

### Ladue Invitational Spring Tournament VI

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## ROUND 11 - TOSSUPS

1. A poem by this man describes a character that used to “break onetwothreefourfive pigeons just like that”, and the title figure of that poem “used to ride a watersmooth-silver stallion” Another of his poems discusses a character whose rectum was egged by officers and was “more brave than me: more blond than you” and “whose warmest heart recoiled at war.” This author of (\*) “Buffalo Bill’s defunct” described a character who “sang his didn’t” and “danced his did” throughout the seasons in a place “with up so floating many bells down.” For ten points name this American poet who wrote “i sing of Olaf glad and big” and “anyone lived in a pretty how town”, known for his unusual use of punctuation and capitalization.

ANSWER: edward estlin cummings

<RP>

2. This man began his political career with help from Tom Pendergast, and while living at Blair House, he survived an attempt on his life by Puerto Rican nationalists Griselio Torresola and Oscar Collazo. This man attacked the “Do-Nothing” Congress after they overrode his veto of the Taft-Hartley Act, and he desegregated the military with Executive Order 9981. This president fired General (\*) MacArthur a year after he sent US troops into the Korean War, and a famous photo shows this president holding up a Chicago Tribune paper falsely stating that Thomas E. Dewey defeated him. For ten points, name this 33<sup>rd</sup> U.S. president that ordered the dropping of atomic bombs on Japan after succeeding FDR.

ANSWER: Harry S. Truman

<ES>

3. The beginning of the first epilogue of this work describes the movements of the “sea of European history” after “seven years had passed” since the main events in the book. After a duel, a character in this work joins the Freemasons, and that duel with Dolokhov resulted from rumors about an affair that man’s wife, Helene, was having. After recovering from an injury obtained during the Battle of (\*) Austerlitz, Andrei Bolkonsky’s engagement is broken off by one character in this book. That character, Natasha Rostova, eventually marries this book’s protagonist, Pierre Bezukhov. For ten points, name this notoriously long work about Russian life during Napoleon’s invasion of Russia, written by Leo Tolstoy.

ANSWER: War and Peace

<MS>

4. Brefeldin A disrupts the function of this organelle, and Rab G-Protein GTPases may define its stable compartments. Mannose-6 phosphate is added by this organelle, and it is commonly found in plasma B cells. If the microtubular structure of the cell is destabilized, the components of this organelle will be scattered throughout the cytoplasm. Those components are (\*) flattened membrane stacks called cisternae, and they make up the cis network, while the trans network of this organelle is responsible for packaging proteins into vesicles. For ten points, identify this organelle that receives and modifies proteins from the endoplasmic reticulum, named after the Italian scientist who discovered it.

ANSWER: Golgi Body [accept Golgi apparatus]

<LP>

5. This poem describes a man’s “hanging face, like a devil’s sick of sin,” and was originally written in the Craiglockhart hospital, like many others by its author. The speaker of this poem sees “an ecstasy of fumbling” by men who were (\*) “bent double, like old beggars under sacks/knock-kneed, coughing like hags,” and later pictures a man with “blood/come gargling from froth-corrupted lungs.” This poem, which tells its reader not to “tell with such high zest” the title “Old Lie” gets its title from a work by Horace. For ten points, name this poem by Wilfred Owen, whose title means “it is sweet and honorable.”

ANSWER: “Dulce et Decorum est”

<MS>

6. This man called Iranian leader Hassan Rouhani a “wolf in sheep’s clothing” in 2013, and he gave a speech at Bar-Ilan University in 2009 in response to a speech given by Barack Obama in Egypt. This person was shot in the shoulder during Operation Inferno before beginning his studies at MIT, and shortly after, his brother (\*) Yonatan was killed in the Entebbe Raid. This man addressed Congress in 2015, and is for a two-state solution. This chairman of the Likud party defeated Shimon Peres in 1996 elections for this man’s current position. For ten points, name this prime minister of Israel, often called “Bibi” by his people.

