



The Illinois Mathematics and Science Academy of Aurora, IL presents

## IMSANITY 4

### -ROUND 10-

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## Tossups

- (1) In one novel, J.R. Isidore kills a cat because he thinks it is one of these creatures, and in a short story, Gloria Weston's dog is a bad replacement for another of them named Robbie. Phil Resch joins Rick Deckard after he is captured by these creatures in one novel, and a collection of short stories about them is linked by Susan Calvin. Helena Glory had six men fall in love with her when she came to free these creatures, and Philip K. Dick asked if they(\*) dream of electric sheep. Karl Capek originated the term for these creatures in *R.U.R.*, and Isaac Asimov wrote three laws of these beings. For ten points, identify these often mechanical creatures who were usually created to serve humans.

ANSWER: robots (accept androids)

- (2) This man noted that free government "adheres to America's soil" in his Bunker Hill Address. He represented the United States in an agreement with Britain that set the borders of Maine. He was an opponent of tariffs until he supported the Tariff of Abominations, and this namesake of a treaty with Ashburton represented his former college in(\*) *Woodward v. Dartmouth*. This statesman is noted for a speech to Robert Hayne opposing nullification titled *Liberty and Union, Now and For Ever, One and Inseparable*. For ten points, name this member of the "Great Triumvirate" with John C. Calhoun and Henry Clay, a congressman and orator from Massachusetts.

ANSWER: Daniel Webster

- (3) The rotational form of this phenomenon was discovered by Peter Debye and describes rotation of electric dipoles. The noise term appears in a special form of the Langevin equation which describes this effect. This phenomenon, a stochastic Weiner process, is modeled by an equation that calculates mean squared displacement. Described by(\*) molecular kinetic heat theory in the second Annus Mirabilis paper, it was first identified in submerged pollen grains. For ten points, give this term named for a Scottish botanist that describes the seemingly random movement of particles in fluids.

ANSWER: Brownian motion

- (4) An alternative name for the Sutej River uses this adjective. The Otter Tail and Bois de Sioux rivers are tributaries of one river of this name, and another river of this name empties into the Gulf of Tonkin after originating in the province of Yunnan. The shortest branch of the Volta River uses this adjective. One river of this name empties into Lake Winnipeg and is distinguished as the one(\*) “of the North”, while the one “of the South” forms the Oklahoma-Texas border. For ten points, give this adjective that also appears in the name of a sea between Egypt and Saudi Arabia.

ANSWER: red (accept more specific answers like Red River of the North or Red River of the South)

- (5) One of this artist’s works depicts a sad looking man sitting on a bed in front of a partially nude woman, while in another, a bright beam of sunlight shines into a red room and onto the title figure. This artist of *Excursion into Philosophy* and *Girl at Sewing Machine* depicted a fire hydrant and barber pole in a depiction of an empty street titled(\*) *Early Sunday Morning*. He showed two women sitting across a restaurant table in *Chop Suey*, but his most famous work was probably inspired by the Greenwich village and depicts a lonely cafe at night. For ten points, name this American artist of *Nighthawks*.

ANSWER: Edward Hopper

- (6) Observers of this holiday stand for the duration of its Neilah ceremony. The ritual of swinging a chicken over one’s head and then killing it is done on the eve of this holiday and is known as Kapparot. The Al Cheit and Ashamnu prayers are read during this holiday, along with the Avodah and the Tetragrammaton by the Kohen Gadol, or the High Priest. A white kittel is worn during this holiday, on which the(\*) Kol Nidre is recited. It occurs five days before Sukkot, on the tenth of Tishri. Participants are wished “tzom kal”, Hebrew for “easy fast” on this holiday. For ten points, name this Jewish day of Atonement.

ANSWER: Yom Kippur

- (7) In one work by this author, Anthony Raine destroys toll gates with the title group of *Rebecca's Daughters*. One of this man's poems says "And the unicorn evil run them through," and "Though lovers be lost love shall not; And death shall have no dominion." He wrote of Polly Garter, Captain Cat, Organ Morgan, and other residents of Llareggub, and began a poem "Now I was young and easy under the apple boughs." The author of(\*) *Under Milk Wood* and *Fern Hill* is, for ten points, which man who urged to "Rage, rage against the dying of the light" in *Do not go gentle into that good night*?

