Science (Astronomy)**

Looking for a unique vacation spot next summer? Consider the following locations.

A: This Martian tourist trap is the tallest mountain in the solar system, at 88 thousand feet.

B: If you are short on cash, you and your friends can hitchhike NASA's Dawn probe, arriving at this dwarf planet in 2015.

C: The view from this 200 mile wide space in Saturn's rings, formed by its moon Pan, would make a great postcard to send to your friends.

D: Wrap up your road trip by visiting this Neptunian moon, with a more eccentric orbit than any other solar system satellite.

Answers: A: **Olympus Mons** B: **Ceres** C: **Encke Division** (*EN-kuh*) D: **Nereid**

**Tossup 6: Social Studies (World History)**

As a music lover, this man revived interest in Handel through his Commemoration of 1784. As First Lord of the Admiralty, he launched Captain Cook on his third voyage to the Pacific. As a dedicated public servant, or perhaps just a devoted gambler, he refused to come to the dinner table for meals, forcing servants to bring him a slice of meat between two slices of bread. Name this Englishman for whom the Hawaiian Islands were once named and a tasty snack still is.

Answer: **4th Earl of Sandwich** (accept *John Montagu*)

**Bonus 6: Math (General)**

Given the symbol for a set of numbers, name what the set stands for (for example, R represents the set of real numbers).

A: N

B: Z

C: Q

D: C

Answers: A: **Natural numbers** B: **Integers** C: **Rational numbers** D: **Complex numbers**

**Tossup 7: Science (Biology)**

Their shapes can be enveloped, complex, helical, and icosahedral. They were shown to be smaller than bacteria when leaves infected with tobacco mosaic disease could infect other leaves through a filter smaller than bacteria. Consisting of DNA or RNA surrounded by a protein capsid, name this type of infectious particle like polio or HIV that replicates itself within cells, and is generally not classified as living.

Answer: **Virus**

**Bonus 7: Literature (Mythology)**

Answer these questions about Japanese religion and mythology.

A: This is the native religion of Japan, once its official religion, whose name means "the way of the gods."

B: Followers of that religion worship these spirits, which range from ancestors to phenomena like the sun. This term approximately means "spirit."

C: This most powerful Japanese deity represents the sun. The Emperors of Japan are thought to be related to her.

D: He and his similarly-named wife were the first two beings, who created the world and many of its spirits. He begat many of them himself, including the sun goddess out of his left eye and the moon god out of his right eye.

Answers: A: **Shinto** B: **Kami** C: **Amaterasu** D: **Isanagi** (*do not accept Isanami*)

**Tossup 8: Math (Algebra) -- Computational (30 Seconds)**

Find the product of "Log base three of eight," "Log base two of 125," and "Log base five of nine." To help you accomplish this, you could recall the change-of-base formula, which states "Log base A of B equals Log base C of B over Log base C of A." You could then simplify this problem, using properties of logarithms, to the product of three integers. Using this or any other method, find the product of these three numbers.

Answer: **18**

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

The saying goes that the only two sure things are death and taxes. Well, this bonus only deals with one. Answer the following about income taxes.

A: This amendment allows for an income tax to be collected.

B: The first income tax in the United States was enacted to raise money during this conflict.

C: This 1894 tariff, also known as the Revenue act, included an income tax of 2%.

D: The tax mentioned in part 2 was struck down by the Supreme Court in this case.

Answers: A: **16th Amendment** B: **Civil War** C: **Wilson-Gorman tariff** D: **Pollock v. Farmers' Loan and Trust Co.**

**Tossup 9: Literature (Mythology)**

In a work by Ulrich von Zatzikhoven, a character by this name is responsible for raising the infant son of the deceased King Ban. She bears some resemblance to the Greek water nymph Thetis, in that they both raised the greatest warrior of their time and delivered powerful weapons to important owners. Bringing up Lancelot and escorting Arthur to Avalon, identify this woman from Arthurian myth who gave Arthur his sword, Excalibur.

Answer: **The Lady of the Lake** (*accept Nimue, Viviane, Niniane or Nyneve*)

**Bonus 9: Science (Chemistry)**

Identify these ideas from thermodynamics.

A: This law states that, if two systems are in thermal equilibrium with a third system, the first two are also in thermal equilibrium.

B: This measurement of energy is equal to internal energy minus temperature times entropy.

C: This cycle named after a French scientist is the idea behind a famous hypothetical heat engine.

D: This is the amount of heat that must be added to a substance per unit mass to increase its temperature by a fixed amount.

Answers: A: **Zeroth Law of Thermodynamics** B: **Helmholtz free energy** (*do not accept Gibbs free energy*) C: **Carnot cycle** D: **Specific heat capacity**

**Tossup 10: Social Studies (Current Events)**

This leader served terms in the late 1980s and early 1990s, but was twice removed on suspicion of corruption. In 1998 she moved to the United Arab Emirates after placing herself on self-imposed exile from her native country. Dozens of people were killed when bombs exploded during her October 2007 arrival home, which she was allowed to do after negotiating with the country's current leader, Pervez Musharraf. Name this former Prime Minister, the first female leader of Pakistan.

