



Illinois Masonic Academic Bowl  
2014 Sectional Tournament

Round # 1  
1<sup>st</sup> Section  
Toss-up Questions

**Question #1: Science – Biology**

*10 points*

These organs can grow a calcified lesion called a **Ghon's [gons]** complex, and the presence of several **cysts [sists]** on these organs is called honeycombing. One of these has a lingula, and these organs contain Clara cells and a cardiac notch. In humans, these organs consist of three right lobes and two left lobes, and these are surrounded by **pleura [PLOO-ruh]**. Name these organs just below the **trachea [TRAY-kee-uh]** which contain **alveoli [al-vee-OH-lie]** that exchange carbon dioxide and oxygen during respiration.

**lungs**

**Question #2: Literature – British Literature**

*10 points*

After this person gave a lecture following a massacre, he was moored in China by his nephew. After his ship was captured by Turkish pirates, this character ended up a slave in **Sallee [sah-LAY]** in what is now Morocco for a time until he escaped with Ismael and Xury. After discovering a group of cannibals from their leftovers, this character shot at them and saved a prisoner, whom he renamed Friday. Name this castaway and subject of a Daniel Defoe novel.

**Robinson Crusoe** (accept either)



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**Question #3: Social Studies – U.S. History**

*10 points*

Invoking “the considerable judgment of mankind, and the gracious favor of Almighty God,” this document included a clause allowing those affected and “of suitable condition” to join the armed forces. This document included exceptions for the city of New Orleans and all of West Virginia. News reaching Galveston, Texas that this document was going to be enforced became the inspiration for the Juneteenth holiday. Name this decree issued on January 1<sup>st</sup>, 1863, which freed all slaves held in Confederate states.

The Emancipation Proclamation

**Question #4: Miscellaneous – Pop Culture**

*10 points*

On this show, one character is able to recognize a quote from Man of La Mancha, while two superiors both compared themselves to Don Quijote [kee-HOE-tay]. In the “Greater Fool” episode of this show, the “sorority girl” from the pilot returns seeking an internship. That pilot opened with a forum at Northwestern where the protagonist claimed that America was no longer the greatest country in the world. Name this HBO drama starring Jeff Daniels as news anchor Will McEvoy and written by Aaron Sorkin.

The Newsroom



**Question #5: Literature – Mythology**

*10 points*

This god broke a goblet by throwing it at **Hymir's** [HIGH-mir's] head, and he followed that act by carrying a cauldron that was a mile deep. This god tricked Alvis into being petrified so that Alvis would not marry this god's daughter **Thrud** [throod]. This son of Jord lost in combat to old age personified as Elli. Grid warned this god about a trap, and aided him in the subsequent battle with **Geirrod** [gayr-RODE]. That trap involved attacking this god when he did not have his magic belt **Megingjoro** [meh-geeng-YOE-ro] and his magic hammer **Mjolnir** [MOLE-nir]. Name this Norse thunder god.

Thor

**Question #6: Science – Astronomy**

*10 points*

Two of these objects, including Grigg-**Skjellerup** [SKEL-leh-rupp], were closely approached by the **Giotto** [JOE-toe] probe. Twenty-one of these objects were discovered by Wilhelm Tempel. The scientific names of one of these bodies uses the letter P if it is periodic or D if it no longer exists. One series of these was named Shoemaker-Levy. Long-period examples are believed to originate in the Oort cloud. When these objects pass near the Sun, they often get dust or plasma tails. Name these objects, the most famous of which is Halley's.

comets



### Question #7: Mathematics – Probability

10 points per part

This arrangement shows all of the possible values of the combination operation.		
1	Name this arrangement in which each number equals the sum of the number above and to the left of it with the number above and to the right of it.	<u>Pascal's triangle</u>
2	One of the rows of Pascal's triangle begins with a one and a four on the left and ends with a four and a one on the right. What number is in the middle of that row?	<u>6</u>
3	Possibly using that row, find the probability of getting exactly two heads if you toss a fair coin four times. Simplify your answer.	<u>3/8</u> (or <u>0.375</u> )

### Question #8: Mathematics – Probability

10 points per part

This operation is used if you are selecting objects from a group, and the order of selection matters.		
1	Name this operation often contrasted with combination.	<u>permutations</u>
2	This function gives the same result as taking the permutation of a number with itself.	<u>factorial</u>
3	If three digits are selected at random without repeats allowed, what is the probability that the first digit is a seven, the second digit is a nine, and the third digit is a two?	<u>1/720</u>



**Question #9: Social Studies – Psychology**

*10 points per part*

His start in psychology came as a designer of French versions of <b>Binet</b> [bih-NAY] intelligence tests.		
<b>1</b>	Name this Swiss developmental psychologist whose system used four discrete stages of development in children.	Jean <b><u>Piaget</u></b>
<b>2</b>	During this first of <b>Piaget's</b> [pee-ah-jays] stages of development, which lasts from birth until around two years, a child learns object permanence while maintaining an egocentric view of its environment.	<b><u>sensorimotor</u></b>
<b>3</b>	Piaget's theories have been used in this field, abbreviated A.I., which has the goal of designing machines that can reason, learn, and use human languages.	<b><u>Artificial Intelligence</u></b>

**Question #10: Social Studies – Psychology**

*10 points per part*

After Number 819 was released, a group of this experiment's participants chanted that he caused their cells to be messes.		
<b>1</b>	Name this experiment in which a group of men were emasculated and given little sensory stimulation. It was conducted by Philip Zimbardo.	<b><u>Stanford</u></b> prison experiment
<b>2</b>	During the experiment, one particularly sadistic guard on the night shift was nicknamed after this movie star.	John <b><u>Wayne</u></b> (prompt on "Marion Morrison" due to context)
<b>3</b>	The experiment was conducted at Stanford University in this U.S. state.	<b><u>California</u></b>



### Question #11: Literature – World Literature

10 points per part

The gypsy <b>Melquiades</b> [mehl-KEE-ah-dehs] makes annual visits to this fictional town.		
1	Melquiades wrote a Sanskrit manuscript of this town's past and future. Its founder was Jose Arcadio Buendia.	<u><b>Macondo</b></u>
2	Macondo is the setting of this author's novel <i>One Hundred Years of Solitude</i> , as well as <i>Leaf Storm</i> .	Gabriel <u><b>Garcia-Marquez</b></u>
3	The town of Macondo is found within this nation. <i>No One Writes to the Colonel</i> was based on the history of this nation, the home of Gabriel Garcia-Marquez.	<u><b>Colombia</b></u>

### Question #12: Literature – World Literature

10 points per part

In this novel, Pangloss is a teacher of <b>metaphysico-theologo-cosmolonigology</b> [meh-tah-FIH-sih-koe thee-uh-LOE-goe kos-moe-lah-nih-GAH-lah-jee] and a devotee of <b>Leibniz</b> [LIBE-niz].		
1	Name this novel in which the protagonist declares that each individual must cultivate one's own garden.	<u><b>Candide</b></u>
2	<b>Candide</b> [kan-deed] was written by this author, who frequently used the turn of phrase "crush the infamous thing." He was imprisoned for almost a year for satirizing King Louis the Fourteenth.	<u><b>Voltaire</b></u> (accept Francois-Marie <u><b>Arouet</b></u> )
3	While fleeing from Jesuit missionaries, Candide and Cacambo discover this utopia, where gold is referred to as "yellow mud." Candide utilizes precious stones and gold gathered here to pay <b>Cunegonde's</b> [koon-uh-gond's] ransom.	El <u><b>Dorado</b></u>



### Question #13: Science – Physics

10 points per part

This force is caused by the motion or spin of charged particles, usually electrons.		
1	Name this force that is paired with electricity to make one of the four fundamental forces.	(electro) <u>magnetism</u> (accept word forms)
2	This S.I.-derived unit of magnetic flux density is used to measure the strength of magnetic fields. It is equivalent to a weber per square meter.	<u>teslas</u>
3	This constant equal to four pi times ten to the negative seven henries per meter for a vacuum measures the ability of a material to support a magnetic field.	<u>permeability</u> of free space (accept <u>mu</u> naught)

### Question #14: Science – Physics

10 points per part

Three of these particles combine to form a <b>hadron</b> [HAY-dron].		
1	Name these fundamental particles that come in six flavors.	<u>Quarks</u>
2	The first generation quarks are up and down. The second generation quarks are charm and strange. This is the name of the two third generation quarks.	<u>top</u> and <u>bottom</u> (either order without prompting)
3	For all six quarks, this value equals one-third. This value equals negative one-third for all anti-quarks, and this number is always conserved or converted to lepton numbers.	<u>baryon</u> number(s)



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**Question #15: Fine Arts – Art History**

10 points

One work by this painter shows Jesus holding a crystal sphere in his left hand with his fingers crossed in his right hand. That work, which was rediscovered in 2011, is known as *Savior of the World*, or *Salvator Mundi* [MOON-dee]. Another work by this artist, showing Cecilia Gallerani holding a white animal, is known as *Lady with an Ermine* [ER-min]. Another work by this artist was inspired by a first century BC architect and shows a man inside a square and a circle. Name this painter who portrayed the wife of Francesco [frah-CHES-koe] del Giocondo [joe-KON-doe] in his *Mona Lisa*.

Leonardo da Vinci (accept either underlined part)

**Question #16: Social Studies – World History**

10 points

This political group was responsible for the 2001 destruction of a large Buddha statue at Bamiyan [bahm-yahm]. At this group's height of power, its leader took a title meaning "commander of the faithful" and subsequently donned a cloak said to have belonged to Muhammad. That leader, Mullah Omar, lost an eye fighting against the Soviets. Name this group of militant Pashtuns [pahsh-toons] fighting to regain control of Afghanistan.

Taliban (accept Taleban, prompt on "Students")





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**Question #17: Mathematics – Math Concepts**

*10 points*

The midpoints of the sides of any quadrilateral can be connected to form this type of quadrilateral. This is the least restrictive designation for which either diagonal of a quadrilateral splits it into two congruent triangles and for which the diagonals bisect each other. Its area can be found from a cross product. This shape's opposite angles are congruent, and its adjacent angles are supplementary. Name this quadrilateral, special cases of which include a rectangle or a rhombus.

parallelograms

**Question #18: Literature – U.S. Literature**

*10 points*

One character in this novel becomes the vice shah of Oran and caliph of Baghdad. In this novel, Generals Peckem and Dreedle differ on what formations should be employed. Set primarily on the island of Pianosa [pee-ah-NOE-sah], this focuses on the 256<sup>th</sup> squadron, which includes petty officer Milo Minderbinder and pilot John Yossarian. Name this novel by Joseph Heller whose name is synonymous with an impossible situation.

Catch-22



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**Question #19: Science – Chemistry**

10 points

The discovery of oxygen by Carl **Scheele** [SHAY-luh] and Joseph Priestley was accomplished by heating the oxide of this element. This compound was used with salt and copper sulfate to extract silver in the patio process. This is combined with silver, tin, and copper to make dental fillings known as amalgams, though its use is controversial because of its high toxicity. Similar concerns have decreased its use in vaccines and thermometers. Name this element formerly known as quicksilver, a metal that is liquid at room temperature.

mercury (prompt on “Hg”)

**Question #20: Social Studies – Economics**

10 points

For durable goods, the long-run price elasticity of this quantity's secondary form is smaller compared to its short-run elasticity, which is always positive. When this quantity's curve shifts to the right, the market-clearing price drops. When input costs drop, a rightward shift is seen in this quantity's upward-sloping curve. Name this economic concept describing the amount of a good available in a market, often contrasted with demand.

aggregate supply



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Teamwork Questions

**Question #21: Mathematics – Algebra**

*10 points per part*

This form uses three fixed quantities to give the equation of a line.		
<b>1</b>	Name this form that is typically written as $y - y_1 = m(x - x_1)$ . [ $y - y_1 = m(x - x_1)$ ]	<u>point-slope</u> form
<b>2</b>	Find the y-intercept of the line with equation $y - 3 = 2x + 4$ .	<u>11</u> (or <u>(0,11)</u> in order)
<b>3</b>	Find the x-intercept of the same line, which once again has the equation $y - 3 = 2x + 4$ .	<u>-5.5</u> (or <u>(-5.5,0)</u> or <u>-11/2</u> or <u>-5 1/2</u> or <u>(-11/2,0)</u> or <u>(-5 1/2,0)</u> in order)

**Question #22: Mathematics – Algebra**

*10 points per part*

All of the derivatives of the smooth examples of these are continuous.		
<b>1</b>	Name these relations with the property that each input produces exactly one output.	<u>functions</u>
<b>2</b>	A function is classified as continuous at a given point if at that point its output is equal to this value.	<u>limit</u> (accept longer answers as long as the key word is limit)
<b>3</b>	If the function given by the fraction quantity $\frac{x^2+5x+6}{x+3}$ is to be made continuous, then it must be assigned this output when x equals negative 3.	<u>-1</u>



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**Question #23: Literature – British Literature**

10 points per part

This essay decries those who grow up to become thieves, go to fight in Spain, or end up in Barbados.		
1	Name this work in which it is suggested that a group of people consume their own children to ease the burden on the country.	[Note to moderator: Do not read the full name, but accept the additional information.] A <b><u>Modest Proposal</u></b> ( <i>for Preventing the Children of Poor People in Ireland From Being A Burden to Their Parents or Country, and For Making Them Beneficial to The Public</i> )
2	A <i>Modest Proposal</i> was penned by this satirist and author of <i>Battle of the Books</i> . In one novel, he wrote about a doctor who travelled to Laputa and Lilliput.	Jonathan <b><u>Swift</u></b>
3	A <i>Modest Proposal</i> was written to address the problem of overcrowding in this predominantly Catholic nation.	<b><u>Ireland</u></b>

**Question #24: Literature – British Literature**

10 points per part

This brother of Valentine advises his cousin to “borrow Cupid’s wings, and soar with them above a common bound.”		
1	Name this man who described himself as worms’ meat after being stabbed in a duel and shouting, “A plague o’ both your houses!”	<b><u>Mercutio</u></b>
2	Mercutio was stabbed by this member of the Capulet family.	<b><u>Tybalt</u></b>
3	The Capulet family feuded with the Montagues in this Shakespearean tragedy.	<b><u>Romeo and Juliet</u></b>



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**Question #25: Fine Arts – Classical/Opera**

10 points per part

This composer spent the first half of his life in Poland and the second half in France.		
1	Name this 19 <sup>th</sup> century composer who wrote almost all of his works for solo piano, including many <b>etudes</b> [ay-toods], mazurkas, and nocturnes. His etudes have been given nicknames such as <i>Black Keys</i> and <i>Winter Wind</i> .	Frederic <u>Chopin</u>
2	<b>Chopin</b> [schoe-pan] also wrote several of these pieces that are in three four time, including the “Minute”. Though these pieces were traditionally used for Austrian dances, Chopin’s were meant for concert performances.	<u>Waltzes</u>
3	Chopin also wrote several of these pieces in three four time, including the “Military”. These pieces were traditionally used for Polish dances.	<u>polonaises</u>

**Question #26: Fine Arts – Classical/Opera**

10 points per part

This composer’s collection titled <i>Images</i> includes <i>Reflections in the Water</i> and <i>Homage to Rameau</i> .		
1	Name this composer of <i>La Mer</i> .	(Claude) <u>Debussy</u>
2	This section of <b>Debussy’s</b> [day-byoo-sees] <i>Suite bergamasque</i> [sweet ber-gah-mahsk] has a title that means moonlight.	<u>“Clair de lune”</u>
3	Debussy also wrote this opera based on a <b>Maeterlinck</b> [MEH-ter-leenk] play involving Prince Golaud.	<u><i>Pelleas et Melisande</i></u>



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**Question #27: Social Studies – World History**

10 points per part

The forces that attacked this fortress only had to fight Swiss mercenaries and wounded veterans.		
1	Name this fortress used as a prison whose storming resulted in the summary execution of Bernard-Rene de Launay on July 14, 1789.	the <u>Bastille</u>
2	The storming of the Bastille was an early engagement in this overthrow of Louis the Sixteenth and Marie Antoinette.	<u>French Revolution</u> (or <u>Révolution française</u> do not accept the “Reign of Terror”)
3	Early during the French Revolution, the National Assembly approved this statement, which claimed that the aim of political association was to preserve the concepts of liberty, property, and security.	<u>Declaration of the Rights of Man and of the Citizen</u> (or <u>Déclaration des droits de l'homme et du citoyen</u> )

**Question #28: Social Studies – World History**

10 points per part

While serving as governor of Gaul, he added modern-day Belgium to the Roman Empire. As proconsul, he allegedly used strong-arm tactics to cow <u>Bibulus</u> [bi-buh-lus].		
1	Name this leader who fell out with Pompey following the death of Crassus at the hands of the Parthians.	Gaius <u>Julius</u> Caesar (prompt on “Caesar”)
2	<u>Suetonius</u> [swee-TOE-nee-us] wrote that Julius Caesar saw an apparition that convinced him to cross this river. Doing so sparked a civil war with Pompey, which Julius Caesar won.	<u>Rubicon</u>
3	Pompey subsequently fled to Egypt to evade capture, but Julius Caesar was presented with Pompey’s head upon arriving in this Egyptian city.	<u>Alexandria</u>



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**Question #29: Science – Physics**

10 points

Spin is projected onto this vector to find **helicity** [heh-LIH-sih-tee]. This quantity is equal to the derivative of a **Lagrangian** [luh-GRAHN-jee-un] with respect to velocity. Squaring this quantity and dividing by twice the mass gives kinetic energy. Newton's 2<sup>nd</sup> Law can be expressed by setting the derivative of this quantity with respect to time for constant mass systems equal to net force. The change in this quantity is equal to the impulse, and this quantity is conserved even in inelastic collisions. Name this quantity equal to mass times velocity.

(linear) **momentum**

**Question #30: Literature – World Literature**

10 points

In a story by Poe, this character encounters a creature with eighty eyes that must have moved via necromancy. This character received a wife in exchange for a saddle, but he was buried alive after she died. Nearly killed by the Old Man of the Sea, he found a large source of ivory thanks to an elephant. This character discovered diamonds of great size in a valley inhabited by large serpents on one of his trips, and this character encountered large birds called rocs. Name this character described by **Scheherezade** [sheh-HERE-uh-zahd], a sailor who went on seven voyages.

**Sindbad** the Sailor (accept **Sinbad**)



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**Question #31: Mathematics – Math Concepts**

10 points

In set theory, this number can be defined using the set that contains only zero. If a function approaches this positive value raised to infinity, then it is indeterminate. This number equals the length of each vector in an orthonormal basis. This is the only positive number that cannot be used as the base of a logarithm, and this is the only positive number equal to its own reciprocal. Name this number that is the multiplicative identity.

one

**Question #32: Social Studies – U.S. History**

10 points

This person chartered the *Oskar II* and sailed to a conference in Stockholm in an attempt to bring an end to World War One. He bankrolled the purchase of many historic buildings that ended up in Greenfield Village. He blamed war on the financial schemes of the “International Jew,” and he bought the *Dearborn Independent* in order to publish such opinions. Name this automobile tycoon who utilized the assembly line in the manufacture of the Model T.