ANSWER: Benjamin “Bibi” Netanyahu [prompt on “Bibi” before mentioned]

<AG>

7. When both Hermes and Apollo fell in love with a woman, that woman claimed she was prettier than this Greek goddess, and was then shot by this goddess with an arrow; that woman was Chione. When Agamemnon’s ships were unable to depart to Troy at the start of the Trojan war because this goddess was upset with him, he was advised to (\*) sacrifice his daughter Iphigenia to her, and because King Oeneus forgot to pray to this goddess, the Calydonian boar was sent to destroy his kingdom. This daughter of Leto turned Actaeon into a deer because he had seen her naked, and this goddess asked Zeus to allow her to remain a virgin. For ten points, name this Greek goddess, the twin sister of Apollo and goddess of the hunt.

ANSWER: Artemis [accept Diana before “Greek”]

<MS>

8. The Castner-Kellner Process produces a mixture with this substance and sodium while producing chlorine. In the patio process, this element is used to extract silver from ore. The most common source ore for refining this substance is the red sulfide mineral cinnabar. The chloride of this element is a common component of reference electrodes, known as (\*) calomel. This element cannot form a monocation with a charge of 1+, and its alloys are known as amalgams. This transition metal’s sulfide is cinnabar it is commonly used in thermometers. For ten points, identify this element, a liquid at room temperature, with symbol Hg.

ANSWER: mercury (accept Hg before mention)

<CL+PA>

9. In one work by this composer, a woman swallows poison from her ring rather than allow herself to be raped by a villain, and the main character of that opera desperately tries to rescue his mother from being burned at the stake, but fails. Another opera by this man ends as the main character cries, “The curse!” after his daughter’s murder by (\*) Sparafucile. In another opera, this man depicted the love triangle between two African princesses and a military commander that ends with the two main characters getting buried alive inside the Temple of Vulcan. For ten points, name this Italian composer of operas such as *Il Trovatore*, *Rigoletto*, and *Aida*.

ANSWER: Giuseppe Verdi

<JS>

10. The Sepulveda Dam lies on a river in this state that originates at Canoga Park. The northern part of this state is home to Suisun Bay, which is located at the confluence of this state’s longest river and the San Joaquin river. Potato Harbor is located on one of this state’s eight Channel Islands, and its largest city lies in the San Fernando Valley. This state’s highest peak, Mount (\*) Whitney, is located partly in Sequoia National Park, famous for its giant redwoods. The Salton Sea lies in this state’s southern part, where the lowest point in North America, Badwater Basin, can be found. The border between this state and Nevada contains the largest alpine lake in the continent, Lake Tahoe. For ten points, name this U.S. state that contains San Francisco and Los Angeles.

ANSWER: California

<AG>

**HALFTIME**

11. A character in this novel records every book and short story she has ever read in a diary, and describes it as a “complete waste of time.” Another character in this novel stares at the reflection of a woman traveling with a sick man on a train window. That character in this work considers himself to be an expert in (\*) ballet, despite having never seen one. At the end of this work, the protagonist feels the Milky Way flow inside him after Yoko dies during a cocoon-warehouse fire. For ten points, name this novel about the affair between Komako and Shimamura, set in the title locale, written by Yasunari Kawabata.

ANSWER: Snow Country

<MS>

12. This man names a self aware “brain” which arises randomly from chaos. The BGK collision operator is used in this man’s namesake equation, from which the H-theorem can be derived. The energy of the band gap of a superconductor is equal to 3.5 times a critical temperature times this man’s namesake constant. Along with James (\*) Clerk Maxwell, this man names a distribution which describes the speeds of particles in an ideal gas. This man names a law which states that the energy of a blackbody is proportional to the fourth power of temperature with Josef Stefan. For ten points, name this Austrian physicist whose namesake constant is equal to the ideal gas constant divided by Avogadro’s constant.

ANSWER: Ludwig Eduard Boltzmann

<AG>

13. This man painted a golden cherub above a reclining nude who wears floral bracelets in his version of *Danae*, and six clothmakers wear black hats and read an open book in his work *Syndics of the Draper’s Guild*. More famous works by this artist include a painting that shows seven men peering across the canvas towards a large manual while the main figure works on (\*) criminal Aris Kindt, as well as a painting that shows a blue and yellow flag above a young girl hanging a dead chicken from her belt. For ten points, name this artist of *The Anatomy Lesson of Dr. Nicolaes Tulp*, who featured the shooting company of Captain Frans Banning Cocq in *The Night Watch*.