ANSWER: Dylan Thomas

- (8) Forces from this city were defeated due to a standard-bearer's hand being chopped off at the Battle of Montaperti. After defeating a nearby city, this city merged with Fiesole. The weak rule of Pietro the Unlucky ended when Charles VIII of France invaded this city. The Guelphs and the Ghibellines feuded in this city, from which Pope(\*) Clement VII came. Leonardo da Vinci worked here and the Bonfire of the Vanities occurred under the influence of Savonarola. For ten points name this Tuscan city that reached its Golden Age under the family of Cosimo and Lorenzo the Magnificent, the Medicis.

ANSWER: Florence (accept Firenze)

- (9) This body contains craters such as Menrva, Sinlap, and Guabonito. University of Idaho professor Jason Barnes has proposed a mission to study this body called AVIATR. This celestial body contains the hydrocarbon lake Ontario Lacus. It is not Triton, but this celestial body has massive tholin deposits. This body's Sotra Patera is believed to be a(\*) cryovolcano. This body has seasonal weather patterns, and rain made of methane was observed by the Huygens probe. For ten points, name this foggy moon, the largest of Saturn and the second largest in the solar system.

ANSWER: Titan (accept Saturn VI)

- (10) Stein's Algorithm computes this value recursively and runs slightly faster than another recursive algorithm that iteratively subtracts the largest possible multiple of the smaller number that is less than or equal to the larger; that latter algorithm is named for Euclid. A slower approach to computing this value is to multiply all shared(\*) prime factors with multiplicity. A fraction is in lowest terms if this value for its numerator and denominator is one. This value is equal to the product of two numbers divided by their least common multiple. For ten points, identify this largest integer by which two numbers can be evenly divided.

**ANSWER:** greatest common divisor or greatest common factor (accept gcd or gcf, accept equivalents like "highest" or "largest" in place of "greatest")

- (11) This actress was fired from a film in which her character was a mother lost in the Pacific entitled *Something's Got To Give*. This woman was the subject of a song which declared "Even when you died / Oh, the press still hounded you" by Elton John entitled *Candle in the Wind*. This actress starred alongside Jack Lemmon and Tony Curtis in(\*) *Some Like It Hot*, and in *The Seven-Year Itch*, she tempts Richard by holding her white pleated dress down while standing on a grate. For ten points, name this actress who appeared on the cover of the first issue of *Playboy* and died of a drug overdose at age 36.

**ANSWER:** Marilyn Monroe (or Norma Jean Mortensen)

- (12) In one novel by this author, Eugene Pota tries to write *A Sexual Biography of My Wife*, and this author also wrote of Bob Slocum getting his life organized after suffocating his son to death. This author of *Portrait of an Artist, as an Old Man* and *Something Happened* wrote another novel in which Albert Tappman is quarantined for urinating heavy water. The protagonist of that novel, *Closing Time*, appeared in an earlier work in which he watched(\*) Snowden die from flak, flew seventy-one missions for Colonel Cathcart, and was a member of Milo Minderbinder's syndicate. For ten points, name this author who wrote of Captain John Yossarian in *Catch-22*.

**ANSWER:** Joseph Heller

- (13) From this civilization, the Cemetery H culture developed. Notable examples of pottery from this civilization include the “Priest-King” Statue and the “dancing girl.” Bricks in this egalitarian civilization were all of uniform size, and this civilization had the first internal urban sanitation system. The home to structures such as the “Great Bath,” its downfall may include an invasion by the(\*) Aryans and the diversion of the Ghaggar Hakra river. For ten points, name this early civilization which included the settlements of Mohenjo-Daro and Harappa near its namesake river.

ANSWER: Indus Valley Civilization (accept Harappan until mention)

- (14) This man used Giacomelli’s aria *Sposa son disprezzeta* in his opera about a captured prisoner of Tamurlane and emperor of the Ottomans, *Bajazet*. J.S. Bach reworked six concertos of his work *Harmonic Inspiration*. The sections *The Sea Storm* and *The Hunt* appear in a work by this composer whose mandolin concerto in C major is often played along with another work whose first section uses forte violas to represent a(\*) barking dog. The creator of *The Contest between Harmony and Invention*, for ten points, name this Baroque composer who incorporated the movements *L’Autunno* and *La Primavera* in his *Four Seasons*.