Henry Ford





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**Extra Question #1: Literature – U.S. Literature**

10 points

Upon returning home, this character is recognized by Peter Vanderdonk. His wife died while berating a New England peddler, according to his daughter Judith. After growing a beard, this character regaled children with tales of playing ninepins with the spirits of Hendrick Hudson. Name this Washington Irving character who missed the American Revolution because he fell asleep for 20 years.

Rip van Winkle

**Extra Question #2: Fine Arts – Classical/Opera**

10 points

This composer often wrote introductory solo voice works to be played before his choral works, including *Canta in Prato* to precede his *Dixit Dominus*, and *Ostro Picta* to precede his *Gloria*. One of his operas, written a few years before a similar work by Handel, is *Orlando furioso*. He wrote a set of twelve concertos [kon-CHER-toes] which includes “La tempest di mare.” Name this composer from Venice nicknamed “The Red Priest” whose *The Contest Between Harmony and Invention* includes *The Four Seasons*.

Antonio Vivaldi



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**Extra Question #3: Science – Biology**

*10 points*

Though this group is a genus, it is within a phylum named for it that includes lobosa and conosa. The lobosa includes the tubulinea class and this genus, while the conosa includes many slime molds. The main species of this genus is the proteus, which has exactly one contractile vacuole. Name these unicellular protists that move using pseudopods, or false feet, and which often change their shape.

amoeba (or ameba)

**Extra Question #4: Social Studies – World History**

*10 points*

Per the Act of **Montevideo** [mon-tay-vee-DAY-oh], this leader was asked to mediate a conflict between Chile and Argentina. Upon reaching his highest post, this leader declared his goal of reuniting Europe “from the Atlantic to the Ural Mountains.” The target of an assassination attempt by Mehmet Ali Agca, he criticized the West for moving towards a “culture of death,” predicated by acceptance of euthanasia and abortion. Name this Polish Catholic who was elected Pope in 1978.

(Pope/Blessed) John Paul II  
(accept Karol Józef Wojtyła)



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**Extra Question #5: Mathematics – Math Concepts**

*10 points*

The tangent of the quantity pi over this number equals two minus the square root of three. The Platonic solid with this number of faces has twenty vertices, and of all the Platonic solids, the one with this number of faces has the faces which each have the most sides. This is the number of edges on a cube, and this is the smallest whole number that is evenly divisible by all of the numbers one through four. Identify this number equal to the number of sides of a dodecagon.

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Teamwork Questions

**Extra Question #6: Science – Chemistry**

*10 points per part*

The alkaline earth metals form a column in the periodic table.		
1	This is the IUPAC group number of the alkaline earth metals.	<u>2</u>
2	This is the heaviest alkaline earth metal. This element and polonium were the two elements found by Pierre and Marie Curie.	<u>radium</u> (prompt on “Ra”)
3	This person bombarded the lightest alkaline earth metal, <b>beryllium</b> [buh-RIL-lee-um], with radiation to discover the neutron in 1932.	(James) <u>Chadwick</u>

**Extra Question #7: Science – Chemistry**

*10 points per part*

Substances often change phases.		
1	Name the phase change from solid to liquid.	<u>melting</u> (prompt on “fusion”)
2	Also known as <b>desublimation</b> [dee-SUB-lih-may-shun], name the phase change directly from gas to solid.	<u>deposition</u> (accept word forms)
3	Name the heat added or released without any change in temperature, which often is used in phase changes.	<u>latent</u> heat



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**Extra Question #8: Social Studies – U.S. History**

*10 points per part*

This is the only amendment ratified by the states via constitutional conventions.		
<b>1</b>	Name this amendment that granted states greater autonomy in regulating alcohol sales.	<b><u>Twenty-First</u></b> Amendment to the United States Constitution (or <b><u>21</u></b> )
<b>2</b>	The 21 <sup>st</sup> Amendment was a direct repeal of this amendment, which banned the manufacture, sale, consumption, and distribution of alcohol.	<b><u>Eighteenth</u></b> Amendment to the United States Constitution (or <b><u>18</u></b> )
<b>3</b>	The enforcement for the 18 <sup>th</sup> Amendment came from an act championed by this Minnesotan and chair of the House Judiciary Committee.	Andrew <b><u>Volstead</u></b>

**Extra Question #9: Social Studies – U.S. History**

*10 points per part*

Per the terms of this treaty, the United States renounced claims to Texas.		
<b>1</b>	Name this treaty in which Spain also agreed to relinquish claims to Oregon Country.	<b><u>Transcontinental</u></b> Treaty (accept <b><u>Adams-Onis</u></b> , prompt on “Purchase of Florida”)
<b>2</b>	Spain also ceded the territory that would become this state. The US had already established a significant military presence here on account of the First Seminole War.	<b><u>Florida</u></b>
<b>3</b>	The build-up to the Adams-Onis Treaty included controversy over ownership of West Florida. Spain claimed ownership via the terms of this 1783 treaty.	1783 Treaty of <b><u>Paris</u></b>



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Round # 2  
1<sup>st</sup> Section  
Toss-up Questions

**Question #1: Mathematics – Math Concepts**

10 points

Two similar triangles are drawn inside one of these shapes in the Butterfly Theorem. An angle whose rays both intersect this shape twice is subject to the Secant-Secant Theorem, and the power of a point depends on its location relative to the center of one of these shapes. This shape is generated in polar coordinates by setting the value of  $r$  equal to a constant. Name this **locus** [LOE-kus] of all points in a plane a fixed distance from a fixed point, a shape whose area can be found by multiplying pi times radius squared.

circle

**Question #2: Social Studies – Geography**

10 points

This mountain range includes Mount Tarn on Brunswick Peninsula. This range includes the highest volcano in the world, which is near its San Francisco Pass. Active volcanoes in this mountain range include Mounts Hudson and **Yate** [YAH-tay]. Its eastern section juts up against the **Altiplano** [ahl-tee-PLAH-noe], and this is the longest continental mountain range in the world. Name this mountain range including Mount **Aconcagua** [ah-kone-KAH-gwah] in Argentina, a long range located in South America.

Andes Mountains



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**Question #3: Fine Arts – Classical/Opera**

10 points

This composer wrote the aria “Einsam in truben Tagen” [INE-sahm in TROO-ben TAH-gen], which is nicknamed “Elsa’s Dream.” One of his characters, Alberich [ahl-beh-reek], makes a curse which this composer uses as a leitmotif [LIGHT-moe-teef] in some of his operas. One of his operas about the search for the Holy Grail, which at first was only allowed to be performed at a theatre in Bayreuth [bay-rooth], is *Parsifal* [PAHR-see-fahl]. Name this composer of *Lohengrin* whose works *Das Rheingold*, *Die Walkure* [dee VAHL-kyoo-ree], *Siegfried*, and *Gotterdammerung* make up his Ring Cycle.

(Richard) Wagner

**Question #4: Literature – U.S. Literature**

10 points

The man in charge of this event had to be sworn in by the postmaster. The man who ran this also ran the local square dances, Halloween program, and teen club. In the build-up to this event, Bobby Martin set an example for Bobby and Harry Jones, who gathered large piles of stones. In years past, chips of wood were used for this, but Mr. Summers and Mr. Graves used paper slips instead. Name this title event in which Tessie Hutchinson got stoned by the people of her village in a short story written by Shirley Jackson.

The Lottery



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**Question #5: Science – Chemistry**

10 points

Hünig's [HYOO-nig's] type of these substances is a poor nucleophile [NOO-kee-oe-file]. A Brook rearrangement uses these substances, such as a Grignard [grih-NARD] or organolithium [or-GA-noe-LIH-thee-um] reagent, as catalysts. These substances tend to hydrolyze triglycerides [trie-GLIH-suh-rides] in a process called saponification, which is why they often feel slippery, and these substances typically taste bitter. Depending on which definition is used, these substances donate an electron pair, accept protons, or yield hydroxide ions. Name these substances that react strongly with acids.

(strong) bases

**Question #6: Social Studies – World History**

10 points

Raised under the Kensington system by Sir John Conroy and the Duchess of Kent, this monarch's reign saw Britain obtain control of Cyprus and obtain just under half of the shares of the Suez Canal. During the "bedchamber crisis", this leader refused to bow to the demands of Sir Robert Peel. This monarch ruled when Benjamin Disraeli and William Gladstone were prime ministers, and she was the mother of Edward the Seventh. Name this 19<sup>th</sup> century ruler, also the Empress of India, who was the longest-ruling English queen.

Queen Alexandrina Victoria





**Question #7: Mathematics – Statistics**

*10 points per part*

[Note: Please read this question slowly.] Find the following values for a distribution that has a minimum value of 10, a first <b>quartile [KWAR-tile]</b> of 14, a median of 15, a third quartile of 20, and a maximum value of 25.		
<b>1</b>	Find the range. Give your answer as a single number.	<u><b>15</b></u>
<b>2</b>	Find the interquartile range. Once again, give your answer as a single number.	<u><b>6</b></u>
<b>3</b>	This adjective can be applied to the set because it has a finite range.	<u><b>bounded</b></u> (above and below)

**Question #8: Mathematics – Statistics**

*10 points per part*

There are population and sample types of this quantity.		
<b>1</b>	Name this quantity equal to the square root of variance that is used to measure the spread of data.	(population or sample) <u><b>standard deviation</b></u>
<b>2</b>	If a set of numbers has a mean of 20 and a variance of 16, then this number is two standard deviations above the mean.	<u><b>28</b></u>
<b>3</b>	Find the population standard deviation of the numbers positive two, negative one, and negative one. This set of numbers has a mean equal to zero.	<u><b>square root of 2</b></u> (or <u><b>root 2</b></u> or <u><b>radical 2</b></u> or equivalents)



**Question #9: Literature – U.S. Literature**

*10 points per part*

This Nantucket Whaler was the second ship that Fedallah spoke of in a prophecy.		
<b>1</b>	Name this ship, made of American wood, that served as the coffin for Stubb.	<u><b>Pequod</b></u>
<b>2</b>	This captain of the <i>Pequod</i> had a fake leg. His demise came when a harpoon rope snagged him by the neck.	Captain <u><b>Ahab</b></u>
<b>3</b>	Ahab's leg was lost in an earlier encounter with this sperm whale.	<u><b>Moby Dick</b></u>

**Question #10: Literature – U.S. Literature**

*10 points per part*

For refusing to repeat the catechism [ka-tuh-ki-zum], this girl is almost taken from her mother by Governor Bellingham.		
<b>1</b>	Name this “living hieroglyphic” who is warned by her mother to not speak of what happens in the forest.	<u><b>Pearl</b></u>
<b>2</b>	Pearl is the daughter of this adulteress, who was forced to wear an embroidered A at all times.	<u><b>Hester Prynne</b></u> (accept either)
<b>3</b>	Hester Prynne is the protagonist of this author's <i>The Scarlet Letter</i> .	Nathaniel <u><b>Hawthorne</b></u>



### Question #11: Science – Biology

10 points per part

The bottom of this organ is the <b>pylorus</b> [pie-LO-rus].		
1	Name this digestive organ between the esophagus and small intestine.	<b><u>stomach</u></b>
2	The digestive fluid produced in the stomach is gastric acid. This is the strong acid that is a major constituent in gastric acid.	<b><u>hydrochloric</u></b> acid (prompt on “HCl”)
3	These animals, including cows, chew on their food again after it has been in their stomach.	<b><u>ruminants</u></b> (or <b><u>ruminantia</u></b> )

### Question #12: Science – Biology

10 points per part

Biologists have spent a lot of time over many years on taxonomy, or organism classification.		
1	Name the 18 <sup>th</sup> century Swedish botanist who popularized binomial nomenclature.	(Carl) <b><u>Linnaeus</u></b> (or (Carl von) <b><u>Linne</u></b> or (Carolus) Linnaeus or (Carolus a) Linne)
2	This classification level is more specific than class but less specific than family. This level includes lagomorphs, rodents, and primates.	<b><u>order</u></b>
3	In 1977, Carl <b>Woese</b> [woze] devised a three-domain system. This is the domain he used for <b>prokaryotes</b> [proe-KA-ree-otes] that are not bacteria.	<b><u>Archaea</u></b>



**Question #13: Social Studies – Religion**

*10 points per part*

This series of blessings were in the Sermon on the Mount.		
<b>1</b>	Name this collection of statements which claims that the kingdom of heaven awaits those poor in spirit and those who are persecuted for the sake of righteousness.	<u>Beatitudes</u>
<b>2</b>	The Sermon on the Mount is contained within Chapter 5 of this first book of the New Testament.	The Gospel According to St. <u>Matthew</u> (accept <u>Book of Matthew</u> )
<b>3</b>	Later in the chapter, Jesus suggests that one should pluck out sinful body parts rather than be sent to hell, using this body part as an example.	right <u>eyes</u>

**Question #14: Social Studies – Religion**

*10 points per part*

The day immediately preceding this day is the “day of preparation.” The hymn “ <u>Lecha Dodi Likrat Kallah</u> [ <u>leh-KAH DOE-dee lih-KRAT kah-lah</u> ]” greets this day as a bride.		
<b>1</b>	Name this day on which work was forbidden. In some traditions, travel outside the city walls was restricted to 2000 cubits, which is about half a mile.	<u>Sabbath</u> (accept <u>Shabbath</u> , <u>Sabbatum</u> , or <u>Sabbaton</u> )
<b>2</b>	Keeping the Sabbath day holy is required by the fourth of these laws. These also forbid killing and taking the Lord’s name in vain.	Ten <u>Commandments</u>
<b>3</b>	In Matthew 12, Jesus claimed that it was lawful to heal on the Sabbath by comparing the act to lifting one of these animals out of a pit.	<u>sheep</u>



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**Question #15: Literature – British Literature**

10 points

This poem asks, “Was there a man dismayed?” In the last stanza of this poem, the speaker asks, “when can their glory fade” before asking the reader to honor the title action. The title group, or “all that was left of them,” had “came through the jaws of Death.” In this poem, the title group knew that “theirs not to reason why, theirs but to do and die.” Name this poem in which the six hundred rode into the valley of death, written by Alfred, Lord Tennyson.

“Charge of the Light Brigade”

**Question #16: Science – Earth Science**

10 points

The inside of these objects is where the **Bergeron** [BER-guh-ron] process takes place, and the artificial creation of conditions similar to the ones inside these was done by C.T.R. Wilson. When one of these objects forms below another one, it can be a **mammatus** [meh-MATE-us], while if one of these forms on top of another one, it is a **pileus** [PIE-lee-us]. The four common types of these objects have Latin names that translate as pile, layer, wisp, or rain. Name these objects made of drops of water or ice, better known as cumulus, stratus, cirrus, or nimbus.

clouds



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**Question #17: Social Studies – U.S. History**

10 points

A follow-up to this agreement was issued following the passage of a clause excluding **mulattoes** [muh-LAH-toes]. One proposed amendment to this involved the emancipation of slaves upon turning 25-years-old. This agreement's eighth and final section addressing a portion of the Louisiana Purchase was annulled by the Kansas-Nebraska Act, and this act allowed for Maine to enter the Union as a free state. Name this 1820 agreement that allowed a midwestern state to enter the Union.

Missouri Compromise of 1820

**Question #18: Miscellaneous – Consumer Education**

10 points

In a case involving *National Bellas Hess*, the Supreme Court ruled that a substantial nexus had to be established in order to enforce one of these. The Illinois Supreme Court found that the Main Street Fairness Act implemented this in an unconstitutional manner. Delaware is the only US state that does not use this, while the proposed Marketplace Fairness Act would force online retailers to remit it. Name this surcharge applied on the purchase of certain goods and services.

(internet) sales tax (accept use tax or excise tax, prompt on "tax")



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**Question #19: Literature – World Literature**

10 points

This novel inspired a nonfiction book written by Elizabeth Jane Cochrane under the pseudonym Nellie Bly. In this novel, the protagonist is suspected to be a bank robber, so he is followed by Inspector Fix. The search for a minister near the end of this novel so that the protagonist can marry **Aouda [ah-OO-dah]** revealed that the protagonist had forgotten about the International Date Line, which lets him arrive back at the Reform Club in time to win a bet he made. Name this novel concerning **Phileas [FIH-lee-us]** Fogg's journey, written by Jules Verne.

*Around the World in Eighty Days*  
(accept *Le Tour du monde en quatre-vingts jours*)

**Question #20: Science – Biology**

10 points

A hole in a part of this organ can cause an infection to be classified as chronic **suppurative [SUH-puh-rah-tiv]**. The front of this organ has a bump called a **tragus [TRAY-gus]**, while the back of its pinna is called its helix. The inside of this organ has three semicircular canals, which are near its organ of **Corti [KOR-tee]** inside of its **cochlea [KOE-klee-uh]**. Its bones, called **ossicles [AH-sih-kuls]**, are the smallest bones in the human body. They are the malleus, incus, and **stapes [STAY-pees]**, which are commonly called the hammer, stirrup, and anvil. Name these sensory organs used for hearing.