ANSWER: Rembrandt Harmenszoon van Rijn [accept either underlined name]

<RP>

14. This man had his tutor executed for his role in the Pisonian Plot, and after failing to seize this ruler’s throne, Gaius Vindex committed suicide. The forces of this emperor’s polity defeated a ruler of the Iceni tribe at the Battle of Watling Street, and that queen launched a revolt during this man’s reign known as (\*) Boudicca’s Uprising. This emperor used a sinking boat to murder his mother Agrippina the Younger, and Galba began the Year of the Four Emperors after this ruler’s death, who was rumored to have fiddled during the Great Fire of Rome. For ten points, name this son and successor of Claudius, the fifth and last emperor of the Julio-Claudian dynasty.

ANSWER: Nero Claudius Caesar Augustus Germanicus

<RP>

15. This team, along with Arsenal, was the first team to play with numbered shirts. Some of this club’s expensive flops have included Andriy Shevchenko and a Spaniard who had previously captained Atlético Madrid at the age of 19. In December 2015, this team fired their renowned Portuguese (\*) manager for the second time, who had won three Premier League titles with the club. Didier Drogba led this team to its first UEFA Champions League title during the 2011-12 season, after losing in the final to Manchester United four years prior. For ten points, name this Premier League club previously led by Jose Mourinho that wears blue jerseys when playing home games at Stamford Bridge.

ANSWER: Chelsea F.C.

<GM+JS>

16. During St. Lucia’s Day in Sweden, a young girl wears a wreath of these objects. Eastern Orthodox bishops use dikirions and trikirions, which hold these objects, and the Paschal version of this object is used during worship in several Christian denominations. A (\*) “Yahrzeit” version of one of these objects is used on the anniversary of a loved one’s death in Judaism. These objects, along with flowers and incense are often placed before an image of the Buddha. For ten points, name these objects whose Votive versions are lit during prayer by Catholics and which are added to the menorah each day during Hannukah.

ANSWER: candles

<GM>

17. This point is the only point that is the isogonal conjugate of itself, and the orthocenter of an acute triangle is this point for its orthic triangle. The barycentric coordinates of this point are (a,b,c), and this point is on the Euler line for a triangle if and only if the triangle is (\*) isosceles. This point only exists for a quadrilateral if the sum of the lengths of its opposite sides are equal according to the Pitot theorem, while the distance from this point to the sides of a triangle times the triangle's semiperimeter is equal to the triangle's area. For ten points, name this point in a triangle which is equidistant from all three sides of a triangle, the intersection of its internal angle bisectors.

ANSWER: incenter

<MS>

18. The first major land battle of this war was fought at Yatay and included a capture of Corrientes. This war emerged out of a conflict involving the Colorados and the Blancos in a country led by Atanasio Aguirre, and Pedro II entrusted military command of his forces to the (\*) Duke of Caxias during this war. This war, which began with an invasion of Mato Grosso, ended at the Battle of Cerro Cora after the death of President Francisco Solano Lopez. For ten points, name this bloodiest South American war in which Paraguay was defeated by a coalition of Argentina, Brazil, and Uruguay.

ANSWER: War of the Triple Alliance [accept Paraguayan War]

<RP>

19. One work by this author ends with a character saying "You have the truth! But are you satisfied?" In that play, Mr. Ponza tries to convince Lady Frola that Guilia is her daughter. In another work by this author of *Right you are (if you think so!)*, one character accidentally thinks he is supposed to be in the 15th century, and it is explained that another character believes himself to be king after falling off a horse. This author of (\*) *Henry IV* wrote a play which sees the Boy commit suicide and the Little Girl drown. At the beginning of that play, the Director is angry when his rehearsal of the play "Mixing it Up" is interrupted. For ten points, name this Italian playwright who wrote *Six Characters in Search of an Author*.

ANSWER: Luigi Pirandello

<MS>

20. Solitons are among the solutions for the Korteweg-de Vries equation, which models these entities. The Iribarren number describes these things, which can move in groups called swells as a result of weather systems. Guyots are created from seamounts by (\*) erosion from these entities, and their extremely large rogue type is formed from their collisions. In shoaling, these things' height increases before they break on the shore. For ten points, name these wind-driven oscillations that transfer energy and move in a transverse direction, occurring on the surface of the ocean.