ANSWER: Antonio Vivaldi

- (15) Necrosis of this tissue is probably caused by mycoplasma-like parasites and produces symptoms similar to Dutch elm disease. In many legumes, proteinaceous forisomes act as valves for cellular elements in this tissue. Strasburger cells associate with cells of this tissue in gymnosperms, which is supported by sclereids. Ernst Munch hypothesized that(\*) turgor pressure drives movement in this tissue, which is formed exterior to the vascular cambium. This tissue consists of companion cells that are connected to sieve-tube elements. For ten points, name this type of vascular plant tissue consisting of sieve cells and companion cells that transport sugars and which is contrasted with xylem.

ANSWER: phloem

- (16) This man argued against opposing the power of the Crown in *A Discourse on Passive Obedience*. This author discussed “ghosts of departed quantities” as a critique of Newton in *The Analyst*, and he credited “occult” qualities with causing motion in *De Motu*. He asserts that people cannot conceive of an object independent of the mind as part of his(\*) “master argument,” which appears in a work that uses Philonous to represent him arguing against Hylas. This philosopher of *An Essay Towards a New Theory of Vision* also wrote *A Treatise Concerning the Principles of Human Knowledge*. For ten points, name this Irish philosopher and namesake of a Californian university.

ANSWER: George Berkeley

- (17) This deity allowed the Jottun Hrungrnir to drink ale at the Asgard hall. Thor dressed up as this god and went to the Jottun king Thrym to get back Mjolnir. This deity had to make two teams of twenty-one ruling kings fight each other for eternity in order to retrieve an item from Odin; that item had been stolen when Loki appeared to this figure as a flea and had been given to her after(\*) she slept with four dwarves. Half of those slain go to this deity’s hall, Folkvangr, and this goddess’s chariot is driven by two cats. For ten points, name this Norse goddess of love and beauty, the sister of Freyr.

ANSWER: Freyja or Freya

- (18) One man with this name succeeded his uncle Conrad III to become Duke of Swabia. Another man with this name had the general Prince Leopold I, who fought against Sweden at Stralsund. One leader of this name acquired Swedish Pomerania in the Treaties of Stockholm, and another was opposed by the(\*) Lombard League. The ascension of one man with this name caused Peter III to exit the Seven Years’ War, and that man started the War of the Austrian Succession. For ten points, give this German name shared by a Holy Roman Emperor nicknamed “Barbarossa” and two Prussian leaders, including an “enlightened despot” with epithet “the Great”.

ANSWER: Frederick (accept Frederick Barbarossa, Frederick Wilhelm I of Prussia, Frederick Wilhelm of Brandenburg, Frederick II of Prussia, or Frederick the Great)

- (19) **The number-average degree of these entities, denoted  $X_{sub N}$ , is given by the Carothers equation, and ABN or benzoyl peroxide is implemented in the creation of these molecules in one method's initiation step. The Resin Identification System can be used to sort them, and the 2000 Nobel Prize in Chemistry was awarded for the discovery of a conductive variety of these molecules. For synthesizing these molecules from 1-alkenes, methylaluminoxane is often used with certain metallocenes in(\*) Ziegler-Natta catalysts. Commercial examples of these include styrofoam, kevlar, and plastics. For ten points, name this class of molecules composed of many repeated subunits known as monomers.**

**ANSWER:** Polymers

- (20) **In one novel by this author, the potter Cipriano Algor leaves the Center after seeing an allegory of Plato's, and in another, the title character kills all of Noah's family when they're on the ark. This author of *The Cave* and *Cain* wrote about a clerk at the Central Registry and his search for an unknown woman in *All the Names*. The priest Bartolomeu de Gusmao's attempts to build a flying machine and the Convent of Mafra appears in(\*) *Baltasar and Blimunda*. In his most famous novel, the King of Ward 3 is stabbed with a pair of scissors and the doctor's wife is the only one to not suffer from the title condition. For ten points, identify this author of *Blindness*.**