**ears** (accept cochlea during the first sentence)



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4<sup>th</sup> Section  
Teamwork Questions

**Question #21: Mathematics – Geometry**

*10 points per part*

This term is sometimes used to describe any three-dimensional shape that can be expressed with one parameter.		
<b>1</b>	Name this term that typically describes a three-dimensional shape that has two circles at opposite ends.	<u><b>cylinders</b></u>
<b>2</b>	Find the volume of a right circular cylinder with a height of 5 and a radius of 3. Do not worry about units.	<u><b>45 pi</b></u> (do not accept “45”)
<b>3</b>	That cylinder has a lateral surface area of 30 pi. Find the total surface area of that cylinder with a height of 5 and a radius of 3.	<u><b>48 pi</b></u> (do not accept “48”)

**Question #22: Mathematics – Geometry**

*10 points per part*

The name of this theorem is used for a type of tessellation using squares of different sizes.		
<b>1</b>	Name this theorem relating the lengths of the sides of a right triangle.	<u><b>Pythagorean</b></u> theorem (or <u><b>Pythagoras</b></u> theorem)
<b>2</b>	The Pythagorean theorem is a special case of this law relating the three sides of any triangle and a function of one of the angles.	law of <u><b>cosines</b></u>
<b>3</b>	There are two right triangles for which the sides are all whole numbers and one of the legs has a length equal to eight. Give the lengths of the hypotenuses of those two right triangles. Both answers required.	<u><b>10</b></u> and <u><b>17</b></u> (both answers in either order, accept the word or between them or no word between them)





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Teamwork Questions

**Question #23: Social Studies – U.S. History**

*10 points per part*

These essays were written with the goal of influencing New York voters.		
1	In Essay 10 of this collection, one author rejects the idea that republican government is possible only in small states. All of them were signed “Publius [POO-blee-us].”	<u>The <b>Federalist</b></u> (accept <u><b>Federalist papers</b></u> )
2	Most historians agree that this collaborator wrote essays two through five and sixty-four. With Lord Grenville, this person negotiated a treaty that opened up British markets to American commerce.	John <u><b>Jay</b></u>
3	John Jay was the first appointee to this high-ranking position. He retired from this position to become Governor of New York, and he turned down a second term offered by John Adams.	<u><b>Chief Justice</b></u> of the United States Supreme Court (prompt on “Justice”)

**Question #24: Social Studies – U.S. History**

*10 points per part*

These included the erection of an independent Polish state and complete autonomy for Belgium.		
1	Name this framework for a potential peace settlement following World War One.	<u><b>Fourteen Points</b></u>
2	The Fourteen Points were formulated by this President, who “kept us out of war” until getting American troops knee-deep in Europe.	Thomas Woodrow <u><b>Wilson</b></u>
3	Wilson was instrumental in the formation of this organization, which distributed colonies in Asia and Africa as “mandates” assigned to the Allied Powers.	<u><b>League of Nations</b></u>



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Teamwork Questions

**Question #25: Fine Arts – Art History**

10 points per part

Identify these Dutch painters.		
1	This 17 <sup>th</sup> century painter completed <i>The Anatomy Lesson of Dr. Nicolaes Tulp</i> and <i>The Night Watch</i> .	<b><u>Rembrandt</u></b> Harmenszoon <b><u>van Rijn</u></b> (accept either underlined part)
2	This 15 <sup>th</sup> and 16 <sup>th</sup> century painter completed <i>The Temptation of St. Anthony</i> and <i>The Garden of Earthly Delights</i> .	Hieronymus <b><u>Bosch</u></b>
3	This 20 <sup>th</sup> century painter and sculptor completed <i>Excavation</i> , <i>Pink Angels</i> , and his <i>Woman</i> series.	Willem de <b><u>Kooning</u></b>

**Question #26: Fine Arts – Art History**

10 points per part

The term mausoleum comes from the name of Mausolus, who was a Persian leader.		
1	Name the city that holds the tomb of Mausolus.	<b><u>Halicarnassus</u></b>
2	This white marble mausoleum built for the Mumtaz Mahal by order of her husband Shah Jahan is located in Agra, India.	<b><u>Taj Mahal</u></b>
3	Castel Sant'Angelo in Rome was built for this emperor.	Publius Aelius Traianus <b><u>Hadrianus</u></b> Augustus



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**Question #27: Science – Chemistry**

*10 points per part*

This is the most abundant element in the Earth's crust.		
<b>1</b>	Name this element that binds to hemoglobin and that is much more concentrated in arterial blood than in venous blood.	<u>oxygen</u> (prompt on "O")
<b>2</b>	This allotrope of oxygen, also called trioxygen, has three oxygen atoms in each molecule.	<u>ozone</u>
<b>3</b>	The ozone layer is mostly found in the lower part of this layer of the Earth's atmosphere.	<u>stratosphere</u>

**Question #28: Science – Chemistry**

*10 points per part*

This element produces a blue-green color in a flame test.		
<b>1</b>	Name this element that combines with tin to create bronze.	<u>copper</u> (prompt on "Cu")
<b>2</b>	Copper exhibits this form of magnetism that weakens fields and is contrasted with paramagnetism and ferromagnetism.	<u>diamagnetism</u> (accept word forms)
<b>3</b>	Like many metals, copper is often attained from its ore by this process involving lots of heat and the use of oxidizing or reducing agents.	<u>smelting</u> (accept word forms)



**Question #29: Social Studies – World History**

*10 points*

Prior to this nation's independence, which was gained in 1956, the Graduates' General Congress was established to push for social reforms. **Ismail al-Azhari** [is-male ahl ah-JAH-ree], who wanted this country to unite with Egypt, was overthrown in separate coups by **Ibrahim Abboud** [ee-brah-heem ah-BOOD] and **Gaafar Nimeiry** [GAH-ah-fahr nuh-MEH-ree]. A 2005 Comprehensive Peace Agreement, also known as the **Naivasha** [nie-VAH-shah] Agreement, provided for a referendum regarding the independence of one region of this country. President Omar al-Bashir has been criticized for fighting involving the **Janjaweed** [JAHN-jah-weed] militia in Darfur. Name this east African nation with capital **Khartoum** [kar-TOOM].

The **Sudan** (do not accept "South Sudan")

**Question #30: Mathematics – Math Concepts**

*10 points*

Jacques Hadamard designed a type of these structures used to create error-correcting code. Some of these are classified as upper or lower triangular, and these are skew-symmetric if their opposite equals their transpose. These structures are used to represent graphs using degrees or adjacency. Putting an augmented one of these into reduced row **echelon** [eh-cheh-lon] form can be used to solve a system of equations. Name these rectangular arrangements of numbers, the square examples of which have determinants.

**matrix** (or **matrices**)



**Question #31: Literature – U.S. Literature**

10 points

One character in this play danced to the **Varsouviana** [var-SOE-vee-a-nah] before confronting her husband about an affair. That woman later escaped an attack by falsely claiming the building was on fire. A later assault in this play was set against jazz music from a neighboring bar. The victim was an alcoholic from Laurel, Mississippi who came to visit her sister Stella in New Orleans. Name this drama featuring Stanley Kowalski and Blanche DuBois, written by Tennessee Williams.

A Streetcar Named Desire

**Question #32: Science – Physics**

10 points

Attempts to understand this force have included **Regge** [REG-gee] theory, dual resonance, and string theory. The existence of this force caused Hideki Yukawa to predict the existence of mesons, and his predictions matched the measurements of **pions** [PIE-ons]. This force is currently explained by quantum chromodynamics, which describes the interactions of gluons and quarks. Name this interaction with a very small range that is used to explain the attractions of particles in an atomic nucleus.

strong nuclear force (or strong interaction, accept color force before “chromodynamics”, prompt color force after “chromodynamics”)



**Extra Question #1: Social Studies – U.S. History**

*10 points*

The illegal transfer of land in this state sparked the Ballinger-Pinchot affair. Two Organic Acts helped move this territory towards home rule, with the second being heavily pushed by James Wickersham. During World War Two, its islands of Attu and Kiska were invaded by the Japanese. In 2008, Mark Begich [BEH-gich] was elected to represent this state in the Senate, defeating long-time incumbent Ted Stevens. Name this state which used to be governed by Sarah Palin.

Alaska

**Extra Question #2: Mathematics – Math Concepts**

*10 points*

If segments are added connecting consecutive midpoints of the sides of one of these regular polygons, the new similar polygon has three-fourths the area of the original. These shapes together with pentagons make up the sides of a truncated icosahedron [ie-KOE-suh-hee-dron], and this shape, triangles, and squares are the only regular figures that can tessellate a plane. The length of this shape's apothem [ah-POTH-um] equals its side length times one-half times the square root of three. Name these polygons with six sides.

(regular) hexagon  
(prompt on "6-gon")



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**Extra Question #3: Literature – British Literature**

10 points

In this work, Pluto restores the sight of a blind man, while **Proserpina** [PROW-sur-pee-nah] gives that man's unfaithful wife a good excuse. One story in this collection describes two mothers-in-law laying accusations of treachery against the daughter of a Roman emperor. In another, Absalom takes a hot iron to the buttocks of Nicholas, and in another a knight learns what women want. The storytellers in this work are journeying to the shrine of St. Thomas a Becket. Name this collection of stories penned by Geoffrey Chaucer.

*The Canterbury Tales* (accept "The **Merchant's Tale**" until "collection")

**Extra Question #4: Fine Arts – Art History**

10 points

A painting by this artist of the Holy Family was commissioned by Agnolo Doni. Another work by this artist includes Baigio da Cesena in its bottom right corner being attacked by a snake, which is supposed to represent Minos. This artist also created three panels showing Noah, three panels showing Adam and Eve, and three panels showing the Creation, all of which were surrounded by prophets and **sibyls** [SIH-buls]. Name this early 16<sup>th</sup> century artist who painted *The Last Judgment* and the Sistine Chapel ceiling.

**Michelangelo** di Lodovico **Buonarroti** Simoni (accept either underlined part)



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**Extra Question #5: Science – Astronomy**

*10 points*

In recent years, scientists observing this planet have measured an increase in wind speed, which is now around 250 miles per hour, and its atmosphere moves around the planet in four Earth days. Its atmosphere, like that of Mars, is high in carbon dioxide. The length of a day on this planet is an unusually long 243 Earth days. Name this only planet in our solar system other than Mercury to not have a moon, the second planet from the Sun.

Venus





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**Extra Question #6: Literature – British Literature**

10 points per part

The car at the center of this story can fly, and it also floats on water.		
1	Name this novel in which the car is repaired by Commander Pott and experiences many adventures with the Commander's family.	<u><b>Chitty Chitty Bang Bang: The Magical Car</b></u>
2	<i>Chitty Chitty Bang Bang</i> was written by this British novelist while recovering from a heart attack. He created the literary villains Le Chiffre and Hugo Drax.	Ian <u><b>Fleming</b></u>
3	Ian Fleming wrote several novels centering on this fictional spy, code named 007.	James <u><b>Bond</b></u>

**Extra Question #7: Literature – British Literature**

10 points per part

The speaker in this poem describes light gleaming from the French coast, and “the cliffs of England...out in the tranquil bay.”		
1	Name this poem that describes a “darkling plain” where “ignorant armies clash by night.”	<u><b>“Dover Beach”</b></u>
2	This author of “ <b>Empedocles</b> [em-peh-doe-klees] on Etna” and <i>Culture and Anarchy</i> wrote “Dover Beach.”	Matthew <u><b>Arnold</b></u>
3	In “Dover Beach,” this ancient Greek playwright of the <b>Oedipus</b> [EH-dih-pus] trilogy “long ago / heard it on the Aegean.”	<u><b>Sophocles</b></u>



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**Extra Question #8: Mathematics – Algebra**

*10 points per part*

Some calculators and computers put the letter E inside numbers to show that they are using this notation.		
1	Name this notation in which each number is expressed as a number between one and ten multiplied by a power of ten.	<u>scientific</u> notation
2	This name has been given to the number one times ten to the hundredth power.	<u>googol</u>
3	Express the number 0.035 in scientific notation.	<u>3.5 times 10<sup>-2</sup></u>

**Extra Question #9: Mathematics – Algebra**

*10 points per part*

A paper published in 2004 by Banks, Hart, and Sakata demonstrated that almost all of these numbers are composite, though exceptions include eleven and one hundred one.		
1	Name these numbers, such as 77 or 949, that read the same forwards and backwards.	<u>palindromes</u> (or <u>palindromic</u> number(s))
2	How many palindromes are there among the integers between ten and one hundred?	<u>9</u>
3	How many palindromes are there among the integers between one hundred and one thousand?	<u>90</u>



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1<sup>st</sup> Section  
Toss-up Questions

**Question #1: Science – Health**

10 points

One type of this symptom that can be treated with **ethosuximide** [eh-thoe-SUK-sih-mide] is classified as the absence type. Another type of this event, which usually occurs in young children with high fevers, is the **febrile** [FEH-brile] type. Sometimes treated with **carbamazepine** [kar-bah-MA-zeh-peen], or tegretol, these can also be classified as **myoclonic** [MIGH-oh-klah-nik] or as tonic-clonic. These occur when there is a breakdown in communications between neurons. Name these episodes often involving convulsions that are experienced by people with epilepsy.

**seizures** (prompt on “convulsion”)

**Question #2: Literature – World Literature**

10 points

In one novel, this author wrote of a poet who was to be hanged if he could not find a wife in a thieves’ den. He also wrote of a goat that learned to use alphabet blocks to spell Phoebus. This author also wrote of a man who rose from working in a glass factory to becoming mayor of a town under the name Father Madeleine, a name he took after leaving prison as **Jean Valjean** [jahn vahl-jahn]. Name this author of *The Hunchback of Notre Dame* and *Les Misérables*.

Victor **Hugo**



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1<sup>st</sup> Section  
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**Question #3: Fine Arts – Composers of the Modern Era**

10 points

In 1958, this composer completed his twelve-tone work using verses from the Book of Lamentations, *Threni* [THREH-nee]. One of this composer's operas, centering around a relationship between Anne Trulove and Tom Rakewell, is based on a series of pictures by William Hogarth. One of his ballets, which created a strong reaction at its 1913 premier, is *The Rite of Spring*. Name this composer who used Russian folklore in his ballets *The Firebird* and *Petrushka* [peh-TROOSH-kah].

Igor Stravinsky

**Question #4: Social Studies – U.S. History**

10 points

In one election, this man had to reveal his relationship with Maria Halpin after opponents used the phrase, "Ma, ma, where's my pa?" In that election, this person defeated a politician nicknamed the "continental liar from the state of Maine." During his second term, this president refused to annex Hawaii, and he lost union support after sending federal troops to break the Pullman strike in 1894. Name this President who defeated James Blaine and Benjamin Harrison in nonconsecutive elections.

Grover Cleveland



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**Question #5: Literature – Mythology**

*10 points*

This god was put on trial and acquitted of murdering **Halirrhottus** [ha-lee-ROE-tee-us]. This god was trapped in a jar for over a year by the **Aloadae** [a-loe-a-day]. Through Otrera, this god was the father of **Penthesilea** [pen-theh-SIH-lay-uh]. After slaying this god's son Dracon, Cadmus served him for eight years before marrying Harmonia, this god's daughter through **Aphrodite** [a-froe-DIE-tee]. Name this Greek war god.

**Ares** (accept **Mars** until "Greek")

**Question #6: Science – Physics**

*10 points*

Cap sealing takes advantage of this phenomenon, since this can be used to temporarily heat aluminum foil. Explained soon after a related discovery by Hans Christian Oersted, its direction is given by Lenz's Law. This is used in a squirrel-cage or asynchronous motor. Name this phenomenon whose explanation is often credited to Michael Faraday and which involves the creation of an electric potential difference by a change in a magnetic field.

(electromagnetic) **induction**



**Question #7: Fine Arts – Art History**

10 points per part

Identify these ancient sculptures.		
1	This work portraying Aphrodite was found on a Greek island and is portrayed prominently in the Louvre. It is missing its arms.	<u>Venus de Milo</u> (or <u>Aphrodite of Milos</u> )
2	This sculpture, also prominently displayed at the Louvre, is missing its arms and head. It was found by Charles Champoiseau in 1863.	<u>Winged Victory of Samothrace</u> (or <u>Nike of Samothrace</u> ) (prompt partial answers)
3	<u>Praxiteles</u> [prak-si-TEH-lees] made a sculpture of <u>Hermes</u> [HER-mees] holding this goddess on his left arm when the goddess was an infant. Hermes is missing most of his right arm.	<u>Dionysus</u>

**Question #8: Fine Arts – Art History**

10 points per part

This style of art went through two periods of iconoclasm, when religious authorities did not approve of religious images in art.		
1	Name this style of works created in the Eastern Roman Empire before 1453.	<u>Byzantine</u> Art
2	This Byzantine cathedral in what is now Istanbul was built under orders from Justinian and completed in 537. After spending several hundred years each as a cathedral and a mosque, it is now a museum.	<u>Hagia Sophia</u>
3	When the <u>Umayyad</u> [oo-MY-yad] Caliphs controlled the Temple Mount in Jerusalem, they built the Al Aqsa Mosque and this building that shows Byzantine influences.	The <u>Dome of the Rock</u> (or <u>Masjid Qubbat As-Sakhrah</u> or <u>Kipat Hasela</u> )



**Question #9: Social Studies – World History**

*10 points per part*

This kingdom was formed through the combining of the Kingdoms of Nejd and Hejaz.		
1	Before embarking on the unification of the areas that would become this nation, Abdul Aziz [ah-ZEEZ] captured the Masmak fortress in Riyadh [ree-YAHD].	Kingdom of <u>Saudi Arabia</u> (accept al-Mamlakah al-‘Arabiyyah as- <u>Su‘ūdiyyah</u> )
2	Saudi Arabia has historically been influenced by this branch of Islam started in the 18 <sup>th</sup> century and generally considered part of Sunni [SOO-nee] Islam.	<u>Wahhabi</u> (sm)
3	In the Great Arab Revolt against the Ottomans, this Welshman secured Allied aid for the Arabs. Winston Churchill tapped him to develop pro-Arab settlements among Britain’s colonies in the Middle East.	Thomas Edward <u>Lawrence</u> (accept <u>Lawrence of Arabia</u> , do not accept “John Hume Ross” or “Thomas Edward Shaw”)

**Question #10: Social Studies – World History**

*10 points per part*

During this move, Zhang Guotao lost a power struggle, and his forces broke off from this at Mao’ergai [mow-er-guy].		
1	Name this journey that ended in Shaanxi [shahn-see] province, where its undertakers remained throughout the Sino-Japanese War.	<u>Long March</u> (or <u>Chang Zheng</u> )
2	The Chinese Communists undertook the Long March in order to escape the forces of this Nationalist leader, who led China’s government from 1928 to 1949.	<u>Chiang</u> Kai-Shek (accept <u>Jiang</u> Jiexi, <u>Chiang</u> Chieh-Shih, or <u>Chiang</u> Chung-Cheng, prompt on Kai-“Shek”)
3	Following World War Two, Chiang Kai-shek’s forces were routed. The Nationalist forces eventually ruled from exile on this island, where the Nationalist government was recognized by the United Nations until Chiang’s death.	<u>Formosa</u> (accept <u>Taiwan</u> )



### Question #11: Science – Biology

10 points per part

This term can be preceded by prefixes such as chemo- or thigmo-.		
1	Identify this term referring to a plant responding to a stimulus.	<b><u>tropism</u></b> (accept word forms such as <b><u>tropic</u></b> )
2	While <b>heliotropism</b> [hee-lee-oe-TROE-pih-sum] is a plant response to sunlight, this tropism is a plant response to any type of light.	<b><u>Phototropism</u></b>
3	Recent research in phototropism has often been conducted on this genus, including the thaliana or thale cress, which has had its entire genome sequenced.	<b><u>Arabidopsis</u></b> (prompt on “rockcress”)

### Question #12: Science – Biology

10 points per part

These two people shared a Nobel Prize with Maurice Wilkins.		
1	Name these two scientists credited for discovering the structure of DNA.	Francis <b><u>Crick</u></b> & James <b><u>Watson</u></b> (either order, must have both names without prompting)
2	Watson and Crick used X-ray diffraction images created by this scientist.	Rosalind <b><u>Franklin</u></b>
3	One of the first people shown Watson and Crick’s discovery was this crystallographer who confirmed the structure of penicillin and found the structure of Vitamin B-12.	Dorothy <b><u>Crowfoot Hodgkin</u></b> (accept either underlined part)





**Question #13: Literature – U.S. Literature**

10 points per part

This novel begins with Tom Joad being released from prison.		
1	Name this novel in which families travel from Oklahoma to California to escape the Dust Bowl.	<i>The <u>Grapes of Wrath</u></i>
2	This author of <i>The Grapes of Wrath</i> wrote about a road trip with his poodle in <i>Travels with Charley</i> .	John Ernst <u>Steinbeck</u>
3	This older brother of Tom Joad suffers from a birth defect.	<u>Noah</u> Joad

**Question #14: Literature – U.S. Literature**

10 points per part

This town is home to Bridewell Jail, where the reader first encounters safecracker Jack Duane.		
1	Name this city, home to Marija Berczynskas [mah-REE-ah ber-ZINS-kus], who convinces her cousin Ona Rudkus to join her in working at a bordello.	<u>Packintown</u> (accept <u>Chicago</u> , Illinois)
2	Packintown is the primary setting of this muckraking novel by Upton Sinclair.	<i>The <u>Jungle</u></i>
3	Jurgis Rudkus, the protagonist of <i>The Jungle</i> , immigrated with his family from this Eastern European nation.	<u>Lithuania</u>



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**Question #15: Miscellaneous – Journalism**

10 points

Guy Raz ran this organization's "Three-Minute Fiction" contest before becoming the host of a program involving <i>TED</i> talks. This programming network included a show hosted by Tom and Ray Magliozzi, nicknamed Click and Clack. In addition to <i>Car Talk</i> , this station hosts the interactive quiz show <i>Wait Wait Don't Tell Me</i> . This is the media organization behind <i>Morning Edition</i> and <i>All Things Considered</i> . Name this non-profit radio organization.	<u>National Public Radio</u> (or <u>NPR</u> )
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**Question #16: Mathematics – Math Concepts**

10 points

This number used as $x$ gives the largest output of the function $x$ raised to the reciprocal of $x$ power. In the standard normal density function, this number is raised to the minus $x$ squared over two power. This number equals the limit of the sum of the reciprocals of the factorials of all whole numbers, and this is the limiting value of the quantity one plus the reciprocal of $x$ , end quantity, raised to the $x$ power. Name this transcendental number equal to about 2.718.	<u><math>e</math></u> (accept <u>Euler's number</u> or <u>Napier's constant</u> , do not accept "Euler's constant")
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**Question #17: Social Studies – Religion**

*10 points*

**Yezidis [YEH-zih-dees]** worship this figure under the name Iblis, while he was also described as the prosecutor at the court of **Yahweh [YAH-way]**. In the Intertestamental period, this figure was referred to as Sammael. This character is the subject of Isaiah 14:12, where he was described as “the morning star.” In Luke 10:18, this character “fell like lightning from heaven.” One of his names means ‘lord of the flies.’ Name this character commonly portrayed as a fallen angel, the archenemy of God and ruler of Hell.