ANSWER: ocean waves (also accept water waves)

<AG>

### End of regulation, only proceed if tied

21. A relative of this ruler was put on trial for stealing churchlands from Lafranc, and this man summoned his nobles and made them swear loyalty in the Oath of Salisbury. This successor to Edgar Aetheling wrote a letter to Lafranc ordering that his half-brother Odo be freed from jail. This king ordered for a destructive campaign to gain control of Northumbria in his (\*) Harrying of the North, and he ordered for the compilation of a written record of England, the Domesday Book. This king led the Norman conquest of England, and his most famous victory is depicted on the Bayeux Tapestry. For ten points, name this English king who defeated Harold Godwinson at the Battle of Hastings.

ANSWER: William the Conqueror [or William I of England; prompt on "William"]

<RP>

22. This thinker asserted that "without music, life would be a mistake" and that he imagines "God as a songster." This man argued that a character who thinks that he cannot affect the balance of the world is a Dionysian figure, which contrasts with an Apollonian figure in drama. This man wrote about slaves and (\*) masters in *On the Genealogy of Morals*. He criticized dichotomous moral systems in *Ecce Homo*. This man described the Ubermensch and wrote *Beyond Good and Evil*. For ten points, identify this philosopher who claimed "God is dead" in *The Gay Science* and also wrote *Thus Spake Zarathustra*.

ANSWER: Friedrich Nietzsche

<CL>

## **BONUSES**

1. Bonus: When this man's son, Phaethon, accidentally drives this god's chariot out of control, Zeus strikes him down with a lightning bolt. For ten points each:

[10] Name this titan who drives his chariot of the sun across the sky every day.

ANSWER: **Helios**

[10] Helios's cattle are located on this island, which is guarded by his daughter Lampetia. When Odysseus lands on this island, he makes his crew swear to not touch any of the cattle, but they do, and all of them are killed except for Odysseus.

ANSWER: **Thrinacia** [or **Trinacria**, **Thrinacie**]

[10] Before stopping at Thrinacia, Odysseus passed these two sea monsters, which ate six of his men. Thanks to help from Thetis, the Argonauts safely traveled through the channel containing these two monsters. Name either.

ANSWER: **Scylla** or **Charybdis** [accept either, accept both]

<MS>

2. Bonus: The Quasi-War began after this event. For ten points each:

[10] Elbridge Gerry, John Marshall, and Charles Pinckney eventually returned to the United States when they received threats after refusing to pay bribes in this political incident.

ANSWER: **XYZ** Affair

[10] The XYZ Affair occurred under the presidency of this man. His brother led the Sons of Liberty and his son eventually became president as well.

ANSWER: John **Adams** (do not accept or prompt on "John Quincy Adams")

[10] Another notable event during the presidency of John Adams was the passage of this legislation. These four bills made it even more difficult for immigrants to become citizens and allowed the president to imprison and deport citizens.

ANSWER: **Alien and Sedition** Acts

<RP>

3. Bonus: Gustave Doré created several woodcuts of the two main characters of this story collection. For ten points each:

[10] Name this 16th century collection of novels about the adventures of two giants. The first title character is the father of the second title character, who becomes friends with Panurge and journeys with him to the Oracle of the Holy Bottle.

ANSWER: *The Life of* **Gargantua and Pantagruel** [accept ***La vie de Gargantua et de Pantagruel***]

[10] The stories of *Gargantua and Pantagruel* were written by this medieval French author, who published his first book under the pseudonym, Alcofribas Nasier.

ANSWER: Francois **Rabelais**

[10] The carnivalesque and grotesque aspects of *Gargantua and Pantagruel* were analyzed in *Rabelais and His World*, a work of literary criticism by this Russian thinker, who also coined the term "heteroglossia".

ANSWER: Mikhail Mikhailovich **Bakhtin**

<RP>

4. Bonus: The human eye has many parts with many functions. For ten points each:

[10] This light-sensitive tissue layer in the back of the eye contains rods and cones that convert the light reflecting off of our surroundings into neural impulses.

ANSWER: retina

[10] This region of the retina made of closely packed cones causes sharp central vision, which is helpful for activities such as driving or reading in which acuity is important. However, it is not sensitive to dim light.

ANSWER: fovea centralis

[10] In this autosomal recessive genetic disorder, nerve cells progressively deteriorate due to ganglioside accumulation. It can be diagnosed by the presence of a cherry-red spot in the center of the fovea.