**ANSWER:** Jose (de Sousa) Saramago

- (21) **A group in this novel takes a bet to spend an hour eating in enemy territory, and Bazin eagerly awaits the day his employer joins the clergy, which is delayed by a letter from the Duchess of Chevreuse. One character pretends to be the Comte de Wardes and abuses the love of the servant Kitty. The protagonist of this novel retrieves twelve diamonds for the queen, and the protestant guard John Felton is tricked into assassinating the Duke of Buckingham. Constance Bonacieux is poisoned and a(\*) fleur-de-lis is branded on the right shoulder of Milady de Winter. For ten points, identify this Alexandre Dumas novel about the title group Athos, Porthos, and Aramis, and D'Artagnan.**

**ANSWER:** The Three Musketeers (or Les Trois Mousquetaires)



## Bonuses

- (1) This president's book *Six Crises* recounts how he and his wife were attacked by a mob in Venezuela. For ten points each:  
 [10] Name this United States President who delivered the Checkers speech. After his resignation, he was pardoned by his successor, Gerald Ford, who was his Vice president after Spiro Agnew.  
**ANSWER:** Richard Milhous Nixon  
 [10] As a congressman and member of the House Un-American Activities Committee, Nixon played a role in the investigation of this lawyer who was suspected of being a Communist and a spy. Evidence against this man included the "pumpkin papers."  
**ANSWER:** Alger Hiss  
 [10] During the 1950 campaign for California's senate seat, Nixon claimed that his opponent, Helen Douglas, was this color down to her underwear, referring to her communist leanings.  
**ANSWER:** pink
- (2) The narrator is annoyed when the title character shouts in Bohemian instead of using English to warn him about a giant snake, though he does succeed in bludgeoning it to death. For ten points each:  
 [10] Identify this novel about Jim Burden and the title Shimerda girl in Black Hawk, Nebraska.  
**ANSWER:** My Antonia  
 [10] *My Antonia* was a work by this Nebraskan author, who wrote about Carl Linstrum and Alexandra Bergson in *O Pioneers*.  
**ANSWER:** Willa Sibert Cather  
 [10] Willa Cather also wrote this novel in which Thea Kronborg leaves Moonstone, Colorado to become a pianist and later an opera singer.  
**ANSWER:** The Song of the Lark
- (3) This late Bauhaus teacher equated life to a giant pyramid in his *Concerning the Spiritual in Art*. For ten points each:  
 [10] Name this Russian painter of several *Improvisations* and *Compositions* whose painting of a figure on a white horse named an artistic movement.  
**ANSWER:** Wassily Wassilyevich Kandinsky  
 [10] This is the painting that inspired Kandinsky's movement, as well as the name of that movement which included Paul Klee.  
**ANSWER:** The Blue Rider (accept plural)  
 [10] In this Kandinsky *Improvisation*, a ship with a green mast fires a cannon ball at a blue-masted ship in an orange body of water.  
**ANSWER:** Sea Battle or Improvisation 31

- (4) This value is multiplied by temperature and three halves to give the average kinetic energy of a gas molecule. For ten points each:  
 [10] Name this constant, usually represented  $k$  sub  $B$ , that is equal to the ideal gas constant divided by Avogadro's number.  
**ANSWER:** Boltzmann's constant  
 [10] A formula on Ludwig Boltzmann's tomb states that the statistical form of this value is equal to the Boltzmann constant times the logarithm of the number of microstates. This value is the subject of the Second Law of Thermodynamics.  
**ANSWER:** entropy  
 [10] In statistical mechanics, this term describes an imaginary collection of repeated systems with specific conditions. The canonical form of this system holds the condition of constant temperature in order to calculate entropy.  
**ANSWER:** ensemble
- (5) With John Donohue, he wrote about the effects of *Roe v. Wade* in *The Impact of Legalized Abortion on Crime*. For ten points each:  
 [10] Name this contemporary American economist who examined cheating in sumo wrestling and inequities in real estate prices in his 2005 collaboration with Stephen J. Dubner, *Freakonomics*.  
**ANSWER:** Steven D(avid) Levitt  
 [10] This other American economist rejected Keynesianism in favor of monetarism with his namesake " $k$ -percent rule", which appeared in his collaboration with his wife Anna Schwartz, *A Monetary History of the United States*.  
**ANSWER:** Milton Friedman  
 [10] Both Steven Levitt and Milton Friedman, along with Friedrich Hayek, were employed by this university, the namesake of a "freshwater school" of economics.  
**ANSWER:** University of Chicago
- (6) Linear approximation utilizes these objects. For ten points each:  
 [10] Name this type of line which locally touches a given function at a single point of intersection. For circles, these lines are perpendicular to radii.  
**ANSWER:** tangent line  
 [10] This type of infinite series, named for an English mathematician, generalizes tangent lines to higher-degree polynomials. The special case in which they are expanded around zero is known as Maclaurin series.  
**ANSWER:** Taylor series  
 [10] The denominator of the  $k$ th term of a Taylor series is this function of  $k$ . This function gives the  $k$ th derivative of  $x$  to the  $k$  power.  
**ANSWER:**  $k$  factorial