**Satan** (accept **Lucifer**, the **Devil**, **Diabolus**, **Beelzebub**, **Belial**, **Beliar**, or equivalents)

**Question #18: Language Arts – Grammar/Usage**

*10 points*

In “Through the Looking Glass,” according to Tweedledee, “but as it isn’t, it’s” *this*. Despite filling an accidental lexical gap in inverted verb construction, this contraction was used by Dickens to indicate the use of cockney slang. Used in phrases involving the fat lady singing and “seen nothing yet,” name this contraction, usually the shortened form of “am not.”

**ain’t**



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**Question #19: Social Studies – U.S. History**

10 points

This person described the President Kennedy assassination as “chickens coming home to roost,” and this leader called for political maturity in his speech “The Ballot or the Bullet.” When this person was a street hustler, his hair color led to his moniker “Detroit Red.” This founder of the newspaper *Muhammad Speaks* was shot while giving a speech at the Audubon Ballroom after a rift developed between this person and Elijah Muhammad. Name this black nationalist leader of the Nation of Islam.

**Malcolm X** (accept Malcolm **Little**  
or el-Hajj Malik el-**Shabazz**)

**Question #20: Science – Chemistry**

10 points

The law named for this scientist was popularized by Stanislao Cannizzaro. His law was proposed soon after Gay-Lussac’s Law, allowing scientists to use volume measurements to find chemical formulas. This person’s law was an early step towards the Ideal Gas Law, but it assumed constant pressure and volume. Because of the importance of his law, this scientist’s name is used for the number of particles in a mole of substance. Name this early 19<sup>th</sup> century Italian scientist.

Amedeo **Avogadro**



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**Question #21: Mathematics – Algebra**

*10 points per part*

Every point on one of these shapes is the same distance from a fixed point and a fixed line.		
<b>1</b>	Name these shapes generated by quadratic functions such as $y$ equals $x$ squared.	<u>parabolas</u>
<b>2</b>	The fixed point used to generate a parabola is called a focus. What is the name of the fixed line?	<u>directrix</u>
<b>3</b>	Give the coordinates of the focus of a parabola if its directrix is the line $x$ equals three and the vertex is located at the point $(-1,2)$ .	<u>(-5,2)</u> (order matters, accept $x=-5$ and $y=2$ or equivalents)

**Question #22: Mathematics – Algebra**

*10 points per part*

Consider the system of equations $x-y=8$ and $x+y=16$ .		
<b>1</b>	Because this linear system of equations has exactly one solution, it can be described as both consistent and as this term, meaning that the two equations are not equivalent to each other.	<u>Independent</u> (accept word forms, do not accept dependent)
<b>2</b>	Find the value of $x$ where the two lines generated by those equations intersect.	<u>12</u>
<b>3</b>	Find the degree measure of any of the angles formed where the two lines intersect.	<u>90</u> (degrees)



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**Question #23: Literature – Mythology**

*10 points per part*

While sitting on <b>Hlidskjalf</b> [ <b>HLID-skalf</b> ], this god is able to see everything that happens in the realms.		
<b>1</b>	Name this chief deity of Norse myth, who gave up an eye to drink from the well of <b>Mimir</b> [ <b>MIH-mir</b> ].	<b><u>Odin</u></b> (accept <b><u>Woden</u></b> , <b><u>Wotan</u></b> , or <b><u>Wodan</u></b> )
<b>2</b>	To gain the power of the runes, Odin used a spear to hang himself from this ash tree for nine days.	<b><u>Yggdrasil</u></b> (prompt on “World Ash,” “World Tree” or “Terrible Horse”)
<b>3</b>	Odin used trickery to obtain the mead of poetry, which was made from the blood of Kvasir. Kvasir himself was created from this substance gathered from the Aesir and Vanir.	<b><u>spit</u></b> (accept <b><u>saliva</u></b> or equivalents)

**Question #24: Literature – Mythology**

*10 points per part*

As a young child, <b>Palamedes</b> [ <b>pa-la-MEE-dees</b> ] threw this person in front of his father’s plow.		
<b>1</b>	Name this youth, who was advised by Athena to take a different route home after visiting Nestor and <b>Menelaus</b> [ <b>meh-neh-LAY-us</b> ].	<b><u>Telemachus</u></b>
<b>2</b>	The ambush that awaited <b>Telemachus</b> [ <b>teh-leh-MAH-kus</b> ] was planned by suitors pursuing this queen, whose husband was absent for twenty years.	<b><u>Penelope</u></b>
<b>3</b>	Penelope was queen of this city-state. Penelope patiently waited for her husband Odysseus to return to his rightful place as king of this locale.	<b><u>Ithaca</u></b>



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**Question #25: Social Studies – U.S. Government**

10 points per part

In <i>Francis v Resweber</i> , the State of Louisiana was accused of violating this amendment four times on account of mechanical failure.		
1	Name this Constitutional amendment that bans excessive bails and fines.	<u>Eighth</u> Amendment (or <u>8</u> )
2	The Eighth Amendment explicitly bans punishment described by this phrase. In <i>Francis</i> , it involved a man who was electrocuted five times.	<u>cruel and unusual</u> punishment
3	In the 2005 case of <i>Roper v Simmons</i> , the Supreme Court reversed the precedent set by <i>Sanford v Kentucky</i> in proclaiming the death penalty “cruel and unusual punishment” against this class of people.	<u>minors</u> (accept those <u>under 18 years</u> of age or equivalents like <u>17 or under</u> , prompt on “child”ren)

**Question #26: Social Studies – U.S. Government**

10 points per part

Two of these have been directed against presidents in US History, one in 1868 and the other in 1998.		
1	Name this process by which members of the legislature vote on whether to throw the President of the United States out of office.	<u>impeachment</u> (accept word forms)
2	Andrew Johnson was impeached for firing Edwin Stanton, who held this now-defunct cabinet post. The firing violated the Tenure of Office Act, later found to be unconstitutional.	Secretary of <u>War</u>
3	Bill Clinton was impeached after a lengthy investigation by this independent counsel.	Kenneth <u>Starr</u>



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**Question #27: Science – Physics**

*10 points per part*

This can be seen in a rainbow or by using a glass prism.		
1	Name this continuum of light with a range of wavelengths.	<u>spectrum</u> (or <u>spectra</u> , accept longer answers)
2	When a prism is used to separate light colors, violet bends the most. This is the color that bends the least.	<u>red</u>
3	Though the light of the Sun fills a large part of the visible spectrum, the spectrum of the Sun has several dark lines named for this German scientist.	Joseph von <u>Fraunhofer</u>

**Question #28: Science – Physics**

*10 points per part*

This quantity equals net force divided by mass.		
1	Name this rate of change of velocity.	<u>acceleration</u>
2	This is the inward acceleration of an object in uniform circular motion.	<u>centripetal</u> acceleration (do not accept “centrifugal”)
3	Albert Einstein added this constant to his general relativity theory but then rejected it. Interest in this value has returned in the last fifteen years because it can be used to explain why the size of the universe is accelerating.	<u>cosmological</u> constant





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**Question #29: Social Studies – World History**

*10 points*

One opposition party in this country, the PDIP, protested the election of Abdurrahman Wahid [wah-HEED] as president over Megawati Sukarnoputri [soo-KAHR-noe-poo-tree]. This country was for many years headed by Sukarno [soo-KAHR-noe] and then Suharto [soo-HAHR-toe]. This country's special forces formed the counter-terrorist force Detachment 88 in response to the 2002 bombing of a nightclub in Bali. Following a referendum, East Timor [tee-mor] voters chose independence from this nation. Name this Southeast Asian nation, the world's largest archipelago.

Indonesia

**Question #30: Mathematics – Math Concepts**

*10 points*

This shape consists of all the points in spherical coordinates for which  $\rho$  goes from zero to a constant times  $\cos \phi$ , and  $\phi$  goes from zero to a constant less than  $\pi/2$ . Spheres tangent to one of these and a plane are called Dandelin spheres. In cylindrical coordinates, the equation  $z = r$  gives one of these shapes. Name this shape whose slices are used to generate ellipses, parabolas, and hyperbolas, and which has a volume equal to one-third  $\pi$  times  $r^2$  times  $h$ .

cones (accept double cone or conic)



**Question #31: Science – Biology**

10 points

The wall surrounding this substance has an **intine** [IN-teen] layer and a sculptured **exine** [EK-seen] layer. This substance is not used by ferns, and this is produced in structures called **microsporangia** [my-kroe-spoe-RAN-jee-uh]. Brownian motion was discovered by observing these grains in water. These cells often start on an anther at the end of a **stamen** [STAY-men] and are transported to a pistil. Name these grains containing microspores that are transported by wind or bees to fertilize many plants.

**pollen** (accept spores before “ferns”)

**Question #32: Literature – U.S. Literature**

10 points

This poet wrote of a rock that “cries out to us, clearly, forcefully” as well as “the Swede, the German, the Scot...praying for a dream.” In one memoir, she wrote of performing in a German production of *The Blacks: A Clown Show*. She also wrote of participating in a Ghanaian march coinciding with the March on Washington in *All God's Children Need Traveling Shoes*. Name this African-American woman from Stamps, Arkansas who wrote the poem “On the Pulse of Morning” and the autobiography *I Know Why the Caged Bird Sings*.

Maya **Angelou**



**Extra Question #1: Mathematics – Math Concepts**

*10 points*

Euler's [OY-ler's] method uses these figures to approximate solutions to differential equations, and Newton's method approximates graphs as these figures to find roots. One of these figures is generated by the polar graph of the secant function. For any two points there is exactly one of these that goes through them, and these figures can be generated by extending a segment forever in both directions. Name these figures whose graph equations can be put into slope-intercept form.

line (prompt on "segment" or "ray" until the end of the 2<sup>nd</sup> sentence; segment or ray is incorrect after that)

**Extra Question #2: Social Studies – World History**

*10 points*

One foreign party to this conflict lent the Condor Legion, which saw action at Brunete [broo-NEH-tay] and Teruel [tay-rwel]. To solidify support for the losing side, the NKVD organized the dismantling of the leadership of the Workers' Party of Marxist Unification. The Connolly Column and Dimitrov Battalion were among the International Brigades that fought in this war. The Republicans, led by the Popular Front, were defeated by the Nationalists, led by the Carlists and Falange [fah-LAHN-hay]. Name this conflict in which General Francisco Franco rose to power, fought on the Iberian Peninsula.

Spanish Civil War



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**Extra Question #3: Literature – British Literature**

*10 points*

<p>This character was granted knighthood in an enchanted place before saying goodbye to his best friend. A creature “of no brain,” he gave a companion a special pencil case to facilitate a friend’s writing. This resident of the Hundred Acre Wood got stuck at Rabbit’s house after eating too much honey. Name this best friend of Christopher Robin, a fictional bear created by A.A. Milne.</p>	<p><u>Winnie</u> the <u>Pooh</u> (accept either underlined answer, accept <u>Edward</u> Bear)</p>
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**Extra Question #4: Science – Chemistry**

*10 points*

<p>This element is separated from sulfur in the Claus process. The molecular form of this element is added to <b>pyridine</b> [PEH-rih-deen] to cause several reactions leading to the formation of pentane, and the addition of this element changes an alkene into an alkane. Just outside the cores of Jupiter and Saturn, astronomers have found the metallic form of this element. The isotopes of this element are protium, deuterium, and tritium. Name this element, the first in the periodic table.</p>	<p><u>hydrogen</u> (prompt on “H”)</p>
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**Extra Question #5: Fine Arts – Classical/Opera**

10 points

This composer worked on a set of eighteen choral preludes late in life, and his earlier similar collections are called the *Schübler Chorales* and the *Orgelbüchlein* [or-gel-BOO-kline]. Another work by this composer, containing an *aria* [AHR-ee-ah] and 30 variations, was published in 1741 and named for the student who first performed it. In another of his works, each major and minor key has a prelude and *fugue* [fyooog]. Name this composer of the *Goldberg Variations* and *The Well-Tempered Clavier* who also wrote the *Brandenburg Concertos*.

Johann Sebastian Bach



### Extra Question #6: Literature – World Literature

10 points per part

This character resented his sister's marriage to <b>Luzhin</b> [loo-zeen], who attempted to frame Little Mother Sonia.		
1	Name this character who was mentally tortured by <b>Porfiry</b> [POR-fih-ree], who promised a plea of temporary insanity if this character confessed.	<b><u>Rodion</u></b> Romanovitch <b><u>Raskolnikov</u></b> (accept either underlined part)
2	In this <b>Fyodor Dostoyevsky</b> [FYOE-dor DOE-stoy-yev-skee] novel, <b>Raskolnikov</b> [ras-KOLE-nee-kof] confessed to the murder of a pawnbroker and her sister.	<b><u>Crime and Punishment</u></b> (accept <b><u>Prestupleniye i nakazaniye</u></b> )
3	Raskolnikov attempted to justify his actions through comparisons to this military leader, describing “wanting to become one” by killing <b>Alyona</b> [ahl-YOE-nah] and <b>Lizaveta</b> [lee-zah-VEH-tah].	<b><u>Napoleon</u></b> Bonaparte

### Extra Question #7: Literature – World Literature

10 points per part

This daughter of Monsieur <b>Rouault</b> [roo-awl] was broken-hearted when Leon <b>Dupuis</b> [doo-pwee] went to study in Paris.		
1	Name this character whose husband's reputation suffered after failing to cure a boy with clubfoot. She also took Rodolphe Boulanger as a lover.	Madame <b><u>Emma Bovary</u></b> (accept either underlined name)
2	Emma Bovary was created by this author. He wrote about the love life of Frederic <b>Moreau</b> [mor-oe] in <i>A Sentimental Education</i> .	Gustave <b><u>Flaubert</u></b>
3	After running up debts and building a web of deceit, Emma Bovary bought enough of this poison from Homais to kill herself.	<b><u>arsenic</u></b>



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**Extra Question #8: Science – Chemistry**

*10 points per part*

One type of these devices is the differential scanning type.		
1	Name these objects used to measure the amount of heat during a reaction.	<u>calorimeters</u>
2	This type of calorimeter, named because it withstands a pressure build-up, works by measuring the change in temperature of a fluid, usually water.	<u>bomb</u> calorimeter
3	Some calorimeters measure temperature by taking advantage of this effect, in which a loop of wire made of two conductors gains electromotive force when its two junctions are at different temperatures.	<u>Seebeck</u> effect

**Extra Question #9: Science – Chemistry**

*10 points per part*

This substance is sometimes called dihydrogen monoxide.		
1	Name this common solvent that at standard pressure boils at 100 degrees Celsius and freezes at 0 degrees Celsius.	<u>water</u>
2	This name is given to water that contains a lot of mineral salts. One way to determine whether water should be classified as this is to check for magnesium and calcium.	<u>hard</u> water
3	One way to soften water is to use this process in which a molecular ring is formed combining a metal with at least two nonmetals. EDTA is often used in this process.	<u>chelation</u> (accept other word forms)



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**Question #1: Miscellaneous – Agriculture**

*10 points*

In the first part of this process, the “cutter” cuts the top part of the plants, then the sets of rollers are used. Done to facilitate cross-pollination and create hybrid seeds, this process is usually done in a four-to-one pattern on the female rows. Name this process of removing the pollen-producing parts from corn stalks.

detasseling

**Question #2: Social Studies – World History**

*10 points*

At this battle, the arrival of forces led by H.E.K von **Zieten** [**ZEE-ten**] neutralized the transfer of Imperial Guard forces following the capture of La Haye Sainte. The transfer was impeded by a secondary battle involving Prussian forces led by Karl von **Bulow** [**BYOO-loe**], which had not engaged at **Ligny** [**lih-nyee**]. The winning side also managed to rebound from a loss at **Quatre-Bras** [**kah-truh brah**] to Marshal Ney. This battle took place in 1815 in the Netherlands, though the land is now in Belgium. Name this battle in which Gebhard von **Blücher** [**BLOO-ker**] and the Duke of Wellington delivered the final blow to the plans of Napoleon Bonaparte.

Battle of **Waterloo**





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**Question #3: Science – Astronomy**

10 points

Events that can be referred to as secondary types of these are often called occultations. An Inex cycle, which is slightly less than 29 years, gives the period of time between Saros series, which are slightly more than 18 years, and a combination of those two systems allows for the predictions of these events. Some types of these cause the appearance of Bailey's beads. This type of **syzygy** [SIH-zih-jee] generally occurs when the Earth enters the **penumbra** [peh-NUM-brah] of the Moon. Name this blockage of sunlight.

**eclipse** (accept lunar eclipse or solar eclipse)

**Question #4: Literature – U.S. Literature**

10 points

This author wrote of an apparition of a man in a brown suit wearing slippers that curl up; the observer became convinced it was the Devil. In one novel, this author wrote of the star of *Daddy's Girl* becoming romantically involved with a clinical psychologist who married Nicole Warren. This author of *Tender is the Night* and *This Side of Paradise* also wrote a novel narrated by Nick Carraway. Name this author of *The Great Gatsby*.