ANSWER: Tay-Sachs disease

<LP>

5. Bonus: Name these things which make up the universe, or at least according to philosophers. For ten points each:

[10] The Pythagoreans claimed that this thing was first thing that existed. The idea that these things were an elementary particle was adopted and developed by Gottfried Leibniz, who wrote a book titled after them.

ANSWER: monads

[10] Democritus claimed that these things were actually the elementary particles, and that they made up the universe, and the space between them was known as the “void.” Its name comes from the Greek word for indivisible.

ANSWER: atoms

[10] This other ancient Greek philosopher and author of *On Nature* claimed that fire was actually the fundamental element of the universe. He was known as the “weeping” philosopher, in contrast to Democritus, the “laughing” philosopher.

ANSWER: Heraclitus of Ephesus

<MS>

6. Bonus: This body of water receives the Don river and is separated from its parent by the Taman and Crimean peninsulas. For ten points each:

[10] Name this body of water separated from the Black Sea by the strait of Kerch.

ANSWER: Sea of Azov

[10] The Don is connected by a namesake Canal to this longest river of Europe.

ANSWER: Volga River

[10] The Volga eventually empties into this endorheic basin which is actually the largest lake in the world.

ANSWER: Caspian Sea

<HR>

7. Bonus: Name these famous saxophonists, for ten points each:

[10] This man’s style was described as “sheets of sound” and his albums include *Giant Steps* and *A Love Supreme*.

ANSWER: John Coltrane

[10] This saxophonist and performer of Ornithology was a pioneer of bebop jazz known as “The Bird”

ANSWER: Charlie Parker

[10] This performer of “Lonely Woman” on *The Shape of Jazz to Come* was an early proponent of free jazz.

ANSWER: Ornette Coleman

<ES>

8. Bonus: To mimic the circular Aztec calendar, this poem begins and ends with the same 6 lines. For ten points each:

[10] Name this poem that begins by talking about a “willow of crystal, a poplar of water, a pillar of fountain by the wind drawn over.” Because the Earth lines up with Venus every 584 days, this poem has 584 lines.

ANSWER: Sunstone [or Piedra de Sol]

[10] This author of “Sunstone” claimed that “Solitude is the profoundest fact of the human condition” in his *The Labyrinth of Solitude*. He also defends the importance of poetry in his *The Bow and the Lyre*.

ANSWER: Octavio Paz

[10] Octavio Paz is an author from this country, which is also the setting of *The House on Mango Street* by Sandra Cisneros as well as Graham Greene’s *The Power and the Glory*.

ANSWER: Mexico

<MS>

9. Bonus: A famous photograph taken at this location by Jeff Widener shows a man with a shopping bag standing in front of a line of tanks. For ten points each:

[10] Name this location in Beijing, the site of violent protesting in 1989, where students demanded for democracy and freedom of speech.

ANSWER: Tiananmen Square

[10] The Tiananmen Square riots were suppressed by this “paramount leader” of the Communist Party who began a liberalization movement in China.

ANSWER: Deng Xiaoping

[10] Deng Xiaoping enacted this man’s Four Modernizations to rejuvenate China’s economy. This first Premier of China met secretly with Henry Kissinger during Nixon’s visit to China, and after his death, Deng was placed under house arrest.

ANSWER: Zhou Enlai

<RP>

10. Bonus: The 969 movement is active in this country. For ten points each:

[10] Name this Southeast Asian country whose current president, Htin Kyaw, replaced Thein Sein in March 2016. This country’s capital became Naypyidaw in 2006, replacing Rangoon.

ANSWER: Myanmar [also accept Burma or Republic of the Union of Myanmar]

[10] This 1991 Nobel Peace Prize winner was under house arrest for roughly 15 years. She is currently the State Counsellor of Myanmar and leader of the National League for Democracy.

ANSWER: Aung San Suu Kyi

[10] Aung San Suu Kyi has faced criticism for ignoring the persecution of this Muslim Indo-Aryan ethnic group in Myanmar, which has been persecuted from Buddhists across the country. Thousands of these people mass migrated from Myanmar to other Southeast Asian countries in 2015.

ANSWER: Rohingyas

<AG>

11. Identify some artists who created famous depictions of horses, for ten points each:

[10] This Swiss artist from the late 18th century painted a black horse poking its head out of some curtains to see an incubus sitting on a sleeping woman in *The Nightmare*.