- (7) This character had to kill nine sea monsters, causing him to lose a swimming contest, and later becomes king of the Geats. For ten points each:  
[10] Identify this hero, friend of Hrothgar and owner of Hrunting, who died killing a dragon.  
**ANSWER:** Beowulf  
[10] Beowulf achieved fame killing this creature and its mother. In another work named for this character, he talks with a dragon, philosophizes, and is mistaken by Ork for a god.  
**ANSWER:** Grendel  
[10] *Grendel* is a novel by this American author whose other works include a novel about the siblings Sally Abbott and James Page, *October Light*, and novel about the police chief Fred Crumly, *The Sunlight Dialogues*.  
**ANSWER:** John Champlin Gardner Jr.
- (8) Along with Pelé, he was named FIFA Player of the 20th Century. For ten points each:  
[10] Name this midfielder who signed record-setting contracts with FC Barcelona and Napoli. He led his home country to the FIFA World Cup title in 1986 after scoring the “Hand of God” goal and the “Goal of the Century” against England.  
**ANSWER:** Diego Maradona  
[10] Diego Maradona played for this country’s international team in addition to coaching that team from 2008 to 2010. This country won the 1978 World Cup on its home soil.  
**ANSWER:** Argentina (or Argentine Republic)  
[10] In the 1978 World Cup, Argentina edged this country’s team in the semifinals. This country has won more World Cups than any other and will host the 2014 World Cup and 2016 Olympic Games.  
**ANSWER:** Brazil (or Federative Republic of Brazil)
- (9) Bill Clinton stated that “[this agreement] means jobs. American jobs, and good-paying American jobs. If I didn’t believe that, I wouldn’t support this agreement”. For ten points each:  
[10] Name this trilateral treaty between the countries of North America which reduced tariff barriers, initially sponsored by George H. W. Bush.  
**ANSWER:** NAFTA or North American Free Trade Agreement  
[10] This third party candidate in the 1992 Presidential Election said that NAFTA would lead to a “giant sucking sound,” because of all of the jobs that would be lost to Mexico. He carried nearly 19 percent of the popular vote but won no electors.  
**ANSWER:** Ross Perot  
[10] NAFTA removed some of the provisions of the Mexican constitution made by this leader, a figure in the Mexican Revolution against Porfirio Díaz and leader of the Army of the South.  
**ANSWER:** Emiliano Zapata