Francis Scott Key **Fitzgerald**



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**Question #5: Social Studies – U.S. Government**

10 points

Along with the Chief Justice, the holder of this post is an <i>ex officio</i> Regent of the Smithsonian. Following presidential elections, this officeholder is officially responsible for presiding over the counting of votes in front of Congress, though the President Pro Tempore [TEM-poh-ree] sometimes carries out that function. The holder of this post breaks ties in the Senate, as he is the acting President of that chamber. Until the 12 <sup>th</sup> Amendment was passed, this position went to the runner-up in an election. Name this post, whose holder is “a heartbeat away from” becoming commander-in-chief.	<u>Vice President</u> of the United States of America
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**Question #6: Science – Chemistry**

10 points

In an isothermal process, the change in entropy is proportional to the natural log of the ratio of the final and initial value of this quantity. This is constant in <b>isochoric</b> [eye-suh-KAWR-ik] processes. In isobaric processes, the amount of work is the integral of pressure with respect to this quantity. Enthalpy equals internal energy plus pressure times this quantity. Name this quantity that varies inversely with pressure in Boyle’s Law and is multiplied by pressure in the Ideal Gas Law, often measured in liters, gallons, or cubic length units.	<u>volume</u>
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### Question #7: Literature – Mythology

10 points per part

Nessus [NEH-sus] got the last laugh over this demigod after Deianeira [day-AN-rah] gave him a tunic covered in poisoned blood.		
1	Name this hero who was undone by the poison of the Lernaean [LER-nay-un] hydra, which he killed as one of twelve labors ordered by his cousin Eurystheus [yoo-RIS-thee-us].	<u>Heracles</u> (accept <u>Hercules</u> )
2	Zeus fathered Heracles by disguising himself as this king and sleeping with Alcmena [alk-MEE-nee] for three days and nights.	<u>Amphitryon</u>
3	While travelling with this group, Heracles was left on Chios [KIE-ose] while searching for Hylas, who had been kidnapped by a nymph. Orpheus protected this group from the Sirens [SIE-rens].	Jason and the <u>Argonauts</u>

### Question #8: Literature – Mythology

10 points per part

This friend of Pirithous [pih-REE-thous] was killed when Lycomedes [luh-koe-MEE-dees] kicked him off a cliff.		
1	Name this Athenian king and husband of Hippolyta [hih-poe-LIE-tah]. After this person forgot to change the flags following his conquering of the Labyrinth, his father Aegeas [ay-JEE-us] jumped into the sea.	<u>Theseus</u>
2	After arriving in Athens to claim his rightful place, this wife of Aegeas and ex-wife of Jason convinced the king to try to poison Theseus. She also killed her sons Alcimenes [al-ki-MEE-nees] and Tisander.	<u>Medea</u>
3	Theseus came of age on his journey to Athens. During that journey, he killed this “stretcher” who would stretch the limbs of shorter travelers and maim taller ones to fit different beds.	<u>Procrustes</u> (accept <u>Damastus</u> or <u>Polypemon</u> )



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**Question #9: Science – Biology**

10 points per part

His famous work was done at the Augustinian Abbey of St. Thomas in <b>Brno</b> [bir-noe] in what is now the Czech Republic.		
1	Name this 19 <sup>th</sup> century monk who performed genetics experiments on pea plants.	Gregor Johann <u>Mendel</u>
2	Mendel focused on characteristics that had one of two phenotypes, one that was dominant and the other of which could be described with this adjective meaning that it was not expressed in <b>heterozygous</b> [heh-tuh-roe-ZIE-gus] plants.	<u>recessive</u>
3	This name was given to Mendel's Second Law, also known as his Inheritance Law, stating that the passing on of one gene did not impact the passing on of a different gene.	Law of <u>Independent Assortment</u>

**Question #10: Science – Biology**

10 points per part

These molecules contain twice as many hydrogen atoms as oxygen atoms in addition to carbon.		
1	Name these energy sources that are often contrasted with fats and proteins.	<u>carbohydrates</u> (or <u>saccharides</u> )
2	This kind of carbohydrate containing glucose is found in wheat, potatoes, and corn. This is sometimes called <b>amylum</b> [AM-uh-lum], since it is made of <b>amylose</b> [AM-uh-lose] and <b>amylopectin</b> [am-uh-loe-PEK-tin].	<u>starches</u>
3	This element is used to test for starch because it turns dark blue when they are combined.	<u>Iodine</u> (prompt on "I")



**Question #11: Fine Arts – Musical Theater**

*10 points per part*

This Marvin Hamlisch musical takes place at an audition.		
<b>1</b>	Name this musical that opens with the number “I Hope I Get It”.	A <u><i>Chorus Line</i></u>
<b>2</b>	<i>A Chorus Line</i> ends with this song, about, “A singular sensation, every little step she takes.”	“ <u>One</u> ”
<b>3</b>	Hamlisch also wrote the music for <i>The Spy Who Loved Me</i> , the tenth movie featuring this protagonist.	James <u>Bond</u> 007

**Question #12: Fine Arts – Musical Theater**

*10 points per part*

This Rodgers and Hammerstein musical is about Curly McLain and Laurey Williams.		
<b>1</b>	Identify this musical named for the territory it is set in. That territory is now a state.	<u><i>Oklahoma!</i></u>
<b>2</b>	Name this song from <i>Oklahoma!</i> sung by Curly, who has, “A wonderful feeling everything’s going,” his way.	“ <u>Oh, What a Beautiful Morning</u> ”
<b>3</b>	Another Rodgers and Hammerstein musical that starts with an upbeat song is this one set in Siam that opens with “I Whistle a Happy Tune”.	<u><i>The King and I</i></u>



**Question #13: Mathematics – Geometry**

*10 points per part*

It is also known as a regular hexahedron.		
<b>1</b>	Name the Platonic solid in which all of the angles are right angles.	<u><b>cube</b></u>
<b>2</b>	This is the number of edges, or line segments, of a cube.	<u><b>12</b></u>
<b>3</b>	If a cube has a volume of 32, then what is the length of each side? Put your answer in simple radical form.	<u><b>2</b></u> times the <u><b>cubed root</b></u> of <u><b>4</b></u> (accept equivalents)

**Question #14: Mathematics – Geometry**

*10 points per part*

This shape is an ellipsoid for which all of the radii are equal.		
<b>1</b>	Name this shape that can be represented by the equation $x^2+y^2+z^2=r^2$ .	<u><b>spheres</b></u>
<b>2</b>	This is the common name given to the problem of fitting spheres into as tight a space as possible. Its Kepler conjecture was proven by Thomas Hales in 1998.	sphere <u><b>packing</b></u>
<b>3</b>	This is the volume of a sphere with a radius of 1. Ignore units.	<u><b>4/3 pi</b></u> (or <u><b>4 pi/3</b></u> ) (accept equivalents)



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3<sup>rd</sup> Section  
Toss-up Questions

**Question #15: Literature – British Literature**

10 points

In one novel by this author, the protagonist stole dark glasses, sideburns, and clothes from a theatrical shop in Iping. In another novel, this author wrote of a group of cannibals that tried to trap the protagonist inside the pedestal of a white sphinx. He wrote of Griffin experimenting with making his cells transparent. He also wrote of a man who encountered the Morlocks and Eloi and travelled to 802,701 AD. Name this author of <i>The Invisible Man</i> and <i>The Time Machine</i> .	Herbert George <u>Wells</u>
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**Question #16: Mathematics – Math Concepts**

10 points

The method of these things accomplishes subtraction using addition. This term refers to a set that contains all of the elements not in a given set, or to the event that a given event does not happen. If two angles have this relationship, then their tangents are reciprocals. The sine of an angle equals the cosine of the angle with this relationship to the first angle. Name this term that also refers to angles that add to ninety degrees.	<u>Complementary</u>
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3<sup>rd</sup> Section  
Toss-up Questions

**Question #17: Social Studies – U.S. History**

*10 points*

This politician used the voting record of Vito Marcantonio to smear Helen Douglas via “pink sheets.” In one speech, this politician claimed that his wife owned a “respectable Republican cloth coat.” In response to accusations concerning an \$18,000 slush fund, this person claimed he had been given a dog. This leader forced the resignation of Elliot Richardson and fired William Ruckelshaus during the Saturday Night Massacre. Name this president who defeated Hubert Humphrey and George McGovern and who resigned following the Watergate scandal.

Richard Milhous Nixon

**Question #18: Science – Physics**

*10 points*

For a particle in circular motion in a magnetic field, this quantity equals linear momentum divided by the product of radius and magnetic field strength. The force of a magnetic field on any particle equals this quantity times the cross product of velocity and magnetic field. This quantity also equals the force of an electric field divided by its field strength, and this equals work divided by electric potential difference. Name this quantity that can be measured in coulombs [koo-lomes].

(net) electric charge





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3<sup>rd</sup> Section  
Toss-up Questions

**Question #19: Fine Arts – Art History**

10 points

One painting by this artist shows his wife wearing a blond wig and holding a white fan while wearing a red Japanese costume. He spent a lot of time from 1899 to 1905 in London, painting several pictures of Charing Cross Bridge and Westminster Palace. Many years earlier, this artist had painted several works set at **Argenteuil [ahr-jen-TOOL]**. This painter also painted his Japanese bridge and several water lilies around his garden at **Giverny [gi-VEHR-nee]**. Name this Frenchman who painted *Impression, Sunrise*.

Oscar-Claude **Monet**

**Question #20: Literature – World Literature**

10 points

One of this writer's plays centers on maidens in Oriental clothing and holding wands. In that play, a king warns that Zeus would send a man-eating monster if the maidens were not protected. This author of *The Suppliants* described the ultimate fight between **Eteocles [ee-tee-OE-klees]** and **Polyneices [pol-ih-NIGH-sees]** in *Seven Against Thebes [theebs]*. Name this author who wrote of Agamemnon's family in the *Oresteia* trilogy.

**Aeschylus**



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4<sup>th</sup> Section  
Teamwork Questions

**Question #21: Mathematics – Pre-Calculus**

*10 points per part*

This theorem is useful for taking complex numbers expressed in polar form and raising them to powers.		
1	Identify this theorem named for a French mathematician that can also be used with fractional exponents.	(Abraham) <b>de Moivre</b> 's theorem (or formula)
2	Using de <b>Moivre's</b> [ <b>mauv's</b> ] theorem or any other method, find the value of the quantity $1+i$ raised to the 4 <sup>th</sup> power.	<b>-4</b> (or <b>4 cis 180</b> degrees or <b>4 cis pi</b> or equivalents)
3	How many solutions are there to the equation $x^5 = 4i$ ? You do not need to find the actual solutions.	<b>5</b>

**Question #22: Mathematics – Pre-Calculus**

*10 points per part*

These types of equations are often used to graph curves in space.		
1	Name these equations that express the coordinates in terms of a variable that is not a coordinate, often using the letter t.	<b>parametric</b> (equations) (or <b>parameter</b> )
2	Give the five-letter name for the shape generated by the parametric equations $x = t$ divided by pi, $y = \cos t$ , and $z = \sin t$ .	<b>helix</b>
3	Give the displacement for that helix as t goes from zero to pi radians. Make sure that you find the displacement rather than the arc length.	<b>square root of 5</b> (accept <b>root 5</b> or <b>radical 5</b> )



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**4<sup>th</sup> Section**  
**Teamwork Questions**

**Question #23: Social Studies – U.S. History**

*10 points per part*

One major candidate in this election blundered when he referred to tariffs as “a local question.”		
<b>1</b>	Name this election in which James Weaver won 3% of the popular vote for the Greenback party. Winfield Scott Hancock lost the electoral vote 214-155, but only trailed by 10,000 popular votes.	United States Presidential Election of <b><u>1880</u></b>
<b>2</b>	This Republican won the election, and stood up to the patronage system of Roscoe Conkling. His presidency lasted only six months.	James Abram <b><u>Garfield</u></b>
<b>3</b>	This self-proclaimed Stalwart was refused an appointment, and got his revenge by shooting President Garfield.	Charles Julius <b><u>Guiteau</u></b>

**Question #24: Social Studies – U.S. History**

*10 points per part*

According to this program’s formulator, this “rests on abundance and liberty for all.”		
<b>1</b>	Name this program that followed the New Frontier and was announced at speeches at Ohio University and the University of Michigan in 1964.	The <b><u>Great Society</u></b>
<b>2</b>	This President set out the concept of the Great Society while running in an election against Barry Goldwater.	Lyndon Baines <b><u>Johnson</u></b> (accept <b><u>LBJ</u></b> )
<b>3</b>	In his 1964 State of the Union Address, Lyndon Johnson outlined his plans for this so-called conflict, which included making the Food Stamp Program permanent.	<b><u>War on Poverty</u></b>



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4<sup>th</sup> Section  
Teamwork Questions

**Question #25: Science – Chemistry**

*10 points per part*

This measurement is also known as substance concentration.		
<b>1</b>	Name this ratio of the moles of solute and the liters of solution.	<u>molarity</u> (or <u>molar concentration</u> , do not accept “molal”ity)
<b>2</b>	Molarity is divided by an equivalence factor to get this measure of concentration associated with gram equivalents.	<u>normality</u> (or <u>normal concentration</u> )
<b>3</b>	In Raoult’s law, vapor pressure is multiplied by this measure of the concentration of solute in a solvent.	<u>mole fraction</u>

**Question #26: Science – Chemistry**

*10 points per part*

This state generally occurs when a forward reaction and a backwards reaction are going at the same rate.		
<b>1</b>	Name this balanced situation.	chemical <u>equilibrium</u> (accept longer answers)
<b>2</b>	Identify the principle, also called the Equilibrium Law, named for a Frenchman stating that certain physical changes lead to a new equilibrium.	Le <u>Chatelier</u> ’s principle
<b>3</b>	This scientist studied the relationship between temperature and equilibrium. The factor named for him is used to calculate osmotic pressure.	Jacobus Henricus <u>van’t Hoff</u> , Jr.



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4<sup>th</sup> Section  
Teamwork Questions

**Question #27: Literature – British Literature**

10 points per part

Darzee and Chuchundra aided this creature in a fight with “wrinkle-skin,” while Darzee’s wife aided him in a quest to dispatch a group of eggs.		
1	Name this creature whose mother used to stay with the General at Segowlee. It killed Karait, and started one fight that was ended by a gunshot from Teddy’s father.	<u>Rikki-tikki-tavi</u> (prompt on “red-eyes”)
2	Rikki-tikki-tavi was this kind of animal. Upon meeting him, the cobra Nag knew to be afraid, which is why Nagaina was signaled to take Rikki-tikki-tavi from behind.	<u>mongoose</u>
3	“Rikki-tikki-tavi” was penned by this author of “If” and <i>The Jungle Book</i> .	Rudyard <u>Kipling</u>

**Question #28: Literature – British Literature**

10 points per part

In response to Davin claiming that Ireland should be first in everything, this character compared the nation to an old sow that ate her offspring.		
1	Name this son of Simon who was reminded of his youth by a dog carcass rolling in the surf. While studying to become a priest, he drew ire for not signing a petition for world peace.	Stephen <u>Dedalus</u>
2	Stephen Dedalus was created by this author of <i>Finnegan’s Wake</i> and <i>Dubliners</i> .	James Augustine Aloysius <u>Joyce</u>
3	In this novel, Stephen is a schoolteacher who pals around with Buck Mulligan. At one point, he flashed back to when he refused to pray for his mother on her deathbed.	<u>Ulysses</u>



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5<sup>th</sup> Section  
Toss-up Questions

**Question #29: Mathematics – Math Concepts**

10 points

This is the value of a closed path integral of work in a conservative vector field. The only function whose domain is the reals and that is both even and odd only gives this number as an output. This number is used in the name of a game in which the total gains equal the total losses. If the product of two numbers equals this number, then one of those numbers equals this number. This is the value of the dot product of two perpendicular vectors, and this number is the additive identity. Name this real number that is neither positive nor negative.

zero (or equivalents)

**Question #30: Social Studies – World History**

10 points

This leader failed to uphold his end of the Treaty of Tarentum despite receiving the troops requested for a fight against the **Parthians** [PAHR-thee-uns]. His military successes included naval victories at Cape **Naulochus** [NOW-loe-kus] and the Gulf of **Ambracia** [am-BRAY-shuh]. Marcus Agrippa led the victorious forces in both of those battles, and the latter led to a resounding victory over Marc Antony and Cleopatra at **Actium** [AK-tee-um]. Along with Marc Antony and Marcus Lepidus, this man formed the Second Triumvirate. Name this Roman emperor, the successor to Julius Caesar.

Caesar Augustus (accept Gaius Octavius or Gaius Julius Caesar Octavianus)



**Question #31: Science – Biology**

10 points

These things are surrounded by spikes called **peplomers** [PEP-luh-mers]. Positive- and negative-sense make up two of the seven categories developed by David Baltimore for these objects. When these things do not have a **lipid** [LIH-pid] membrane, they are called naked. Some of these replicate by reverse transcription, and these are surrounded by a protein shell called a capsid. Name these objects that can only replicate inside living cells and are responsible for many diseases.

viruses

**Question #32: Literature – U.S. Literature**

10 points

This poet wrote of his soul standing “surrounded, in measureless oceans of space” while observing a quiet creature. In another poem, this man wrote of “the lady of this teeming and turbulent city, sleepless amid her ships.” The author of “A Noiseless Patient Spider” and “Drum-Taps,” his poems written in honor of Abraham Lincoln include “O Captain! My Captain!” and “When Lilacs Last in the Dooryard Bloom’d.” Name this author of the poetry collection *Leaves of Grass*.

Walter Whitman, Jr.



**Extra Question #1: Mathematics – Math Concepts**

*10 points*

Pairs of these things are subject to the Axiom of pairing, which in turn is subject to the Axiom schema of replacement. A commonly used set of axioms for handling these was developed by Abraham **Fraenkel** [FRANE-kul] and Ernst Zermelo. The quantity commonly thought of as their size is called cardinality. Name this unordered collections of elements that can be operated on by union and intersection.

sets

**Extra Question #2: Social Studies – U.S. History**

*10 points*

Cannon from this site was transported by Henry Knox to Dorchester Heights in Boston to scare the British. Following a failed attack on Quebec, revolutionary forces retreated to this site, later re-taken along with Mount Independence by John Burgoyne. This fort was initially called Carillon when built by the French during the French and Indian War. Name this fort taken during the American Revolution by Ethan Allen and the Green Mountain Boys.

Fort **Ticonderoga** (prompt on “Carillon”)





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**Extra Question #3: Fine Arts – Composers of the Modern Era**

10 points

Sarah Vaughan won an Emmy for performing songs from this composer. One of those songs was “I’ve Got a Crush on You,” which appeared in the shows *Treasure Girl* and *Strike Up the Band*. His song “A Woman is a Sometime Thing” appears in an opera set in the fictitious Charleston, South Carolina neighborhood called Catfish Row. Name this composer of the opera *Porgy and Bess* who included a clarinet glissando at the beginning of his piece *Rhapsody in Blue*.

George Gershwin

**Extra Question #4: Science – Health**

10 points

This value can be increased by taking **midodrine** [MIH-doe-dreen] or by the release of **aldosterones** [al-doe-STEHR-ones], and both fluid balance and this value are regulated by the **renin-angiotensin** [reh-nin an-jee-oe-TEN-sin] system. If this value is low, the result is low perfusion, a symptom of shock. If this value is high, the person is at risk for a stroke. Two numbers are found when this is measured. This value is measured with a **sphygmomanometer** [sfig-moe-ma-NAH-mee-ter], which usually includes a cuff that goes around the arm. Name this quantity that has systolic and diastolic values.

(arterial) blood pressure



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**Extra Question #5: Literature – World Literature**

*10 points*

On the advice of Countess Ivanova, this character's son was told she was dead. This mother of Seryozha moved to Italy after birthing a daughter. She was called upon to sort out a quarrel between Dolly and Stepan, her brother. Her husband considered a duel, separation, and divorce upon her revealing her true feelings for Alexei Vronski. Name this title character of a Leo Tolstoy novel.