Answer: **Benazir Bhutto**

**Bonus 10: Literature (Literature)**

Identify the following characters from various dramas from a description.

A: She is sentenced to death for burying her brother Polynices, and after being imprisoned in a cave, she hangs herself.

B: In a Samuel Beckett play, Vladimir and Estragon are both waiting for this title figure, but he never appears.

C: In a Shakespearean play, this unnamed character is called a dreamer for warning Julius Caesar to beware the Ides of March.

D: In Richard Sheridan's *The Rivals*, she is the aunt of Lydia, but is more famous as the namesake for such statements as 'the very pineapple of politeness'.

Answers: A: **Antigone** B: **Godot** C: **Soothsayer** (*accept Fortuneteller*) D: **Mrs. Malaprop**

**HALFTIME**

**Tossup 11: Science (Earth Science)**

It is located at the subduction of the Pacific Plate underneath the Philippine Plate, and it was first fully descended in 1960 by the manned vessel Trieste. In 1951, it was surveyed by the Challenger vessel, which determined its depth to be 10,900 meters, in a location now known as Challenger Deep. Name this deepest ocean trench located in the Pacific.

Answer: **Mariana(s) Trench** (*prompt Challenger Deep*)

**Bonus 11: Math (Algebra)**

Evaluate the following permutations or combinations in  $n C r$  and  $n P r$  notation.

A:  $5 C 2$

B:  $8 P 8$

C:  $4 P 1$

D:  $4 C 2$

Answers: A: **10** B: **40320** C: **4** D: **6**

**Tossup 12: Literature (Literature)**

He wrote a biography of his father in 1906 and a biography of his famous ancestor, John. His autobiographical works include The River War and London to Ladysmith via Pretoria. He also wrote historical works including his six volume work about World War I titled The World Crisis. His history of World War II is partially a memoir due to his involvement. Winner of the 1953 Nobel Prize in Literature, identify this author of History of the English-Speaking Peoples, who was also Britain's prime minister from 1940-1945.

Answer: **Sir Winston Leonard Spencer-Churchill**

**Bonus 12: Fine Arts (Visual Art)**

Given a description, identify the Spanish artist.

A: There is a little girl shown in the bottom of Las Meninas, by this artist.

B: This man's most famous painting is The Third of May, 1808, which depicts a massacre of civilians at the hands of Napoleon's troops.

C: This cubist sculptor completed the work Monsieur Cactus in 1939.

D: Woman and Bird, a sculpture by this surrealist artist, can be found in Barcelona.

Answers: A: **Diego Rodríguez de Silva y Velázquez** B: **Francisco José de Goya y Lucientes** C: **Julio González** D: **Joan Miró i Ferrà**

**Tossup 13: Math (Calculus)**

This mathematician would have been a soldier if his poor eyesight had not forced him to the sciences instead. A student of Johann Bernoulli, the two worked together to define a rule bearing his name; that rule allows calculus students to evaluate limits in the indeterminate form. Name this mathematician whose rule states that if a limit is indeterminate, its value can be found by evaluating the limit of the derivatives of the numerator and denominator.

Answer: **Guillaume de L'Hôpital** (*accept L'Hospital*)

**Bonus 13: Science (Biology)**

Given a hormone, name the primary gland that secretes it.

A: Prolactin

B: Dopamine

C: Insulin

D: Epinephrine

Answers: A: **Pituitary** B: **Hypothalamus** C: **Pancreas** D: **Adrenal**

**Tossup 14: Miscellaneous (Interdisciplinary)**

Drivers in South Africa could once purchase a version of this weapon to mount on their cars, but the idea never really took off. The earliest type required a hand pump and probably used a mixture of pitch, naphtha, and sulfur. In World War I, the Germans used diesel-fueled ones to clear enemy trenches and by World War II, a soldier could carry a portable one on his back. Name this weapon, absent from the U.S. arsenal since 1978, which uses compressed gas to propel a stream of burning liquid up to 80 meters.

Answer: **Flamethrower**

**Bonus 14: Literature (Literature)**

Answer the following questions. The order of the questions might help you.

A: This is the poem that Maya Angelou read at the 1993 inauguration of President Clinton.

B: This work by Hemingway is a nonfiction illustration of the ceremony and traditions of Spanish bullfighting.

C: This Frost work includes the lines, "But I have promises to keep, / And miles to go before I sleep."

D: This play by Williams is about the Reverend T. Lawrence Shannon and his stay at a hotel with a church tour group.

Answers: A: **On the Pulse of Morning** B: **Death in the Afternoon** C: **"Stopping by Woods on a Snowy Evening"** D: **Night of the Iguana**

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

The daughter of Betty and John Wayles, this woman spent much of her early life as a nurse. She lived for years at Eppington plantation before moving to Paris at the age of 14. After two years in France, she moved back to Virginia with her owner, where she lived for the rest of her life. In 1802, James Callendar, in an attempt to discredit the current U.S. President, alleged she and her owner had an intimate relationship. Identify this woman, who may have given birth to several of Thomas Jefferson's children.

Answer: **Sally Hemmings**

**Bonus 15: Math (Geometry)**

Given the number of sides in a regular polygon, give the internal angle in degrees.