ANSWER: Henry **Fuseli**

[10] This American artist specialized in his works depicting the Old American West. His bronze sculptures *The Scalp* and *Bronco Buster* both depict a cowboy and horse.

ANSWER: Frederic **Remington**

[10] Four horses run in synchronization and neither of their hooves touch ground in this Frenchman's work *The 1821 Derby at Epsom*. In addition to his other paintings featuring horses, this man is most famous for *The Raft of the Medusa*.

ANSWER: Theodore **Gericault**

<RP>

12. Bonus: Phenolphthalein is often used as an indicator in this process. For ten points each:

[10] Name this technique where a buret delivers a volume of solution with known concentration into the analyte in order to find the concentration of the analyte.

ANSWER: acid-base **titration**

[10] The solution with known concentration, the titrant, is dropped into the analyte until it completely reacts at this point, which is marked by an indicator.

ANSWER: **equivalence point** (also accept **stoichiometric point**)

[10] When a base and an acid react, they undergo this process, which results in the formation of a salt and water.

ANSWER: **neutralization**

<AG>

13. Bonus: Name these Shakespeare plays. For ten points each:

[10] This comedy is performed for the drunkard Christopher Sly and centers around Petruchio's attempts to control his wife Katherina, who represents the title animal.

ANSWER: **Taming of the Shrew**

[10] Shakespeare's recurring character Falstaff appears as a central figure in this comedic play, in which he fails to court the wealthy Mistresses Page and Ford with love letters.

ANSWER: *The* **Merry Wives of Windsor**

[10] This Shakespearean tragedy is set in Rome and follows the life of Caius Marcius, the title Roman general, who is eventually killed by Aufidius for betraying the Volscians.

ANSWER: *The Tragedy of* **Coriolanus**

<RP>

14. Bonus: Answer some questions about memes that became popular in the summer of 2016. For ten points each:

[10] After a three-year old boy climbed into his enclosure, this Western lowland gorilla tried to protect him, but was shot dead by a zookeeper from the Cincinnati Zoo. His death spurred an era of memes.

ANSWER: **Harambe**

[10] This meme is based off of an aardvark that titles a PBS Kids show. Memes of this character show him making incestuous suggestions to his sister D.W. and clenching his fist in anger.

ANSWER: **Arthur**

[10] Arthur was not the only animated TV character who became a meme. Pacha, one of the stars of this Disney show, also appeared in many memes, often exhibiting a face of satisfaction and forming a perfect symbol with his fingers.

ANSWER: The **Emperor's New Groove**

<RP>



15. Bonus: Answer the following about Mahayana Buddhism, for ten points each:

[10] Buddhists of the Mahayana sect believe that these figures left nirvana in order to guide others on the path to enlightenment. The sanskrit names of these figures translates roughly to “beings of spiritual awakening”.

ANSWER: **Bodhisattvas**

[10] The oral teachings of the Buddha are often recorded as sutras in the Mahayana sect, and one of the most popular sutras is named after this aquatic flower, which is also the national flower of India.

ANSWER: **Lotus** flower

[10] The Lotus sutra includes an upaya parable about a father who believes that he is not guilty of falsehood when he uses bejeweled animal carriages to lure his sons out of a house with this condition.

ANSWER: **burning** [accept **on fire** or other synonyms]

<RP>

16. Bonus: The creator of these constructs painted them on a van. For ten points each:

[10] Name these representations of subatomic particles’ behavior created by a Caltech physicist. In them, electrons are represented as solid lines, and photons are represented by wavy lines.

ANSWER: **Feynman diagrams**

[10] As opposed to regular particles, Feynman diagrams represent these types of particles as going backwards in time. These particles have the same mass as their associated particles, but negative charge.

ANSWER: **antiparticle** [accept **antimatter**]

[10] This process occurs when a particle and an antiparticle collide. When an electron and a positron perform this process, they create two photons.

ANSWER: **annihilation**

<MS>

17. Bonus: At the end of this novel, the protagonist’s corpse is placed at the altar of the cathedral he once built with Don Antonio Olivares. For ten points each:

[10] Name this novel about Jean Marie Latour’s efforts to spread Catholicism in New Mexico.

ANSWER: **Death Comes for the Archbishop**

[10] In this other novel by the author of *Death Comes for the Archbishop*, the Swedish immigrant Alexandra Bergson marries Carl Linstrum after her younger brother, Emil, is killed.