**Anna Karenina** (accept either)



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**Extra Question #6: Social Studies – World History**

*10 points per part*

The seeds for this event were sown at the Hampton Court Conference, when its planned target attempted to appease the Puritans and re-introduced fines for <b>recusancy</b> [ree-KYOO-sun-see].		
<b>1</b>	Name this attempt on the life of the king organized by Robert Catesby at the Duck and Drake. Guy Fawkes was in attendance.	<b><u>Gunpowder</u></b> Plot
<b>2</b>	The Gunpowder Plot was an attempt to take the life of this Scottish king, the successor to Elizabeth the First who was eventually succeeded by Charles the First.	<b><u>James I</u></b> (accept <b><u>James VI</u></b> of <b><u>Scotland</u></b> )
<b>3</b>	This nobleman was granted an annual annuity after presenting an anonymous letter that warned him not to attend Parliament. He presented the letter to James the First's first minister.	Baron <b><u>Monteagle</u></b> (accept William <b><u>Parker</u></b> )

**Extra Question #7: Social Studies – World History**

*10 points per part*

This conflict saw simultaneous battles at Rorke's Drift and <b>Isandlwana</b> [eye-SAN-dul-wah-nah], and was the brain child of Sir Bartle <b>Frere</b> [frehr].		
<b>1</b>	Name this 1879 armed conflict, which was preceded by an ultimatum presented to <b>Cetshwayo</b> [ketsh-WIE-oe], the half-nephew of <b>Shaka</b> [SHAH-kah].	Anglo- <b><u>Zulu</u></b> War
<b>2</b>	The Zulu War was instigated in order to organize a British-held colony in this modern-day republic.	<b><u>South Africa</u></b>
<b>3</b>	The plan for organizing the South Africa colony was based on a similar plan Lord Carnarvon used in uniting this North American colony.	<b><u>Canada</u></b>



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**Extra Question #8: Mathematics – Trigonometry**

*10 points per part*

This name can be applied to several formulas in trigonometry, such as the double angle or half angle formula. It is synonymous with tautology.		
<b>1</b>	Give this name for an equation with variables that is always true no matter what values are substituted in for the variables.	<u>identity</u> (or <u>identities</u> )
<b>2</b>	According to a trigonometric identity, what is the value of secant squared of x minus tangent squared of x?	<u>1</u> (do not accept “-1”)
<b>3</b>	According to a hyperbolic trigonometric identity, what is the value of hyperbolic sine squared of x minus hyperbolic cosine squared of x?	<u>-1</u> (do not accept “1”)

**Extra Question #9: Mathematics – Trigonometry**

*10 points per part*

One of these units equals approximately 57 degrees.		
<b>1</b>	Name this unit used to measure angles. When it is a central angle in a circle, this equals the ratio of arc length to radius.	<u>radians</u>
<b>2</b>	Radians are useful in this branch of mathematics focused on derivatives and integrals because they remove the necessity of multiplying by a constant when taking the derivative of the sine or cosine function.	(integral or differential) <u>calculus</u>
<b>3</b>	Find the tangent of the quantity seven pi over six radians.	<u>root 3 / 3</u> (or <u>one-third root 3</u> or <u>one-third radical 3</u> or equivalent)



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Round # 5  
1<sup>st</sup> Section  
Toss-up Questions

**Question #1: Science – Earth Science**

*10 points*

These objects leave chatter marks when they pluck. These grow at accumulation zones, and they shrink at ablation zones, with sudden shrinkage caused by calving. The debris left behind by these objects accumulates to form moraines. These can leave behind depressions called **cirques [sirks]**, which are sometimes filled with tarn lakes. To be classified as one of these, an object has to persist over a long period of time, and these are generally found on mountains or in polar regions. Name these large bodies of ice.

glaciers

**Question #2: Miscellaneous – Industrial Arts**

*10 points*

Due to pressure from the Federal Highway Administration, improvements were made to the electroslag version of this process. The V butt and the lap are two common joints utilized in this process. A tungsten electrode is utilized in its **TIG [tig]** form. This process commonly involves an **oxyacetylene [ok-see-uh-SEE-tuh-leen]** torch. Name this process sometimes contrasted with **soldering [SAH-der-eeng]** by which metals are joined together, usually involving heat.

welding



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Round # 5  
1<sup>st</sup> Section  
Toss-up Questions

**Question #3: Literature – British Literature**

10 points

This author wrote of a Single Gentleman who sought to aid his brother, who gambled away the income from the title establishment. In another novel by this author, **Monsieur Blandois** [mon-sur blan-dwah] blackmailed the title character's employer regarding the withholding of funds. This author wrote of Orlick's attack on Mrs. Joe Gargery, who took in her brother Pip. Name this author of *David Copperfield* and *Great Expectations*.

Charles Dickens

**Question #4: Mathematics – Math Concepts**

10 points

This mathematical operation can be expressed as a linear combination using **Bezout's** [bay-zoo's] identity. This equals the number of lattice points crossed by a line from the origin to the coordinates of the two input values. If this value is one, then its inputs are called relatively prime. This value found by the **Euclidean** [yoo-KLIH-dee-un] algorithm equals the product of two numbers divided by their least common multiple. This operation can also be evaluated by multiplying the shared prime factors of a set of numbers. Name this largest value that goes into all of a set of numbers.

**greatest common factor** (accept **gcf**, **greatest common divisor**, or **gcd**; accept highest or largest in place of greatest)



**Question #5: Social Studies – World History**

10 points

Domestically, this ruler greatly expanded the use of *missi dominici* [mis-see doe-mih-NEE-chee] as tools of governance. His reign also saw a so-called “Renaissance” which included the establishment of the Palatine school led by *Alcuin* [al-kwin]. During a feud with his brother, this leader married *Desiderata* [deh-si-duh-RAH-tah] as a show of unity with the Lombards, but he abandoned the alliance after the death of his brother Carloman. This leader was buried at *Aachen* [AH-ken] Cathedral when he died in 814. Name this King of the Franks and first Holy Roman Emperor.

Charlemagne (accept Charles I, Charles the Great, Charles le Grand, Carolus Magnus, Karl der Grosse)

**Question #6: Science – Biology**

10 points

A growth in these organs that can be caused by *Denys-Drash* [deh-nees drash] syndrome is a Wilms tumor. These organs secrete *calcitriol* [kal-sih-TRIE-ol] and EPO. Several nutrients are reabsorbed by these organs’ proximal convoluted tubules, each of which is between a Bowman’s capsule and a loop of *Henle* [HEN-lee] inside a *nephron* [NEH-fron]. The *adrenal* [uh-DREE-nul] glands are on top of these organs. The waste from these organs is sent through a *ureter* [YUR-eh-tur] to the bladder. Name these organs that filter the blood and can produce very painful stones.

kidneys



### Question #7: Mathematics – Trigonometry

10 points per part

Consider the graph generated by the function $y$ equals two plus five times the cosine of the quantity $x$ plus the fraction two pi over three. $\left[ y = 2 + 5 \cos \left( x + \frac{2\pi}{3} \right) \right]$		
1	Give the name of the role played by the value five in the equation, which gives the amount of the vertical stretch of a trigonometric graph.	<u>amplitude</u>
2	Give the maximum value of the $y$ -coordinate on the graph of the function.	<u>7</u>
3	Give the least positive value of an $x$ -coordinate which causes the $y$ -coordinate of this graph to equal 7.	<u>4 pi / 3</u> (or <u>four-thirds pi</u> or equivalents)

### Question #8: Mathematics – Trigonometry

10 points per part

If an angle is drawn in standard position on the unit circle, this function gives the distance from the origin to the intersection of the terminal side of the angle with the line $y=1$ .		
1	Give this function equal to the ratio of the hypotenuse length to the length of the side opposite an angle.	<u>cosecant</u> (or <u>csc</u> , do not accept “secant”)
2	A formula for the derivative of the cosecant function is given by multiplying the opposite of the cosecant function times this function.	<u>cotangent</u>
3	This is the cosecant of 45 degrees.	square <u>root</u> of <u>2</u> (accept <u>radical 2</u> or equivalents)





**Question #9: Social Studies – Current Events**

*10 points per part*

In September 2013, this state had two Democratic state senators recalled.		
<b>1</b>	Senate President John Morse and representative Angela Giron were the targets of recall campaigns within this state after voting in favor of gun control.	<u>Colorado</u>
<b>2</b>	Colorado's government moved fairly quickly to enact tougher gun control laws in the wake of a mass shooting at a movie theater in this city.	<u>Aurora</u>
<b>3</b>	To fight the money contributed by the National Rifle Association, this New York mayor contributed \$350,000 to support the two incumbents.	Michael <u>Bloomberg</u>

**Question #10: Social Studies – Current Events**

*10 points per part*

Under Prime Minister John Howard, this person served as shadow minister for foreign affairs.		
<b>1</b>	Name this man, who was ousted as Prime Minister by his deputy, only to regain the post. In September 2013, he lost another election, this time to Liberal leader Tony Abbott.	Kevin <u>Rudd</u>
<b>2</b>	Kevin Rudd's time as prime minister of this country saw a formal apology issued to <b>Aborigines</b> [a-boe-RIH-jih-nees] who were part of the Stolen Generation.	Commonwealth of <u>Australia</u>
<b>3</b>	This woman became Australia's first female prime minister when she defeated Kevin Rudd in a leadership vote within the Labour Party in 2010.	Julia <u>Gillard</u>



### Question #11: Science – Physics

10 points per part

This particle is the carrier of the electromagnetic force.		
1	Name this quantum of light.	<u>photons</u>
2	One verification of the lack of mass of a photon is the success of this law giving an inverse square relationship between electric force and distance from a static charge.	<u>Coulomb</u> 's law
3	This effect is the increase in wavelength of a photon when it is scattered by a charged particle, usually an electron.	<u>Compton</u> effect

### Question #12: Science – Physics

10 points per part

Physics has several fictitious forces, which means that they are not perceived in every reference frame.		
1	Fictitious forces are generally caused by this tendency, the subject of Newton's first law of motion. Give a one-word answer.	<u>inertia</u> (or <u>inertial</u> )
2	One fictitious force is this effect, caused by rotating reference frames, that causes motion on Earth's surface to be deflected based on where it is relative to the equator.	<u>Coriolis</u> (force or effect)
3	The Coriolis force can be calculated by multiplying this number times the cross product of velocity and angular velocity.	<u>2</u> (or <u>-2</u> )



**Question #13: Literature – World Literature**

10 points per part

Bonancieux [boe-nahn-syoo] approached this Gascon after Constance was kidnapped.		
1	Name this character who foiled a plot to steal two diamonds from a set of studs given to the queen. He later pretended to be Monsieur de Wardes, and as such received a sapphire ring.	<u>D'Artagnan</u>
2	D'Artagnan [d-ahr-tah-nyan] is the young protagonist of this author's <i>The Three Musketeers</i> .	Alexander <u>Dumas</u> pere
3	This companion of D'Artagnan recognized the sapphire ring as a gift to his wife. This former count attempted to hang his wife after discovering the fleur-de-lis [flur-de-lee] branded on her shoulder.	<u>Athos</u> (or Comte Olivier de la <u>Fere</u> )

**Question #14: Literature – World Literature**

10 points per part

In this short novel, a Russian traveler reveals the grave illness of one of the main characters.		
1	Name this story in which that illness struck a man who was attempting to educate the natives while shipping back boatloads of ivory.	<u>Heart of Darkness</u>
2	<i>Heart of Darkness</i> was written by this Polish-born author of <i>Nostromo</i> and <i>Lord Jim</i> .	Josef Tedor <u>Konrad</u> Nalecz Korzeniowski
3	This manager of the Inner Station, in attempting to convert the natives, ended up becoming as savage as them.	<u>Kurtz</u>



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Toss-up Questions

**Question #15: Fine Arts – Classical/Opera**

10 points

<p>This composer wrote parts for three basset horns and included Gregorian chants in his <i>Maurerische Trauermusik</i> [mor-REESCH trow-er-MYOO-sik]. One of his operas begins with three ladies killing a serpent after a prince faints. He left out the piano left hand notes in his 26<sup>th</sup> Piano Concerto, which was nicknamed “Coronation.” Don Alfonso tries to show that all women are unfaithful in one of this composer’s operas, <i>Così fan tutte</i> [KOE-see fahn TOO-tay]. Name this composer of <i>The Magic Flute</i> who also wrote the <i>Jupiter Symphony</i> and “Eine Kleine Nachtmusik.”</p>	<p>Wolfgang Amadeus <u>Mozart</u></p>
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**Question #16: Literature – World Literature**

10 points

<p>This work describes a prank involving a notice indicating one character’s scheduled times for using the restroom. Its author had to share a room with the dentist Albert Dussel. Given to its author’s father by Miep Gies [mip gis], this was written while its author resided at 263 Prinsengracht. The person who wrote this book died of typhus with her sister Margot in 1945 at Bergen-Belsen. Name this journal written by a young Dutch Jew during the Nazi occupation.</p>	<p><u>Diary of Anne Frank</u> (accept <u>Diary of a Young Girl</u> or <u>Het Achterhuis</u>)</p>
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Toss-up Questions

**Question #17: Social Studies – Geography**

*10 points*

One section of this river flows over the **Fula [fuh-lah]** rapids and through the Al Sudd swamp. That section is the Bahr al-Jabal, which joins the Sobat at Malakal. Another tributary flows through Al-Duwaym and Lake Victoria before joining the other major tributary, which begins at Lake Tana in Ethiopia. Those major tributaries are named White and Blue. Name this river that empties into the Mediterranean Sea through its delta in Egypt.

**Nile** River (accept **White Nile** until “Those tributaries”)

**Question #18: Science – Chemistry**

*10 points*

This process is used with **thiosulfate [thie-uh-SUL-fate]** in the last step of the Winkler test to measure oxygen in water. A variation of this process used to test for the presence of water was invented by Karl Fischer. Graphs representing this process usually have a point of inflection called the equivalence point. Those graphs usually show volume on the x-axis and **pH [p h]** on the y-axis. Name this process of adding a reactant to determine the concentration of a solution, often using an indicator.

**titration** (accept other word forms)



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Toss-up Questions

**Question #19: Literature – Mythology**

10 points

After **Heracles** [HEHR-uh-klees] slew one of this god's cattle, **Menoetes** [meh-NOE-eh-tees] wrestled Heracles. One of this god's lovers was turned into a mint plant by his jealous wife, and another lover was turned into a white poplar. Also called "the Rich One," this god owned a helmet that made its wearer invisible. Due to eating **pomegranate** [po-meh-GRa-net], Persephone had to spend part of her time with this god, her husband. This god combined with his brothers Zeus and Poseidon to defeat the Titans. Name this Greek lord of the underworld.

**Hades** (accept **Pluto** until "Greek")

**Question #20: Social Studies – U.S. History**

10 points

The diplomacy of Chief Black Buffalo defused an altercation between the people following these leaders and the Lakota. Those people built Fort Mandan before being led across the Bitterroot range by Old Toby. Undertaken by the Corps of Discovery, the group led by these people eventually included Toussaint Charbonneau and his wife, the **Shoshone** [show-SHOW-nee] Indian **Sacagawea** [sah-kah-jah-WAY-uh]. Name these two leaders of a trip to the Pacific Northwest ordered by President Thomas Jefferson.

**Lewis & Clark** Expedition (accept equivalents, both names required)



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4<sup>th</sup> Section  
Teamwork Questions

**Question #21: Mathematics – Algebra**

*10 points per part*

Complex numbers have two components, one of which is real.		
1	Give the name of the other component, which is usually represented with the letter b and multiplied by i.	<u>imaginary</u>
2	Find the imaginary component of the result when the quantity, $2+i$ , and quantity, is multiplied by the quantity $4-2i$ . Give only the imaginary component.	<u>0</u> (accept <u>0i</u> )
3	Find the value of i raised to the fourth power.	<u>1</u>

**Question #22: Mathematics – Algebra**

*10 points per part*

Answer the following about polynomials.		
1	What name is given to a polynomial with two terms?	<u>binomial</u>
2	What name is given to a polynomial with degree four?	<u>quartic</u>
3	Factor the quartic binomial $9x^4-25$ over the integers.	<u><math>(3x^2+5)(3x^2-5)</math></u> (or <u><math>(3x^2-5)(3x^2+5)</math></u> or equivalent)



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4<sup>th</sup> Section  
Teamwork Questions

**Question #23: Literature – British Literature**

10 points per part

This son of Thomakin committed suicide after being caught up in the <b>orgyporgy</b> [or-jee-por-jee].	
<b>1</b>	Name this son of Linda who was exposed to society by Bernard Marx. <b><u>John</u></b> the Savage
<b>2</b>	John the Savage whipped Lenina Crowne in this novel set in the year 632 After Ford. <b><u>Brave New World</u></b>
<b>3</b>	<i>Brave New World</i> was written by this author of <i>Point Counterpoint</i> and <i>Crome Yellow</i> . Aldous <b><u>Huxley</u></b>

**Question #24: Literature – British Literature**

10 points per part

At one point, this character practices the art of gleaning while his friend pretends to be a prince.	
<b>1</b>	Name this courtier who repeatedly wins a bet by guessing that a coin will come up heads. <b><u>Rosencrantz</u></b>
<b>2</b>	Rosencrantz's friend Guildenstern pretended to be this Prince of Denmark, a title Shakespeare character. <b><u>Hamlet</u></b>
<b>3</b>	Rosencrantz and Guildenstern are seen flipping coins at the beginning of this author's play <i>Rosencrantz and Guildenstern are Dead</i> . Tom <b><u>Stoppard</u></b> (accept Tomas <b><u>Straussler</u></b> )





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4<sup>th</sup> Section  
Teamwork Questions

**Question #25: Social Studies – U.S. History**

*10 points per part*

This battle actually took place in Prophetstown.		
1	Name this November 1811 battle after which the Shawnee leader <b>Laulewasikau</b> [lau-leh-why-sih-kow], also known as The Prophet, fled to Canada.	Battle of <b><u>Tippecanoe</u></b>
2	The Battle of <b>Tippecanoe</b> [tih-peh-kah-noo] served as a source for a campaign slogan for this winning commander and victor in the 1840 Presidential election.	<b><u>William Henry Harrison</u></b>
3	The Battle of Tippecanoe took place in this state.	<b><u>Indiana</u></b>

**Question #26: Social Studies – U.S. History**

*10 points per part*

This leader headed the offensive that drove the Japanese out of Papua New Guinea.		
1	Name this general who oversaw the creation of a liberal constitution during the Allied occupation of Japan after World War Two.	Douglas <b><u>MacArthur</u></b>
2	Despite the successful landing at Inchon, this president relieved MacArthur of command of the UN forces during the Korean War due to insubordination.	Harry S <b><u>Truman</u></b>
3	During his stint as Army Chief of Staff, MacArthur organized the forces sent to disburse this protest group led by Walter Waters.	<b><u>Bonus Army</u></b> (accept <b><u>Bonus Expeditionary Force</u></b> )



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**Round # 5**  
**4<sup>th</sup> Section**  
**Teamwork Questions**

**Question #27: Fine Arts – Art History**

*10 points per part*

Name these architects.		
<b>1</b>	This architect designed the Walt Disney Concert Hall and the Experience Music Project.	Frank <u><b>Gehry</b></u> (or Frank Owen <u><b>Goldberg</b></u> )
<b>2</b>	This architect designed the glass pyramids in front of the Louvre.	Ieoh Ming <u><b>Pei</b></u>
<b>3</b>	This architect designed the Shard, a London skyscraper that opened in 2012.	Renzo <u><b>Piano</b></u>

**Question #28: Fine Arts – Art History**

*10 points per part*

His <i>Moon and Half Dome</i> is set in Yosemite Park.		
<b>1</b>	Name this photographer who took many black-and-white landscapes set in the American Southwest.	Ansel <u><b>Adams</b></u>
<b>2</b>	Like Dorothea Lange, Adams took pictures of Americans at the Manzanar War Relocation Center, most of whom were natives of this country.	<u><b>Japan</b></u> ese
<b>3</b>	An Adams work showing a moonrise was taken on November 1, 1941 just outside of this town in New Mexico.	<u><b>Hernandez</b></u>



**Question #29: Mathematics – Math Concepts**

*10 points*

The derivative of the inverse of this function on  $x$  equals one over the square root of the quantity one minus  $x$  squared. This function is used to build the **Fourier [for-ee-ay]** transform of odd functions. The magnitude of a cross product is the product of the vectors' magnitudes times this function of the angle between them. The derivative of this function is the cosine function. Name this trigonometric function that gives the  $y$ -coordinate on the unit circle, and that gives the ratio of the opposite side to hypotenuse length in a right triangle.

sine (accept an additional variable such as  $\sin x$  or  $\sin \theta$ , do not accept "cosine")

**Question #30: Social Studies – World History**

*10 points*

New rulers of this empire, called "Great Speakers," were obligated to lead "coronation wars." One such war fought against the Olomites doomed Tizoc to a short reign. Their penultimate leader died during a smallpox epidemic following a cannibalistic ritual, but not before driving out invaders during La **Noche Triste [NOE-chay TREES-tay]**. Name these **Nahuatl [nah-HWAH-tul]** speakers who were conquered by forces under Hernan Cortes at **Tenochtitlan [teh-noech-TEET-lahn]**.