A: 3

B: 5

C: 9

D: 20

Answers: A: **60 degrees** B: **108 degrees** C: **140 degrees** D: **162 degrees**

**Tossup 16: Fine Arts (Music)**

Based on Heinrich Heine's satirical treatment of an old legend, this originally-one-act opera was written to get its composer out of debt. In it, the sea-captain Daland offers his daughter Senta to the title character. When that man despairs that she may not remain faithful, she jumps into the ocean, thus breaking the curse that forced him to sail the seas until he found a faithful wife. Name this opera by Richard Wagner about a cursed captain from Holland.

Answer: **The Flying Dutchman** (accept *Der fliegende Holländer*)

**Bonus 16: Social Studies (Geography)**

Answer these questions about cultural landmarks added to the list of World Heritage Sites in 2007.

A: The youngest site included on the list is this Australian icon that features "shell" roofs and 3000 performances each year.

B: Samarra, home to the Spiral Minaret and former capital of the Abbasid Empire, lies in this Middle East country.

C: The Old Town of Corfu, though largely built by Venetians, now belongs to this Mediterranean nation of many islands.

D: This colorful sandstone palace, built by the Mughal Emperor Shah Jahan, was meant to be a paradise on Earth complete with its own river.

Answers: A: **Sydney Opera House** B: **Iraq** C: **Greece** D: **Red Fort Complex** (accept *Delhi Fort, Lal Qil'ah*)

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

In how many ways can one rearrange the word "million," excluding repetitions?

Answer: **1,260**

**Bonus 17: Miscellaneous (Interdisciplinary)**

Identify the following things, people or places that have something in common.

A: In Shakespeare's *A Midsummer Night's Dream*, he is the Duke of Athens.

B: This 2006 Spanish language film, directed by Guillermo del Toro, won three Academy Awards.

C: Pit, the titular character of this video game, is the loyal servant of the goddess Palutena.

D: This character appears in both *The Portrait of the Artist as a Young Man* and *Ulysses*, representing the author of those works in both.

Answers: A: **Theseus** B: **Pan's Labyrinth** C: **Kid Icarus** D: **Stephen Daedalus**

**Tossup 18: Social Studies (Geography)**

Its name comes from the Celtic for "to flow," and it originates as the Brigach and the Breg rivers. Its delta at the Black Sea is located near the Tulcea region of Romania and the Odessa region of Ukraine. Cities it passes through include Bratislava, Belgrade, Budapest, and Vienna. Identify this river, the second longest in Europe, which inspired Johann Strauss' famous waltz.

Answer: **Danube River**

**Bonus 18: Literature (Literature)**

Answer these questions about modern narrative poetry and its familiar form: the ballad.

A: One of the first modern ballads with a known author is Clever Tom Clinch Going to Be Hanged, the tale of an executed highwayman written by this author of Gulliver's Travels.

B: The poems Marmion and The Lay of the Last Minstrel brought this Scottish writer fame long before he wrote the better known Waverley novels.

C: Samuel Taylor Coleridge ushered in the era of Romantic literature with this lyrical ballad about a ship's misfortunes after a sailor kills an albatross.

D: The greatest literary ballad of the Romantic period may be La Belle Dame Sans Merci, written by this author during the same Great Year as Ode to a Nightingale.

Answers: A: **Jonathan Swift** B: **Sir Walter Scott** C: **The Rime of the Ancient Mariner** D: **John Keats**

**Tossup 19: Science (Physics)**

In 1884 they were selected by Oliver Heaviside. In conjunction with Willard Gibbs they were placed into the standard vector form that they are recognized in today. They all appeared in an 1861 paper entitled On Physical Lines of Force that was written by their namesake. They include Ampère's Law, Gauss' Law, and Faraday's Law of Induction. Give the collective name of the four equations that unify electricity and magnetism and together can be used to derive the electromagnetic wave equation.

Answer: **Maxwell's Equations** (accept *Maxwell's Laws*)

**Bonus 19: Math (Other)**

Simplify these trigonometric quantities.

A: Sine squared of theta plus cosine squared of theta.

B: Secant squared of theta minus one.

C: Cosine squared of theta minus sine squared of theta.

D: Cosecant of theta minus cotangent of theta.

Answers: A: **1** B: **tangent squared of theta** C: **cosine of two theta** D: **tangent of theta over 2**  
(accept *tangent of one-half theta*)

**Tossup 20: Literature (Mythology)**

Sealed in a chest immediately after birth and delivered to Persephone, he was so loved by her that she refused to give him up. Zeus intervened and it was decided that he would spend four months of the year with Persephone, four to himself, and four with Venus. Producing blood-red anemone upon the ground where his blood spilled, identify this lover of Venus who was killed by a boar.

Answer: **Adonis**

**Bonus 20: Social Studies (World History)**

Answer these questions about the remarkable accomplishments of guys named Zeno.

A: Zeno of Citium, who taught that detachment from emotions and submission to divine will leads to happiness, founded this school of philosophy in Athens.

B: Carlo Zeno, the grand admiral of Venice, defeated this rival maritime city at the 1380 Battle of Chioggia.

C: A famous one of these, ascribed to Zeno of Elea, says that no moving object can reach its destination since it must first cross an infinite number of halfway points.