- (10) This figure's namesake paradox comes from a story where his ship was replaced with several new boards. For ten points each:  
 [10] Name this Greek hero, who killed all of the sons of Pallas in addition to the Crommyonian Sow. With the help of a ball of string, he slayed the Minotaur.  
**ANSWER:** Theseus  
 [10] Theseus moved a boulder which held underneath a sword and sandals belonging to this man, his father. This king of Athens committed suicide by drowning in the sea after Theseus failed to switch the colors of his sail when returning.  
**ANSWER:** Aegeus  
 [10] While traveling to Athens, Theseus killed this bandit, who used pine trees to catapult his victims into the air. Theseus later had sex with this robber's daughter, Peregrine, who bore Melanippus.  
**ANSWER:** Sinus (also accept Pityocamptes)
- (11) The premiere of this man's semi-autobiographical film *Limelight* led to his twenty year exile from the United States. For ten points each:  
 [10] Name this mustachioed "tramp" who starred in and directed the silent films *Modern Times* and *The Kid*.  
**ANSWER:** Sir Charles Spencer "Charlie" Chaplin  
 [10] In this Chaplin film, the first in which he spoke, a Jewish barber is mistaken for Adenoid Hynkel, the leader of Tomainia. Chaplin delivers a speech declaring democracy and an end to antisemitism in this film satirizing Hitler's Nazi regime.  
**ANSWER:** The Great Dictator  
 [10] This comedic actor got his start with silent films, and led the country of Freedonia in *Duck Soup*. This host of *You Bet Your Life* is the namesake of a disguise involving a large nose and a bushy mustache. He performed a Charleston on Hitler's bunker in 1958.  
**ANSWER:** Julius Henry Marx or Groucho Marx (prompt on "Marx" and accept any correct more specific response)
- (12) Pedro Opazo served in this position for only one day. For ten points each:  
 [10] Name this position in which the holder rules from La Moneda. Ricardo Lagos and Ramon Freire have held this title, while Operation FUBELT attempted to oust one holder of it.  
**ANSWER:** President of Chile (accept equivalents)  
 [10] Operation FUBELT was a CIA initiative to prevent this man from becoming President of Chile. He was overthrown in a coup d'etat in 1973 and committed suicide.  
**ANSWER:** Salvador Allende Gossens  
 [10] This military leader replaced Allende and has been Chile's longest-serving President. He was advised by the Chicago Boys.  
**ANSWER:** Augusto Pinochet Ugarte

- (13) Certain Van de Graaff generators utilize this effect to generate charge. For ten points each:  
 [10] Name this effect in which adhesion between two materials being rubbed together produces a charge separation.  
**ANSWER:** triboelectricity  
 [10] Triboelectricity is one source for this form of electricity which sees separation of charges without movement in the form of a current. This type of charge is created from the contact and separation of two materials, one of which is a strong insulator.  
**ANSWER:** static electricity  
 [10] This term refers to any means by which electric charges are separated. In contrast to conduction, in this process, the charged material never touches the other material.  
**ANSWER:** electrostatic induction
- (14) This piece was the first part of a project involving Austrian composers such as Carl Czerny and Johann Hummel. For ten points each:  
 [10] Name this work for piano consisting of thirty-three variations written by Ludwig van Beethoven.  
**ANSWER:** The Diabelli Variations  
 [10] *The Diabelli Variations* were based on a work in this style. This form originates from the Ländler folk dance, and works in this style include *Tales from the Vienna Woods* and *The Blue Danube* by this style's "king", Johann Strauss.  
**ANSWER:** waltz  
 [10] This composer of the *Mephisto* waltzes and non-Austrian collaborator of Diabelli included *Feux Follets* and *Mazeppa* in his *Transcendental Études*.  
**ANSWER:** Franz Ritter von Liszt (or Liszt Ferenc)
- (15) "One shade the more, one ray the less / Had half impaired that nameless grace / Which waves in every raven tress / Or softly lightens o'er her face." For ten points each:  
 [10] Identify this poem, where the title figure has "all that's best of dark and bright / Meets in her aspect and her eyes" and "a heart whose love is innocent" and is compared to the night "Of cloudless climes and starry skies."  
**ANSWER:** She Walks in Beauty  
 [10] *She Walks in Beauty* is a work by this poet, who described a man who was seduced by Donna Julia, among others, in his unfinished *Don Juan*.  
**ANSWER:** George Gordon Byron or Lord Byron  
 [10] Lord Byron wrote this poem, which describes the title event when "Pale grew thy cheek, and cold; / Colder thy kiss" and concludes "How should I greet thee? / With silence and tears."  
**ANSWER:** When We Two Parted