Aztecs



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Round # 5  
5<sup>th</sup> Section  
Toss-up Questions

**Question #31: Literature – U.S. Literature**

10 points

This author wrote about a reporter from the *Defender* who compared the people at Jesus' crucifixion to people in Little Rock. She wrote of a woman who gave up dreams of living in New York to marry a man who coveted entry into the Foxy Cats Club, Paul Phillips. One of her poems described seven pool players at the Golden Shovel who "sing sin" and "thin gin." Name this author of the poetry collection *Annie Allen* and the poem "We Real Cool."

Gwendolyn Elizabeth Brooks

**Question #32: Science – Physics**

10 points

Stephen Benton invented the most popular type of this phenomenon, the rainbow. In general, these are classified as either thin or thick, as amplitude or phase, and as transmission or reflection. Those classifications depend on the location of the reference beam when these are created and the spacing of their interference pattern. Dennis Gabor invented this technique whose creation was made practical by the development of lasers. Name these images which appear to be three-dimensional.

hologram (or holography)



**Extra Question #1: Social Studies – U.S. History**

*10 points*

One side to the negotiations over this treaty sent admiralty lawyer Williams Adams to negotiate it. Article Ten of this agreement dealt with the abolition of the slave trade. During negotiations, Lord Castlereagh was advised by the Duke of Wellington to “take the *status quo ante bellum*.” Name this treaty that brought an end to the War of 1812.

Treaty of Ghent

**Extra Question #2: Science – Physics**

*10 points*

This phenomenon explains why it is easier to hear noises across a lake at nighttime rather than during the day. This physical process is skewed in people who suffer from **keratoconus** [keh-rah-toe-KOE-nus] or astigmatism, and it can be impacted by direction in materials with **birefringence** [bie-ree-FRIN-jens]. Beyond a critical angle, total internal reflection occurs instead of this wave phenomenon. Name this phenomenon quantified by Snell’s Law, the bending of light as it changes from one medium to another.

refraction (accept word forms such as refract or refracting, do not accept diffraction)



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Extra Section  
Toss-up Questions

**Extra Question #3: Fine Arts – Art History**

10 points

Based on a misunderstanding of psychological testing, this artist made a series of works based on **Rorschach** [ROR-schock] inkblots. This artist's *Detail of the Last Supper* is also known as *Christ 112 Times*. He wallpapered at least one of his exhibitions with pink images of cow's heads. He also made several Brillo boxes, and he made images showing Liza Minelli, Elvis Presley, and Marilyn Monroe. Name this man nicknamed the Prince of Pop Art who repeatedly showed Campbell's Soup cans.

Andy Warhola

**Extra Question #4: Literature – U.S. Literature**

10 points

In "Liar!" one of these was given telepathy. In the story "Runaround," one of these is seen circling a pool of Selenium. In "Reason," Powell and Donovan develop one that founds a religion based on its ability to convert a beam of energy from the sun. These are not to harm a human being according to their first law. Name these objects for which three laws were developed by Isaac Asimov.

robots



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Toss-up Questions

**Extra Question #5: Mathematics – Math Concepts**

*10 points*

When this operation is applied to two **quaternions** [kwa-TEHR-nee-ons], it is anticommutative. If this operation is applied to a function and the derivative of another function, the result can be integrated by parts. For **matrices** [MAY-trih-ses], this operation pairs each of the rows of the first matrix with each of the columns of the second matrix. When this is applied to two prime numbers, the result is composite. Name this operation that can be done repeatedly using exponents and which can represent repeated addition.

**multiplication** (accept word forms, **product**, or **times**)



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**Round # 5**  
**Extra Section**  
**Teamwork Questions**

**Extra Question #6: Science – Biology**

*10 points per part*

This organ contains the right <b>atrioventricular</b> [ay-tree-oe-ven- <b>TRIH</b> -kyoo-lur] valve, which is also called the tricuspid valve.		
<b>1</b>	Name this muscular organ that pumps blood.	<b><u>heart</u></b>
<b>2</b>	The heart has four chambers, including two atria that take in blood, and these two chambers that push blood out.	(left and right) <b><u>ventricles</u></b>
<b>3</b>	Because of their shape, this is the name of the two valves blood travels through when it leaves the ventricles. These are also called the pulmonary and aortic valves.	<b><u>semilunar</u></b> valve(s)

**Extra Question #7: Science – Biology**

*10 points per part*

This organ includes the <b>cerebellum</b> [seh-reh-BEL-lum] and its namesake stem.		
<b>1</b>	Name this large organ inside your skull.	<b><u>brain</u></b>
<b>2</b>	This is the name given to the four divisions of the brain's cerebral cortex. These divisions are named frontal, <b>parietal</b> [puh-RIE-uh-tul], <b>occipital</b> [ok-SIH-pih-tul], and temporal.	<b><u>lobes</u></b>
<b>3</b>	This bundle of fibers connects the left and right halves of the brain.	<b><u>corpus callosum</u></b>





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Extra Section  
Teamwork Questions

**Extra Question #8: Literature – U.S. Literature**

10 points per part

Following a break-in in this play, one of the conspirators reveals his involvement by calling Williamson a liar.		
1	Name this play in which Williamson is one of four real estate salesmen trying to hawk overpriced land to unwitting buyers.	<u>Glengarry Glen Ross</u>
2	<i>Glengarry Glen Ross</i> was written by this playwright. He wrote about events surrounding Don's Resale Shop in <i>American Buffalo</i> .	David Alan <u>Mamet</u>
3	<i>Glengarry Glen Ross</i> and <i>American Buffalo</i> are both set in this Midwestern city.	<u>Chicago</u> , Illinois

**Extra Question #9: Literature – U.S. Literature**

10 points per part

The opening scene of this story takes place on Helseggen mountain.		
1	Name this tale in which the tour guide described a rainbow that he compared to the pathway between Time and Eternity at the vortex of the title event.	"A <u>Descent into the Maelstrom</u> "
2	In this story, William Legrand describes the title object as having three black spots on its back. The object was used in lieu of a bullet to find the hidden treasure of Captain Kidd.	"The <u>Gold-Bug</u> "
3	"A Descent into the Maelstrom" and "The Gold-Bug" were written by this author. He wrote of a murdering orangutan in "The Murders in the Rue Morgue."	Edgar Allan <u>Poe</u>



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**Round # 6**  
**1<sup>st</sup> Section**  
**Toss-up Questions**

**Question #1: Social Studies – Religion**

*10 points*

Ezekiel said that Noah, Daniel, and this man could save only themselves. In one encounter, this person cried that “now my eye sees thee, therefore I despise myself and repent in dust and ashes.” This man, called the greatest of the men of the East, was visited by Eliphaz, Bildad, and Zophar. This person was robbed of his cattle, children and health to determine whether he was truly pious towards God. Name this man who was the subject of a contest between God and Satan.	<u><b>Job</b></u>
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**Question #2: Language Arts – Grammar/Usage**

*10 points*

These sounds are classified based on place and manner of articulation, as well as voicing. Created using obstruction to the airflow in the oral cavity, these do not serve as the nucleus of a syllable. These sounds end with at least a partial closure of the vocal tract. Name these speech sounds, of which there are 21 in the Roman alphabet.	<u><b>consonants</b></u>
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Round # 6  
1<sup>st</sup> Section  
Toss-up Questions

**Question #3: Science – Health**

*10 points*

Primates need to eat this nutrient because they are missing the **GULO** [goo-loe] enzyme. Because this blocks some effects of hydrogen peroxide, it reduces the risk of cancer. This nutrient is necessary in the formation of tendons because this oxidizes **proline** [PROE-leen] to create **collagen** [KAHL-luh-jen]. A lack of this nutrient causes muscle pain, gum disease, and weak scar tissue. This vitamin is also known as **ascorbic** [uh-SKOR-bik] acid, and a lack of this causes scurvy. Name this vitamin concentrated in berries and citrus fruit.

Vitamin **C** (accept (L-)ascorbic acid or ascorbate before “ascorbic acid” is mentioned, prompt on “antioxidant”)

**Question #4: Social Studies – U.S. History**

*10 points*

In 2006, the Northwest Austin Municipal Utility District unsuccessfully challenged this law’s constitutionality. Its protections were expanded in 1975 to include language minorities. This law controversially listed several jurisdictions that were required to get preclearance from the Attorney General or a federal court before changing related laws. This law banned the use of literacy tests and ordered the Attorney General to challenge the legality of poll taxes. Name this act meant to protect the suffrage of all Americans.

**Voting Rights** Act of 1965



**Question #5: Miscellaneous – Technology**

*10 points*

The prototype for this service was developed for Odeo employees, but its creators later formed Obvious Corporation in order to acquire it. In October 2012, this acquired the video clip company Vine. When this website gets overloaded, users see the fail whale. One former mascot of this company was Larry, named after the former Boston Celtic. Name this microblogging site where messages are capped at 140 characters.

Twitter.com

**Question #6: Science – Chemistry**

*10 points*

The measurement of fluoride in water is more precise when a total ionic strength adjustment type of this solution is used. A list of these substances that are blocked by membranes, do not react with most salts, are highly soluble, and have a pH [p h] near 7 is named for Norman Good. Sometimes exemplified by the combination of carbonic acid and bicarbonate in blood plasma, these solutions often contain a weak acid or base with its conjugate. Name these solutions that resist changes to the pH of a solution.

buffer (solution) (or buffering agent)



### Question #7: Mathematics – Algebra

10 points per part

Answer the following about symmetry.		
1	Give a single word for the type of triangle that is symmetric about a line through a vertex and the middle of the opposite side. Such a triangle might also be equilateral.	<u>isosceles</u>
2	This type of function has a graph that is symmetric about the y-axis.	<u>even</u>
3	If the derivative of an odd function at x equals 3 is equal to 5, what is the derivative of the same function at x equals negative 3?	<u>5</u> (do not accept “-5”)

### Question #8: Mathematics – Algebra

10 points per part

With this type of function, the output gets multiplied by a fixed value every time that a fixed value is added to the input.		
1	Name this type of function that has a horizontal <b>asymptote</b> [A-sim-tote] on one side of its graph. Give the name rather than the formula.	<u>exponential</u> (accept other word forms)
2	If an exponential function goes through the points (1,1) and (2,2), then what will be the value of y when x equals 4?	<u>8</u>
3	Compound interest can be represented as exponential growth. Find the value of \$100 if it is invested for 2 years with 10% growth compounded annually.	<u>\$121</u>



**Question #9: Fine Arts – Jazz**

10 points per part

Name these instruments.		
1	Though famous performers on this instrument often play similar instruments such as the <b>flugelhorn</b> [FLOO-gul-horn], cornet, and horn, this was the primary instrument of Woody Shaw, Miles Davis, and Wynton Marsalis.	<b><u>trumpet</u></b> (or <b><u>trumpeter</u></b> )
2	This was the primary instrument played by McCoy Tyner, Thelonius Monk, and Art Tatum.	<b><u>piano</u></b> (or <b><u>pianist</u></b> , prompt on “keyboard”)
3	This was the primary instrument played by Kid Ory, Glenn Miller, and Curtis Fuller.	<b><u>trombone</u></b> (or <b><u>trombonist</u></b> )

**Question #10: Fine Arts – Jazz**

10 points per part

This saxophonist was a central figure in bebop.		
1	Name this musician whose songs include “Ko-Ko”, “Scrapple from the Apple”, and “Yardbird Suite”.	Charlie <b><u>Parker</u></b>
2	Parker recorded a 1950 album with this trumpeter known for the song “Salt Peanuts” and for his huge cheeks and bent trumpet.	John “Dizzy” <b><u>Gillespie</u></b>
3	Parker often worked with this drummer, especially during the late 1940s. This drummer formed a group and recorded the album <i>We Insist!</i> , which was subtitled his <i>Freedom Now Suite</i> .	Max <b><u>Roach</u></b>



### Question #11: Science – Chemistry

*10 points per part*

This red brittle substance is usually ferric oxide.		
1	Name this form of corrosion that takes place when iron is exposed to oxygen and moisture.	<b>rust</b> (accept longer answers, prompt on “oxidation”)
2	This process prevents rust by coating iron or steel with a layer of zinc.	<b>galvanization</b> (accept word forms)
3	Stainless steel uses this element to prevent rust.	<b>Chromium</b> (prompt on “Cr”)

### Question #12: Science – Chemistry

*10 points per part*

Identify these namesakes of gas laws that are not part of the ideal gas law.		
1	The law of partial pressures is named for this English scientist.	John <b>Dalton</b>
2	The law stating that the rate of effusion is inversely proportional to the particle masses is named for this Scottish scientist.	Thomas <b>Graham</b>
3	The nonrelativistic probability distribution of speeds of gas molecules is named for these two scientists.	James Clerk <b>Maxwell</b> and Ludwig <b>Boltzmann</b> (both answers in either order without prompting)



### Question #13: Social Studies – World History

10 points per part

This country elected Africa's first female head of state, Ellen Johnson-Sirleaf.		
1	Name this nation founded by former slaves from the Americas. It descended into civil war when Sergeant Samuel Doe overthrew William Tobert.	Republic of <u>Liberia</u>
2	Doe was executed shortly after forces led by Charles Taylor overtook this national capital.	<u>Monrovia</u>
3	This founder of the Black Star Line and civil rights leader attempted to obtain land grants from Liberia.	Marcus <u>Garvey</u>

### Question #14: Social Studies – World History

10 points per part

Their name translates as "one of the majority."		
1	Name this party that fractured off from a larger party after Julius Martov won a key vote. This group overthrew the Provisional Government during the October Revolution in 1917.	<u>Bolsheviks</u> (accept <u>Bolsheviki</u> or <u>Bolshevists</u> )
2	This leader of the Bolsheviks was inspired by his brother Alexander, who was executed for attempting to assassinate Alexander the Third. He later oversaw the pullout of Russian forces from World War One and died in 1924.	Vladimir Ilyich <u>Ulyanov</u> (accept <u>Lenin</u> )
3	Initially appointed as Minister of Justice under George Lvov [li-VOV], this man headed the Provisional Government that was overthrown by Lenin's forces.	Alexander <u>Kerensky</u>





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Toss-up Questions

**Question #15: Literature – Mythology**

*10 points*

Along with **Cybele** [SIH-beh-lee], this goddess and her husband were honored by Romans during Hilaria. This goddess taught her worshippers to bake and brew beer. She was beheaded by her son when she pitied her brother. She used Wadjet as a wet nurse while her son was in hiding, as Seth laid claim to the throne. This goddess gathered the body parts of her husband and resurrected him after his murder. Name this sister of **Nephthys** [NEF-this] and wife of Osiris.

Isis

**Question #16: Science – Physics**

*10 points*

The switched types of these devices are used as filters in integrated circuits and behave similarly to resistors. The common measurement of these devices is multiplied by resistance to calculate the time it takes them to discharge. These generally include an insulator called a dielectric between two conductors. Their common measurement is charge divided by electric potential difference. Name these devices whose strength is measured in farads.

capacitors



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**Question #17: Social Studies – U.S. Government**

10 points

In *Schillinger v US*, it was held that the infringement of these rights is a tort. Their “cooperative classification” includes such categories as “human necessities” and “fixed constructions.” The Supreme Court ruling in *O’Reilly v Morse* determined that “abstract ideas” were not eligible for these. The office that oversees these rights in the U.S. also oversees trademarks, and these rights typically last twenty years. Name this exclusionary right granted to an inventor.

patents

**Question #18: Fine Arts – Art History**

10 points

The dark mountain at the right side of this painting has a profile similar to a sleeping woman and is underneath its yellow moon. The rolling hills in the center reach the same height as the church steeple, which, according to some interpretations points to an image of the head of the artist in the sky. Painted in Saint-Remy-de-Provence, this work’s left foreground shows a dark cypress tree. Name this 1889 work with a swirling sky painted by Vincent van Gogh.

*The Starry Night* (or *De sterrennacht*)



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**Question #19: Mathematics – Math Concepts**

10 points

This set of numbers is the set of all inputs that give discontinuous points on **Thomae's** [TOE-may's] function. This set of numbers is partitioned by a **Dedekind** [DEH-deh-kihnd] cut, and a so-called spiral is used to show that this set of numbers is countable. **Euclid** [YOO-klid] demonstrated that assuming that the square root of two is in this set leads to a contradiction. Name this set of numbers, each of which can be represented by repeating or terminating decimals and also can be represented as the quotient of two integers.

rational number (or rationals)

**Question #20: Literature – U.S. Literature**

10 points

One character in this novel, who invites people to visit him in Wyoming, is Wild Bob. After returning from war, this novel's protagonist finishes optometry school before having two children, one of which becomes a Green **Beret** [buh-RAY]. After a plane crash in Vermont, the protagonist of this novel loses his wife before having brain surgery. The protagonist of this novel describes his travels through time, including time spent in a zoo on Tralfamadore [tral-FA-muh-dor]. Name this novel set against the backdrop of the firebombing of Dresden, written by Kurt Vonnegut.