D: Zeno the Isaurian appeased the Monophysites and forged lasting peace with the Vandals as ruler of this empire.

Answers: A: **Stoicism** B: **Genoa** C: **Paradox** (prompt on contradiction) D: **Byzantine Empire** (accept Eastern Roman Empire, prompt on Roman Empire)

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

It can be derived from a dissociation constant expression by taking the negative logarithm of both sides. Useful for calculating the pH of a buffer solution, name this equation in acid-base chemistry that states that pH equals the pKa times the log of the base concentration divided by the acid concentration.

Answer: **Henderson-Hasselbalch equation**

**Tossup: Literature (Literature)**

In 1885, he was born into a mining family in Eastwood, Nottinghamshire, England. Persuaded by his mother to leave the working class, he earned a scholarship to Nottingham High School, and later attended University College for two years. In 1909, he published a collection of poems and his first novel, "The White Peacock." In 1920, he published "Women in Love," and one year later, he its sequel "The Rainbow." Name this author who is famous for his works, "Lady Chatterley's Lover" and "Sons and Lovers."

Answer: **D.H. Lawrence**

**Bonus: Fine Arts (Music)**

Richard Wagner was an eccentric man. Answer the following about operas he may have written in a pink bubble bath.

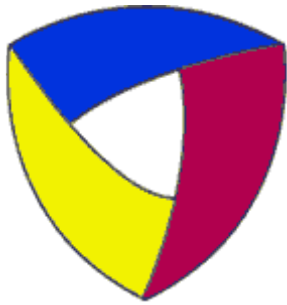
A: The title of this opera refers to Brünnhilde, though her eight sisters, all daughters of Wotan, also fit the bill. At the end of the opera, she is placed on a rock and surrounded by impenetrable fire.

B: The titular young man is the son of Siegmund and Sieglinde. He is unable to experience fear until he comes face-to-face with Brünnhilde, the first woman he has ever met.

C: A dramatic interpretation of the end of the world, this opera's name translates to "Twilight of the Gods." The title becomes especially relevant when, in the final scenes, Valhalla burns to the ground.

D: The previous answers are three of the four parts of this larger work. The Rheinmaidens take possession of a gold object at the beginning and end of this four-night-long operatic cycle.

Answers: A: **Die Walküre** (Accept *The Valkyrie*) B: **Siegfried** C: **Götterdämmerung** D: **Der Ring des Nibelungen** (accept *The Ring of the Nibelungs* or *The Ring Cycle*)



# **Aegis** Questions

**2007 IHSSBCA Kickoff  
Round 9**

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

Although they are prohibited by Article 1 of the Constitution, members of the 1787 Constitutional Convention thought this was unnecessary. Today, they are banned by dozens of countries and the European Union. In 1868, Congress declared that anyone who commits treason cannot become an elected official, but, because of this Constitutional clause, that law did not apply to members of the Confederacy. Give this three word phrase, which translates from Latin as "from something done afterward."

Answer: **Ex Post Facto Laws**

**Bonus 1: Literature (Literature)**

Answer the following about biographies and their authors.

A: He has written many biographical novels of famous figures, and Vincent van Gogh is the subject of his *Lust for Life*.

B: Often considered the greatest biography in English, this James Boswell work is also seen as a literary history of England in the late 1700s.

C: Actually written by Gertrude Stein, its final chapter describes the group known as the "Lost Generation."

D: This author, primarily known as a poet, wrote several biographies of Abraham Lincoln, including the Pulitzer-winning *Abraham Lincoln: The War Years*.

Answers: A: **Irving Stone** B: **The Life of (Samuel) Johnson, LL.D.** C: **The Autobiography of Alice B. Toklas** D: **Carl Sandburg**

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

Evaluate the definite integral from  $t$  equals  $x$  to  $2x$  of the function  $3t^2 + 4t$ , dt.

Answer: **7x cubed plus 6x squared**

**Bonus 2: Science (Physics)**

Name the following particles, all of which are named after Greek letters.

A: Though not technically a helium nucleus, this radioactive particle also consists of 2 protons and 2 neutrons.

B: Discovered by Henri Becquerel, this high-energy ionizing radiation is massless and chargeless.

C: The electron is the lightest lepton. This second-generation lepton is significantly heavier than the electron, and was originally thought to be a meson.

D: This very light particle, the first meson to be discovered, is composed of a quark paired with an antiquark.

Answers: A: **Alpha particle** B: **Gamma ray** (accept *gamma radiation*) C: **Muon** (accept *mu particle*)

D: **Pion**

**Tossup 3: Literature (Literature)**

This novel, first regarded as a huge joke, took 17 years to complete and until its final publication in 1939 was known simply as *Work In Progress*. Nominally about the cyclical nature of history, the story concerns a Dublin family headed by Mr. Humphrey Chimpden Earwicker and the last sentence is actually the beginning of the book's first, unfinished sentence. Name this notoriously difficult to read novel, the last ever written by James Joyce.

Answer: **Finnegans Wake**

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

Answer the following about members of Abraham Lincoln's cabinet.

A: This secretary of state was ridiculed for his 7.2 million dollar purchase of Alaska.