ANSWER: **O Pioneers!**

[10] *Death Comes for the Archbishop* and *O Pioneers!* are both books by this author, whose Great Plains trilogy also includes *My Antonia*.

ANSWER: Willa **Cather**

<RP>

18. Bonus: Name these Mesoamerican civilizations. For ten points each:

[10] Archaeologists have discovered rubber artifacts which indicate that this civilization may have been the first to play the sacrificial ballgame, but they are best known for their iconic basalt statues of heads, which weigh several tons.

ANSWER: **Olmec**

[10] Like the Olmecs, these ancient people of Peru are well known for their works of art. These people created several “trophy heads” as well as namesake “lines” in the desert, which could be seen in their entirety from surrounding hills.

ANSWER: **Nazca**

[10] This civilization, that was centered on the Yucatan peninsula, created a calendar that predicted the end of the world to be on December 21, 2012, and built the city of Chichen Itza.

ANSWER: **Maya**

<RP>

19. Bonus: When the vectors  $a$  and  $b$  are perpendicular, this function of  $a$  and  $b$  is equal to 0. For ten points each:

[10] Name this vector operation that takes two vectors  $a$  and  $b$  and returns the scalar  $a$  times  $b$  times the cosine of the angle between them. This function is also defined as the sum of the product of the corresponding components of the two vectors.

ANSWER: **dot product** [or **scalar product**, **inner product**, **projection product**]

[10] This inequality states that the magnitude of the vector  $a$  times the magnitude of the vector  $b$  is greater than or equal to the dot product of  $a$  and  $b$  squared. Holder's inequality is a generalization of this inequality.

ANSWER: **Cauchy-Schwarz** Inequality [or **Cauchy-Bunyakovsky-Schwarz** Inequality]

[10] Another inequality relates the quadratic, arithmetic, geometric, and harmonic types of this quantity. The arithmetic form of this value for a set is the sum of the numbers divided by the number of numbers, and is known as the average.

ANSWER: **means**

<MS>

20. Bonus: The number 5 is equal to 101 in this base. For ten points each:

[10] Name this base of communication in computers, where numbers consist of solely 0's or 1's.

ANSWER: **binary** [also accept **base 2**]

[10] Unlike regular computers, data in these objects can be encoded such that each bit actually exists in multiple states. Shor's algorithm as well as Grover's algorithm can run on these devices.

ANSWER: **quantum computers** [do NOT accept supercomputers]

[10] Quantum computers store information in these units, which, for  $n$  bits can have more than 2 to the  $n$ th power states because they are superpositions of the 0 and 1 states.

ANSWER: **qubits** [also accept **quantum bits**]

<AG>

21. Bonus: James II was thought to have suffered a nosebleed at the start of this supposedly bloodless event. For ten points each:

[10] Name this 17th century event in which William and Mary were invited into England to overthrow James II, who was strongly disliked for his support of Catholicism.

ANSWER: **Glorious Revolution** [accept **Revolution of 1688**]

[10] Tensions against James II grew dramatically after he unexpectedly had a child with Mary of Modena. That baby became known by this name due to rumors that the child was not James's son, but was smuggled into the royal bedchamber in a specific object.

ANSWER: **warming-pan** baby (prompt on partial answer)

[10] During the Glorious Revolution this document was passed in 1689, reaffirming civil liberties like habeas corpus, and granting the parliament the right to make laws and levy taxes.

ANSWER: **Bill of Rights**

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22. Bonus: Because circles can only intersect at two points, it is impossible to draw one of these objects for four or more sets using only circles. For ten points each:

[10] Name these eponymous graphics which are used to represent the relationships between sets. One of these for two sets is usually drawn with two circles, with the area inside both circles containing the elements in both sets.

ANSWER: **Venn** diagrams [prompt on **set** diagrams or **logic** diagrams]

[10] In a Venn diagram, this operation represents the objects inside the sets but not in their intersection. It returns true when one input is true and the other is false, but not when both are the same. It is equivalent to (p or q) and not(p and q).

ANSWER: **xor** [accept **exclusive or**, do not accept or prompt on **or**]

[10] Venn diagrams can also help illustrate these two eponymous rules in logic, which state that not(A or B) equals not(A) and not(B), as well as not(A and B) equals not(A) or not(B).

ANSWER: **De Morgan's** laws

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