- (16) Men are only allowed to wear the ihram during this event, which includes drinking from the Zamzam Well and circling the Kaaba seven times. For ten points each:  
 [10] Name this pillar of Islam, a pilgrimage to Mecca that all able Muslims must do at least once.  
**ANSWER:** Hajj  
 [10] At the end of Hajj, Muslims celebrate this holiday, which commemorates the willingness of Abraham to sacrifice his son. During it, a goat or cow is slaughtered, and one-third of it is given to friends and another one-third to the poor.  
**ANSWER:** Eid-Al-Adha (prompt on Eid and do not accept “Eid-Al-Fitr”)  
 [10] After collecting seventy pebbles at Mina or at the Muzdalifah plain, pilgrims fling the pebbles at these structures in a rite called “Stoning the Devil”.  
**ANSWER:** walls or Jamarat (also accept Jamrah)
- (17) The sum of these numbers for a fixed value of  $n$  is 2 to the  $n$  power. For ten points each:  
 [10] Identify these numbers given by “ $n$  choose  $k$ ”. The name for these numbers is derived from the fact that they are multiplied by  $x$  to the  $k$  times  $y$  to the  $n - k$  in a namesake theorem.  
**ANSWER:** binomial coefficients  
 [10] The binomial coefficients are the entries in one of these shapes named for Pascal. Binomial coefficients of the form “ $n$  choose 2” are numbers named for this shape.  
**ANSWER:** triangle  
 [10] The sum of this power of the first  $n$  integers is the square of the  $n$ th triangle number.  
**ANSWER:** cube or third power
- (18) People of Abrahamic faiths have killed each other in massive quantities during the last century. For ten point each, answer the following questions on genocides:  
 [10] The Committee of Union and Progress in Turkey ordered the genocide of people of this ethnicity. Today, these people largely live in a nation with capital Yerevan, which was the first country to adopt Christianity.  
**ANSWER:** Armenians  
 [10] The Armenian genocide created a precedent for the Holocaust and the Final Solution, which was conceived by this man. This Nazi leader led the SS, and his attempted surrender to the Allies caused Hitler to order him arrested.  
**ANSWER:** Heinrich Himmler  
 [10] In more recent years, the Balkans experienced genocide under the Serbian Slobodan Milosevic. Muslims of this Bosnian silver-mining town were massacred by forces under Ratko Mladic, and U.N. peacekeepers in this city notably did not confront Mladic.  
**ANSWER:** Srebrenica

- (19) These cells are affected by the poliovirus and contain axons and dendrites. For ten points each:
- [10] Name these cells, the core cells of the vertebrate nervous system.  
**ANSWER:** neurons (do not prompt on or accept “nerve cells”)
- [10] Some neurons are covered by a specialized sheath made of this substance. This substance can be composed of Schwann cells or oligodendrocytes.  
**ANSWER:** myelin
- [10] Myelin is attacked by the body’s own cells in this autoimmune disease, which causes various neurological and physical disabilities such as fatigue, dizziness, and muscle spasms.  
**ANSWER:** Multiple Sclerosis (or MS)
- (20) In this novel, Ogier P. attempts to learn everything by reading every book in a library in alphabetical order, earning him the nickname the “self-taught man.” For ten points each:
- [10] Identify this novel in which Anny rejects Antoine Roquentin, who experiences the title phenomenon.  
**ANSWER:** Nausea (or La Nausé)
- [10] *Nausea* is a novel by this existential author, who wrote about Garcin, Ines, and Estelle trapped together in a room furnished in the style of the Second Empire in *No Exit*.  
**ANSWER:** Jean-Paul Sartre
- [10] Sartre wrote this retelling of *The Oresteia*, in which Zeus reveals that once men realize they are free, the gods have no power over them.  
**ANSWER:** The Flies (or Les Mouches)
- (21) One of these termed “di-ethyl” was once used as an anesthetic, and their crown variety is used in phase transfer catalysis. For ten points each:
- [10] Name these organic compounds that contain an oxygen atom connected to two alkyl groups. They are synthesized in a process named for Williamson or by the dehydration of alcohols.  
**ANSWER:** ether
- [10] These reagents, which add alkyl groups to carbonyl compounds, must be stored in ether because they react with water. They also react with gaseous oxygen and acid to give peroxides.  
**ANSWER:** Grignard reagents
- [10] Grignard reagents are formed by the reaction of alkyl halides with this metal in etheral solvent. This metal must be stripped of its oxide coating for it to react, and ribbons of it are commonly lit to produce bright white light.  
**ANSWER:** magnesium