B: Before becoming Chief Justice of the Supreme Court, this secretary of the treasury began issuing paper money instead of coins.

C: This secretary of war during the Civil War was appointed and confirmed as a Supreme Court justice one day before his death.

D: While he opposed a blockade of Southern coasts, his execution of that plan as secretary of the navy was crucial in the Northern victory.

Answers: A: **William Henry Seward, Sr.** B: **Salmon Portland Chase** C: **Edwin McMasters Stanton** D: **Gideon Welles**

**Tossup 4: Science (Chemistry)**

A 1973 study found it to be lethal to parakeets when heated to 260 degrees Celsius, though over 10 acres of it are still used in the Hubert Humphrey Metrodome, the largest concentrated supply of it on Earth. Referred to as K416 during the Manhattan Project, its original discovery by Roy Plunkett came about when he left perfluoroethylene in a storage container. Name this polymer manufactured by DuPont, often used in pans as a non-stick coating.

Answer: **Teflon** (accept *polytetrafluoroethylene* or *PTFE*)

**Bonus 4: Literature (Literature)**

Identify the following about literary boats.

A: The captain of this whaling ship has a peg leg, and one of its harpooners is covered in tattoos.

B: This C.S. Forester creation is the commander of the HMS Lydia and HMS Sutherland.

C: The protagonist boards the Pilgrim in Boston, but later changed places with someone aboard the Alert in his autobiographical *Two Years Before the Mast*.

D: This foretopman first served on the Rights-of-Man, but was impressed into serving on the HMS Indomitable, captained by Edward Vere.

Answers: A: **Pequod** B: **Horatio Hornblower** C: **Richard Henry Dana, Jr.** D: **Billy Budd**

**Tossup 5: Social Studies (Geography)**

The name of this body of water can be directly translated as "Gate of Tears." Towards its African side are the "Seven Brothers," islands that played a major role in human migration out of Africa. Technically divided into two separate straits by the island of Perim, name this twenty-mile-wide strait connecting Djibouti and Yemen.

Answer: **Bab el Mandeb** (accept *Bab al Mandab* or *Mandab Strait*)

**Bonus 5: Math (General)**

Answer the following questions about the sequence with first term 2 and second term 4.

A: If this is an infinite geometric series, what is the sum?

B: If this is a geometric series, what is the tenth term?

C: If this is an arithmetic series, what is the sum of the first ten terms?

D: If this is an arithmetic series, what is the tenth term?

Answers: A: **Infinity** (accept *"the series diverges"* or *equivalents*) B: **1024** C: **110** D: **20**

**Tossup 6: Fine Arts (Visual Art)**

It was retouched before publication; in the published version, a transparent image of a thumb remains curled around a wooden tent pole. The focus of the photograph, Florence Owens Thompson, was not identified until she came forward in the late 1970's. In it, two children rest their heads on her shoulders and an infant rests on her lap while she cups her head in her hand. Identify this photograph, picturing a destitute pea picker in California, taken in 1936 by Dorothea Lange.

Answer: **Migrant Mother**

**Bonus 6: Science (Astronomy)**

Give the names of these solar system exploration missions.

A: This twin rover of Opportunity explored Gusev Crater on Mars.

B: Launched in 1989, this orbiter observed and mapped Venus for 4 years.

C: This probe landed on Titan in January, 2005, after breaking apart from its sister orbiter.

D: This Soviet craft was the first probe to impact the moon, reaching it in September, 1959.

Answers: A: **Spirit** B: **Magellan** C: **Huygens** (*do not accept Cassini-Huygens*) D: **Luna 2**

**Tossup 7: Science (Biology)**

This enzyme requires magnesium to function, and can be divided into several different families.

They need a primer to function, because they can only add to three-prime hydroxyl groups.

Eukaryotes have ones with very good error-correction. The most significant one, however, is from thermus aquaticus, or taq (*tack*), because it can function at high temperatures, making polymerase chain reaction possible. Name this enzyme that attaches DNA base pairs together.

Answer: **DNA polymerase**

**Bonus 7: Social Studies (World History)**

Identify these groups of warriors who excelled at sticking it to the Man.

A: Though they are mainly remembered as spies and assassins, this secretive class of Japanese warriors originally protected peasants from rampaging samurai.

B: The famed English longbow archers who decimated the French knights in the Hundred Years' War were members of this class of free, landholding farmers.

C: This French Resistance group, famous for their berets, fought a guerrilla war against the Vichy government and held back advancing Germans after D-Day.

D: During the English Civil War, these Puritan supporters of Parliament routinely withstood the cavalry charges of their Cavalier foes.

Answers: A: **Ninjas** B: **Yeomanry** C: **Maquis** (*MAH-key*) D: **Roundheads**

**Tossup 8: Miscellaneous (Sports)**

While at the University of New Mexico, this man was both a safety and wide receiver, both different positions than the one he currently plays. He was drafted 9th overall in 2000, one round ahead of teammate Mike Brown, and he is still with the same team. Currently embroiled in an ongoing legal dispute with Tyna Robertson, he was the NFL Player of the Year in 2005, even though his team lost in the first round of the playoffs to the Carolina Panthers. Name this middle linebacker for the Chicago Bears.

Answer: **Brian Urlacher**

**Bonus 8: Fine Arts (Music)**

Given a description, identify the symphony with a geographic title.

A: It opens with a D minor that moves to an allegro and ends with a contrapuntal, and is the last symphony composed by Franz Joseph Haydn.

B: Shostakovich's seventh, it begins and ends with an allegro, and the first movement is seen as representative of war.

C: Sometimes referred to as Mozart's 'symphony without minuet', it opens with a long Adagio and includes an Andante in G major in which the trumpets and drums are silent.

D: One of Mendelssohn's mature symphonies, its first movement begins with an Andante con moto, and it was inspired by a stay at Holyrood Palace.

Answers: A: **London Symphony** B: **Leningrad Symphony** C: **Prague Symphony** D: **Scottish Symphony**

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

You have a circular dartboard of radius 1 foot, which has an inscribed square drawn on it. Assuming you will hit somewhere on the dartboard, what is the probability you will hit inside the inscribed square?

Answer: **2/pi**

**Bonus 9: Science (Chemistry)**

Name the following Nobel Prize Winners in Chemistry given the year in which they won the prize and a distinction that was NOT cited by the prize committee.

A: 1934. With his graduate student Stanley Miller he demonstrated that Earth's early atmosphere could have produced amino acids spontaneously.

B: 1908. His gold foil experiment disproved the plum-pudding model of the atom.

C: 1951. Element number 106, with atomic symbol Sg, is named after him.

D: 1954. He also won a Nobel Peace Prize in 1962 for working to prevent above-ground nuclear testing.

Answers: A: **Harold Urey** B: **Ernest Rutherford** C: **Glenn Seaborg** D: **Linus Pauling**

**Tossup 10: Literature (Literature)**

Ralph (*RAYF*) Vaughn Williams composed an orchestral suite inspired by this play, including the movement "March Past of the Kitchen Utensils." That movement is inspired by a scene in which the main character of the work puts his dog on trial for stealing a piece of Sicilian cheese. In this trial, the ballot boxes are switched, tricking Philocleon into acquitting the accused for the first time ever.

Identify this play, a satire of the Athenian court system by Aristophanes.

Answer: **The Wasps**

**Bonus 10: Miscellaneous (Sports)**

Answer these questions about one of the most remarkable months in sports history: September, 1927.

A: On the 22nd, heavyweight champ Gene Tunney defeated this former boxing champion in a rematch with a controversial long count.

B: On the 30th, this New York Yankees slugger hit his 60th home run of the season, setting a record that would last 34 years.

C: On the 29th, this teammate of the player in B set a new record for RBI with 175, only to break it for good four years later.

D: On the 10th, for the first time in seven years, the U.S. failed to take home this sport's Davis Cup after losing to France in the finals.

Answers: A: **William Harrison "Jack" Dempsey** B: **George Herman "Babe" Ruth** C: **Henry Louis "Lou" Gehrig** D: **Lawn tennis**

**HALFTIME**

**Tossup 11: Literature (Mythology)**

He is a central character of the Icelandic prose epic The Völsunga Saga and the Middle German epic the Nibelungenlied (*nibble-uungen-leed*). Vulnerable on one spot of his back where a leaf fell, this son of Hiordis, the second wife of Sigmund, killed Fafnir, and bathed in his blood to gain invulnerability. Identify this man who rode through a ring of flames in order to become the husband of the Valkyrie Brünhild.

Answer: **Sigurd** (accept Siegfried)

**Bonus 11: Social Studies (Other)**

Let's find out what you know about our neighbor to the north, Canada.

A: This man is the Canadian Prime Minister.

B: That man is the head of this party, the plurality in the Canadian House of Commons.

C: Within twenty, this is the number of people that make up the House of Commons.

D: The Canadian Supreme Court has this number of justices.

Answers: A: **Steven Joseph Harper** B: **Conservative Party of Canada** C: **308** (288-328) D: **Nine**

**Tossup 12: Science (Physics)**

Due to confinement, they are never found alone. They have charges of positive  $2/3$  and negative  $1/3$ , and are the only type of particle which interacts through all four fundamental forces of nature. They have one of six flavors, and are the constituents of hadrons. Named after a passage in Finnegans Wake, name these subatomic particles that can be up, down, charm, strange, top, and bottom.

Answer: **Quark**

**Bonus 12: Math (Algebra)**

Answer these questions related to polynomials.

A: This is a function made of one polynomial divided by another polynomial.

B: Also known as zeros, these are the x-coordinates at which a polynomial equals zero.

C: This type of equation is named after a Greek mathematician, and refers to polynomials where the variable must be an integer.

D: The Abel-Ruffini theorem states that there is no general solution for polynomials with degree greater than or equal to this number.

Answers: A: **Rational function** B: **Roots** C: **Diophantine equations** D: **5**

**Tossup 13: Social Studies (World History)**

It overturned a decree made by Pope Alexander VI. Signed in 1494, it moved the line originally demarcated by Alexander 270 leagues to the west. In 1529 it was further clarified by the Treaty of Zaragoza in order to extend the line all the way around the world, which allowed Portugal to conduct trade in Asia without Spanish interference. In 1750 the Treaty of Madrid clarified it once again, this time allowing the Portuguese to move as far west as the 46th meridian, establishing what is now known as Brazil. Name this treaty that split the world in half between Spain and Portugal.

Answer: **Treaty of Tordesillas**

**Bonus 13: Literature (Literature)**

Identify the following real-life literary invalids.

A: This blind poet of ancient Greece wrote The Iliad and The Odyssey.

B: This other blind poet wrote Paradise Lost and Paradise Regained.

C: This Romantic poet had a clubfoot, but that didn't stop him from traveling to Greece to fight the Turks in their War of Independence.

D: This author of The Rape of the Lock suffered from Pott's disease, which stunted his growth and deformed his body, notably making him hunchbacked.

Answers: A: **Homer** B: **John Milton** C: **George Gordon, Lord Byron** D: **Alexander Pope**

**Tossup 14: Math (Algebra) -- Computational (30 Seconds)**

Find the coordinates of the vertex of the parabola with equation  $4y = x^2 - 6x + 1$ . Since the parabola opens up, this is the same as the lowest point of the parabola.

Answer: **(3,-2)**

**Bonus 14: Miscellaneous (Interdisciplinary)**

Identify the following prisoners.

A: This inmate of Robben Island Prison, number 46664, was imprisoned on charges of sabotage following the Rivonia Trial.

B: This inmate, Barry Bonds' personal trainer, was held in contempt of court for refusing to testify in the BALCO trial.

C: This inmate of the Chateaux D'if (*Shah-tow DEEF*) meets the priest Faria, who assists with his escape.

D: This man was charged with breaking into a pool hall and was not allowed defense council, leading to the Supreme Court overturning the case in 1963.

Answers: A: **Nelson Mandela** B: **Greg Anderson** C: **Edmond Dantes** D: **Clarence Gideon**

**Tossup 15: Fine Arts (Music)**

Many of this composer's works are based on poetry, including that of James Agee, Soren Kierkegaard, and Matthew Arnold, while Richard Sheridan's play School for Scandal inspired one of his overtures. The partner of fellow composer Gian Carlo Menotti, name this man who wrote what was in 2004 voted the saddest piece of classical music, Adagio for Strings.

Answer: **Samuel Barber**

**Bonus 15: Social Studies (Geography)**

Identify these countries that may be best known for their short-lived status.

A: Created as a safehaven for the Igbo people, this country was starved out of existence in 1970 and then reabsorbed by Nigeria.

B: With its capital at St. Francisville, it broke away from Spain only to be incorporated into Louisiana, Mississippi, and Alabama three months later.

C: Recent attempts to resurrect it have failed, but from 1922 to 1924, northern Iraq was this autonomous kingdom.

D: Lasting just eleven days in November, 1918, a Soviet Republic was established in this disputed, hyphenated territory between France and Germany.

Answers: A: **Republic of Biafra** B: **Republic of West Florida** C: **Kurdistan** D: **Alsace-Lorraine**

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

Born in Versailles, this man was sent to America in 1793. Instead of going to Philadelphia as he was ordered to, he instead went to South Carolina, where he commissioned four ships in an attempt to form a militia to fight Spain. After being ordered by the Jacobins to return to France, he asked George Washington for asylum, which was granted. Name this Frenchman, who attempted to convince the United States to ally with France and fight Spain in Florida.

Answer: "**Citizen**" **Edmond-Charles Genet**

**Bonus 16: Math (Calculus)**

Find the value of these limits.

A: The limit of the quantity  $x^2 - 5x + 6$  over the quantity  $x - 2$  as  $x$  approaches 2.

B: The limit of  $\frac{1}{x}$  as  $x$  approaches 0.

C: The limit of  $\frac{\sin x}{x}$  as  $x$  approaches 0.

D: The limit of the quantity  $1 + \frac{1}{x}$  to the  $x$ th power as  $x$  approaches infinity.

Answers: A: **-1** B: **Does Not Exist** C: **1** D: **e** (Accept *Euler's Number*, *Euler's Constant*, or *Napier's Constant*.)

**Tossup 17: Miscellaneous (Entertainment)**

No one knows exactly where this place is, but apparently it encompasses Outer Space, Hell, and a town that used to be Peaksville, Ohio. It is home to robotic grandmothers and monsters on Maple Street. According to one source, it is the "fifth dimension" and "lies between the pit of man's fears and the summit of his knowledge." Time Enough At Last, Nightmare at 20,000 Feet, To Serve Man, and It's a Good Life were all classic episodes of what '60s sci-fi series hosted by Rod Serling?

Answer: **The Twilight Zone**

**Bonus 17: Literature (Mythology)**

Answer the following about trees in Mythology.

A: This is the name of the World Tree that connects the nine worlds of Norse mythology.

B: They were Atlas' daughters who guarded a golden tree with golden leaves and more importantly, golden apples, which were sought by Hercules.

C: This was the tiny, insignificant plant that Hodur was tricked into using to kill his brother Baldur.

D: This nymph, the object of Apollo's affection, was turned into a laurel tree while fleeing from him.

Answers: A: **Yggdrasil** B: **Hesperides** C: **Mistletoe** D: **Daphne**

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

Find the definite integral, from  $x$  equals one to  $x$  equals five, of  $f$  of  $x$  equals eight  $x$  to the third power plus six  $x$   $dx$ .

Answer: **1320**

**Bonus 18: Science (Biology)**

Identify these terms from biology named after scientists. All your answers should be two words, the first being the last name of a scientist.

A: Also known as the citric acid cycle, this important metabolic pathway of respiration produces ATP, NADH, FADH<sub>2</sub>, and CO<sub>2</sub>.

B: Located at the beginning of the nephron, this sac contains the glomerulus.

C: Usually between three and four centimeters long, this passage to the pharynx can be opened by swallowing, and is named after a sixteenth-century Italian anatomist.

D: These small pieces of DNA named after a Japanese scientist are created on one strand during DNA replication, because DNA polymerase can only follow the strand in one direction.

Answers: A: **Krebs cycle** B: **Bowman's capsule** C: **Eustachian tube** D: **Okazaki fragment(s)**

**Tossup 19: Literature (Literature)**

He is the subject of Tom Stoppard's play "The Invention of Love", which details this man's unrequited homosexual desire for his college roommate, Moses Jackson. His poetry, including "Is my team ploughing?", is filled with unbridled pessimism and an obsession with the inescapable nature of death. Only publishing two books during his lifetime, the second of which being titled very fatalistically as "Last Poems," identify this British poet of the collection A Shropshire Lad, who penned such works as "When I was one-and-twenty" and "To An Athlete Dying Young".

Answer: **Alfred Edward Housman**

**Bonus 19: Fine Arts (Visual Art)**

Identify the following paintings from their depictions of animals.

A: A woman in the foreground of this painting is holding a black umbrella with one hand and has her monkey's leash in the other.

B: There is a small dog at the bottom of this Van Eyck painting depicting a marriage.

C: A series of paintings by C.M. Coolidge, which includes "Waterloo: Two" and "A Bold Bluff".

D: Depicting an attack off the coast of Havana, the man being depicted only lost a leg.

Answers: A: **A Sunday Afternoon on the Island of La Grande Jatte (accept Un dimanche apres-midi a l'île de la Grande Jatte)** B: **The Arnolfini Wedding (accept the Betrothal of the Arnolfini or The Arnolfini Portrait and other clear knowledge equivalents)** C: **Dogs Playing Poker** D: **Watson and the Shark**

**Tossup 20: Science (Astronomy)**

Created in 1961, while its namesake founder was working at the National Radio Astronomy Observatory, this formula was announced at the first conference of SETI, the Search for Extra-Terrestrial Intelligence. Its founder originally used it to produce a final product of ten, although this number was based on the approximation of several unknowns. More recently, it has been used as the basis of the Rare Earth Hypothesis, which gives a very small value to this estimate's third term. Give the name of this formula, which attempts to approximate the number of intelligent civilizations in the Milky Way.

Answer: **Drake Equation**

**Bonus 20: Math (Geometry)**

Name these geometric figures.

A: This is a cone or pyramid whose tip is cut off parallel to its base.

B: This is a collection of shapes that fills up a plane exactly, without any space in between or overlaps.

C: In general, this figure can be generated by a plane curve and a line not lying in the plane, though it is usually generated by a circle and a perpendicular line.

D: This is one half of a double cone, like those used to generate conic sections.

Answers: A: **Frustum** B: **Tessellation** C: **Cylinder** D: **Nappe**

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

This man's first complete score was for La La Lucille, and later came Lullaby and the song Somebody Loves Me. Associated with Tin Pan Alley, his best known work was written in just three weeks for bandleader Paul Whiteman, and was orchestrated by Ferde Grofe. At age 39 this man died, two years after his Porgy and Bess premiered. Name this jazz composer, the brother of Ira, who penned Rhapsody in Blue.

Answer: **George Gershwin**

**Tossup: Science (Biology)**

This disease is most commonly caused by the delta F508 mutation, which affects a protein which transports chloride ions across cell membranes. Carriers are less susceptible to dehydration from cholera, as sufferers retain more water and have thicker mucous membranes. Other symptoms are the lack of the vas deferens and lack of pancreatic secretions. Name this autosomal recessive disease most common in Europe whose most prominent symptom is an accumulation of mucous in the lungs, and which is named after the scarring caused by namesake sacs on the pancreas.

Answer: **Cystic fibrosis** (*accept CF*)

**Bonus: Literature (Literature)**

What does it take to become a successful woman writer? Talent and perseverance, of course, but it might also help to have Anne as your first name. Identify the following literary Annes from a description.

A: She is mainly known for her poetry, though she also wrote Agnes Grey.

B: Sometimes called the mother of the Gothic novel, her best known books are The Mysteries of Udolpho and The Italian.

C: Born Howard Allen O'Brien, this author of The Vampire Trilogy changed her first and last names to be more feminine.

D: Born Anne Gray Harvey, she put together her last poetry collection The Awful Rowing Toward God, shortly before committing suicide by carbon monoxide inhalation.

Answers: A: **Anne Bronte** B: **Ann Radcliffe** C: **Anne Rice** D: **Anne Sexton**