***Slaughterhouse-Five**, or, **The Children's Crusade: A Duty Dance with Death***



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Teamwork Questions

**Question #21: Science – Biology**

*10 points per part*

This process follows interphase and is followed by cytokinesis [sie-toe-kih-NEE-sis].		
1	Name this process in which one cell nucleus becomes two cell nuclei.	<u>mitosis</u> (prompt on cell “division” or cell “fission”)
2	This stage of mitosis just before cytokinesis involves the re-formation of the nuclear membranes.	<u>telophase</u>
3	The <b>cyclin</b> [SIE-klin]-dependent types of these enzymes involved in <b>phosphorylation</b> [fos-FOR-uh-lay-shun] regulate a cell’s progression through mitosis.	<u>kinases</u>

**Question #22: Science – Biology**

*10 points per part*

Robert Whittaker started recognizing these as a kingdom, separating them from the plant kingdom.		
1	Name these organisms that include mushrooms.	<u>fungi</u> (or <u>fungus</u> )
2	Along with <b>glucans</b> [GLOO-kans], mannans, and glycoproteins, fungi have this polymer in their cell walls, as opposed to the cellulose in plants.	<u>chitin</u>
3	Fungi of the genus <b>Penicillium</b> [peh-nih-SIL-lee-um] are used to produce not only antibiotics, but also this class of drugs used to treat high cholesterol.	(fermentation-derived) <u>statin</u> (s)



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Teamwork Questions

**Question #23: Social Studies – Economics**

10 points per part

The Herfindahl index for this kind of market is ten thousand.		
1	Name this kind of market that can be created by the government through the granting of patents and copyrights. Common geographic ones include public utilities.	<u>monopoly</u>
2	Because the firm in a monopoly supplies fewer goods than would create equilibrium, this reduction of economic efficiency occurs as buyers who would pay more than the equilibrium price are shut out of the market.	<u>deadweight loss</u> (accept <u>excess burden</u> or <u>allocation inefficiency</u> )
3	Deadweight loss occurs because a monopolist, like any capitalist in a rational choice system, seeks to maximize this quantity. As a market approaches perfect competition, this value for each seller approaches zero.	<u>profit</u> (accept <u>income</u> )

**Question #24: Social Studies – Economics**

10 points per part

Producers who have lower opportunity costs than other firms enjoy this.		
1	Name this benefit of a firm caused by different cost ratios of various commodities that is often based on conditions in different countries.	<u>comparative advantage</u>
2	In <i>On the Principles of Political Economy and Taxation</i> , David Ricardo described comparative advantage in relation to two European countries producing wine and cloth. Name either.	<u>England</u> and/or <u>Portugal</u> (do not accept “Britain” or “United Kingdom”)
3	David Ricardo formulated the “Iron Law of” these, claiming that like any good, they will trend towards a market equilibrium.	<u>wages</u> (accept <u>pay</u> or other equivalents)



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Teamwork Questions

**Question #25: Mathematics – Analytical Geometry**

*10 points per part*

Consider a graph of the equation $x^2$ over 4 plus $y^2$ over 16 equals one. $\left[ \frac{x^2}{4} + \frac{y^2}{16} = 1 \right]$		
<b>1</b>	Name the shape of the graph generated by the equation.	<u>ellipse</u>
<b>2</b>	Find the length of a semi-minor axis of that ellipse. That is equivalent to finding the length from the center of the ellipse to the nearest point on the ellipse.	<u>2</u>
<b>3</b>	Find the distance from one focus of this ellipse to the other focus. Give your answer in simple radical form.	<u>4 root 3</u> (or <u>4 times the square root of 3</u> or <u>4 radical 3</u> or equivalents)

**Question #26: Mathematics – Analytical Geometry**

*10 points per part*

This class of figures exhibits self-similarity, meaning that a part of the figure can be equivalent to the whole figure.		
<b>1</b>	Name these shapes with fractional dimensions.	<u>fractals</u>
<b>2</b>	This fractal is generated by repeatedly removing the middle triangle from triangles. This is named for a Polish mathematician.	<u>Sierpinski</u> triangle (accept other second words such as gasket or sieve)
<b>3</b>	This is the Hausdorff dimension of a <b>Sierpinski</b> [sir-PIN-skee] triangle.	<u>log<sub>2</sub>3</u> ( <u>log base two of three</u> or <u>log three over log two</u> or equivalents)



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**Question #27: Literature – U.S. Literature**

*10 points per part*

The mining settlement of Angel's Camp is found within this county.		
<b>1</b>	Name this county, one former resident of which owned a dog named Andrew Jackson that lost a fight to an animal whose hind legs had been cut off.	<u><b>Calaveras</b></u> County
<b>2</b>	Calaveras County was the setting of a short story by this author about the degenerate gambler Jim Smiley.	Mark <u><b>Twain</b></u> (accept Samuel Langhorne <u><b>Clemens</b></u> )
<b>3</b>	Jim Smiley found a frog, gave it a good education, then named it after this famous American statesman.	Daniel "Dan'l" <u><b>Webster</b></u>

**Question #28: Literature – U.S. Literature**

*10 points per part*

This poem describes a ship as "the meteor of the ocean's air."		
<b>1</b>	Name this poem whose title vessel had a deck "once red with hero's blood." At the end, that ship was given to the god of storms.	<u><b>"Old Ironsides"</b></u>
<b>2</b>	"Old Ironsides" was written by this poet, who wrote of a voice that sings "Build thee more stately mansions, O my soul" in "The Chambered Nautilus."	Oliver Wendell <u><b>Holmes</b></u> , Sr.
<b>3</b>	"Old Ironsides" was written to protest the destruction of this ship on the orders of the Naval Secretary.	<i>USS</i> <u><b>Constitution</b></u>



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Toss-up Questions

**Question #29: Science – Biology**

*10 points*

The structure of this organelle was described by Ada Yonath. This organelle is responsible for the polymerization of **microcins** [MY-kroe-sins] and several other natural antibiotic polypeptides. George Emil Palade discovered that these organelles are often bound to the rough endoplasmic reticulum. These organelles have a namesake RNA. Name these organelles where protein molecules are assembled based on codons from RNA.

ribosomes

**Question #30: Social Studies – World History**

*10 points*

In the build-up to this action, Thomas de Montacute, Earl of Salisbury, captured a key fort on the Loire River before being killed by a cannonball. The Battle of the Herrings was the result of an offensive launched to end this attack. At the outset, the victorious side was led by John, Comte de Dunois, as the Duke was imprisoned at **Agincourt** [a-jin-kor]. This came to an end after the last of the invading troops were penned at the Tourelles bridge. Name this siege broken in 1429 by an army led by Joan of Arc, the turning point of the Hundred Years' War.

Siege of Orleans





**Question #31: Mathematics – Math Concepts**

*10 points*

If two **vertices** [VER-tuh-sees] of this shape are on the z-axis, the other vertices are all approximately 63.4 degrees from the z-axis. In Cartesian coordinates, this shape's vertices can be placed so each has coordinates whose absolute values are zero, one, and the golden ratio. This shape's surface area is a side length squared times five root three. Using the center of each face of this shape as a vertex creates a dodecahedron. Each vertex of this shape is the vertex of five triangles. Name this Platonic solid with twenty faces.

icosahedron (or icosahedra)

**Question #32: Literature – British Literature**

*10 points*

In this play, a dustman refuses an offer of ten pounds, as it may lead him to save money. That character later becomes upset that he is lecturing for the Wannafeller Moral Reform World League. One scene in this play is complicated by the arrival of a family who believes that one person is using the "new small talk." That family is the Eynsford Hills. The protagonist in this 1912 work is a phonetician who wagers that in six months he can pass a cockney flower girl as a duchess. Name this play in which Eliza Doolittle is taught by Henry Higgins, penned by George Bernard Shaw.

Pygmalion



**Extra Question #1: Mathematics – Math Concepts**

10 points

This person used several decreasing geometric sequences whose first number was ten million. This person also designed a series of rods that made it easier for people who don't know multiplication tables to perform multiplication and division. Those rods are this person's namesake bones. His work with geometric sequences allowed him to compile tables that allowed people to use addition to multiply and use multiplication to evaluate exponents. Name this Scottish developer of logarithms.

(John) Napier

**Extra Question #2: Fine Arts – Classical/Opera**

10 points

In one opera by this composer, the title character oversees the succession following the death of her husband, the Babylonian King Nino. In another opera by him, the title character kills Orbazzano after returning to Syracuse. Those works, both based on works by Voltaire, are *Semiramide* [seh-mee-rah-MEE-day] and *Tancredi* [tahn-KREH-dee]. In another work by this composer, a character disguised as Lindoro tries to impress Rosina with the help of Figaro. Name this composer of *The Barber of Seville* who also wrote *William Tell*.

Gioachino Rossini



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**Extra Question #3: Literature – British Literature**

*10 points*

This character lost his shadow for a short time after a window was shut behind him. Jane eventually becomes his mother, and Jane sends her daughter Margaret to fill that role. He nearly died after becoming trapped on Marooners' Rock. The Lost Boys ended up with a mother after this character taught the Darling children to fly. Accompanied by Tinker Bell, name this "boy who would not grow up," created by Sir James Barrie.

**Peter Pan**

**Extra Question #4: Social Studies – World History**

*10 points*

To marry the Countess von Chotek, this person renounced his children's regal claims, which led to the coronation of his nephew Charles the First of Austria. This person's demise was preceded by performing army maneuvers in Bosnia and Herzegovina, which led to his being targeted by the Black Hand. Name this Austro-Hungarian leader assassinated by Gavrilo Princip.

Archduke Franz **Ferdinand**,  
Erzherzog von Österreich-Este



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**Extra Question #5: Science – Earth Science**

*10 points*

A common defect with spin polarization in this mineral is the nitrogen-vacancy center. High quality examples of this are classified as first water, while low quality examples are crushing bort. This mineral can be confused with **moissanite** [**mois-sahn-ite**], a silicon carbide that, like this material has a very high thermal conductivity. This mineral is ranked above corundum on the Mohs scale, where it is rated a ten. Name this allotrope of carbon that is a very valuable gem.

**diamonds**



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**Extra Question #6: Social Studies – U.S. History**

10 points per part

The <i>Washington Post</i> compared this leader's <i>A Time for Choosing</i> speech to William Jennings Bryan's <i>Cross of Gold</i> speech.		
1	Name this person ridiculed for the film <i>Bedtime for Bonzo</i> by incumbent Pat Brown during an election which he won to become governor of California.	Ronald Wilson <u>Reagan</u>
2	This man attempted to impress Jodie Foster by shooting Ronald Reagan, but he failed to kill the President. At trial, he was found not guilty by reason of insanity.	John Warnock <u>Hinckley</u> , Jr.
3	In the immediate aftermath, Alexander Haig showed his lack of constitutional knowledge by asserting that he was in charge, despite holding this cabinet post.	Secretary of <u>State</u>

**Extra Question #7: Social Studies – U.S. History**

10 points per part

Congress passed the McNary-Haugen bill twice, but this President vetoed it both times.		
1	Name this politician who, as a governor, refused to back the reinstatement of police officers who were fired for striking, reasoning that "there is no right to strike against the public safety by anybody, anywhere, any time."	John Calvin <u>Coolidge</u>
2	Coolidge's presidency began with cleaning up the administration this leader left behind. In his campaign, he promised a "return to normalcy."	Warren Gamaliel <u>Harding</u>
3	On account of his actions during the aforementioned police strike, Coolidge was punched in the eye by James Peters, the mayor of this major city.	<u>Boston</u> , Massachusetts



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**Extra Question #8: Mathematics – Probability**

*10 points per part*

In the Monty Hall problem, there are three doors, one of which has a good prize and two of which have a bad prize. A contestant picks one of the three doors and is then shown a losing prize behind a different door. If the contestant originally picked a winner, the losing prize is chosen at random, and if the contestant originally picked a loser, the other losing prize is chosen.		
<b>1</b>	What is the probability that the winning prize is behind the door the contestant selected?	<u><b>1/3</b></u> (or <u><b>0.3 repeating</b></u> )
<b>2</b>	What is the probability that the winning prize is behind the door that was not shown and that the contestant did not select?	<u><b>2/3</b></u> (or <u><b>0.6 repeating</b></u> )
<b>3</b>	Because the solution to this problem goes against common sense intuition, it is classified by Willard Quine as a <b>veridical</b> [veh-RIH-dih-kul] type of this statement that goes against either logic or common sense.	<u><b>paradox</b></u>

**Extra Question #9: Mathematics – Probability**

*10 points per part*

With probability, this term can be synonymous with experimental.		
<b>1</b>	Give this adjective that refers to beliefs based on observations and experience rather than theory.	<u><b>empirical</b></u>
<b>2</b>	Empirical evidence can be based on the number of times something happens in a trial, which is this quantity. The relative type of this is the number of times a certain outcome occurs divided by the number of trials.	(relative) <u><b>frequency</b></u>
<b>3</b>	A person gets a particular outcome 12 times during 20 trials. How many times would they expect that outcome to occur if they ran a total of 50 trials?	<u><b>30</b></u>



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1<sup>st</sup> Section  
Toss-up Questions

**Question #1: Social Studies – World History**

10 points

Before he was the target of a **coup [koo]** led by Lazar Kaganovich and **Vyacheslav [VYA-cheh-slaf]** Molotov, this premier oversaw a period of liberalization named for a novel by Ilya Ehrenburg, his “thaw.” That period came after he gave a speech “On the Personality Cult and Its Consequences,” denouncing the policies of his predecessor, which included the Great Purges. This leader was succeeded in his highest post by Leonid Brezhnev and was himself the successor to Josef Stalin as Russian Premier. Name this leader who is believed to have banged his shoe on a desk during a 1960 United Nations meeting.

Nikita Sergeyevich **Khrushchev**

**Question #2: Literature – U.S. Literature**

10 points

In describing spring, this poet wrote of “the wanton frisking kid, and soft fleeced lambs.” In one poem, she describes some poems as “ill-formed offspring.” She wrote of love worth “more than whole mines of gold” in “To My Dear and Loving Husband,” and she also wrote verses about the burning of her house. Name this colonial writer whose poems were published in the collection *The Tenth Muse Lately Sprung Up in America*.

Anne **Bradstreet**



**Question #3: Mathematics – Math Concepts**

*10 points*

The example of this thing named for **Erdos [ur-dosh]** and Mordell applies to any point inside a triangle. One of the examples of this, named for **Chebyshev [CHEH-bih-shev]**, limits the probability of attaining a value more than a given number of standard deviations from the mean. Another example of this type of statement, relating an inner product to a product of magnitudes, is named for Cauchy and Schwarz. One of these limits the length of the longest side of a triangle. Name these statements that include less than or greater than relationships.

inequality (or inequalities)

**Question #4: Miscellaneous – Sports**

*10 points*

This person hit the game-winning shot in the 1982 NCAA Men's Basketball Championship. In the 1989 NBA Playoffs, he hit "The Shot" to clinch a 3-2 series win over Cleveland. He was the NBA Finals MVP six times, as he led his team to two three-peats in the 1990s, interrupted by a stint as a baseball player. This person ended his career with the Washington Wizards, and he now owns the Charlotte Bobcats. Name this basketball player whose jersey number 23 was retired by the Chicago Bulls.

Michael Jeffrey Jordan





**Question #5: Science – Biology**

*10 points*

Not found in monocots, this substance includes **fusiform** [FYOO-sih-form] initial cells that can be storied or non-storied. Other cells in this substance are ray initial, and this is created by the division of pericycle cells. One type of this substance is called **phellogen** [FEL-uh-jen], and this substance can also be referred to as secondary or lateral meristem. One type of this is responsible for creating cork. Name this layer of cells whose vascular type creates secondary xylem and phloem.

(vascular pro)**cambium** (accept (secondary or lateral) meristem until it is mentioned)

**Question #6: Literature – British Literature**

*10 points*

Before losing a fight, this character said he would be damned if he cried “hold, enough.” His wife encouraged him to “screw his courage to the sticking-place” in order to succeed. One of this character’s **soliloquies** [suh-LIH-luh-kwees] states, “out, out, brief candle,” and, “Tomorrow, and tomorrow, and tomorrow, creeps in this petty pace from day to day.” He could only be vanquished once Birnam wood came to **Dunsinane** [DUN-sih-nane] and by someone not born of woman. Name this killer of King Duncan, the title character of a Shakespeare play set in Scotland.

**MacBeth** (prompt on “Thane of Fife” or “Thane of Cawdor”)



### Question #7: Social Studies – Geography

*10 points per part*

This river's major drainage basins include Yazoo and Atchafalaya [ah-chah-fah-LIE-uh].		
1	Name this longest river in the United States. Its major tributaries include the Ohio and Missouri.	<u>Mississippi</u> River
2	This lake in Minnesota is often cited as the source of the main length of the Mississippi River.	Lake <u>Itasca</u>
3	Near the Gulf of Mexico, the Bonnet Carré Spillway directs excess floodwater from the Mississippi towards this lake.	Lake <u>Pontchartrain</u>

### Question #8: Social Studies – Geography

*10 points per part*

This "Big Island" is home to Mauna Kea, Mauna Loa, and Kilauea.		
1	Name this largest of James Cook's "Sandwich Islands."	<u>Hawaii</u> Island
2	This most populous of the Hawaiian islands is the home of Honolulu.	<u>Oahu</u>
3	This "Garden Isle" is the oldest of the Hawaiian islands. Fort Elizabeth on this island is a former Russian outpost.	<u>Kauai</u>



### Question #9: Mathematics – Probability

10 points per part

These diagrams have some of the same properties as Euler [OY-ler] diagrams.		
1	Name these diagrams used to show relationships between sets.	<u>Venn</u> diagram(s)
2	Including the region not in any of the sets, this is the number of regions in a Venn diagram representing three sets.	<u>8</u>
3	If Set A contains 10 elements, Set B contains 20 elements, and the union of Sets A and B contains 23 elements, this is the number of elements in the intersection of Sets A and B.	<u>7</u>

### Question #10: Mathematics – Probability

10 points per part

This mathematical field is closely related to decision theory, and some of its initial development came from a book by John von Neumann and Oskar Morgenstern.		
1	Name this field which studies several situations, including those in which people can decide whether or not to cooperate.	<u>game</u> theory
2	This situation studied in game theory involves two people, each of whom would benefit by betraying the other one.	<u>prisoner's dilemma</u>
3	If a character in a game is supposed to make 4 decisions, and each decision has three unique options, this is the total number of ways they could make those decisions.	<u>81</u>



**Question #11: Literature – World Literature**

*10 points per part*

This farmer was promised the governorship of an island.		
<b>1</b>	Name this husband of Teresa <b>Cascajo</b> [kahs-KIE-yoe] who ended up getting beaten by two friars escorting a noblewoman.	<b><u>Sancho Panza</u></b> (accept either)
<b>2</b>	The light of Sancho Panza's eye was this donkey, Sancho's mount.	<b><u>Dapple</u></b>
<b>3</b>	Sancho Panza accompanied this knight-errant on his many misadventures, which included attacking windmills.	Don <b><u>Quijote</u></b> de la Mancha (accept either name of <b><u>Alonso Quijana</u></b> )

**Question #12: Literature – World Literature**

*10 points per part*

She fled from her homeland after seeing her dead husband <b>Sychaeus</b> [sigh-KAY-us] in a dream.		
<b>1</b>	Hiarbas granted this former princess of <b>Tyre</b> [ter] as much land as could be covered with a bull's hide.	<b><u>Dido</u></b> (accept <b><u>Elissa</u></b> )
<b>2</b>	Venus infused <b>Dido</b> [DIE-doe] with passion for this former Trojan, who abandoned her to continue on to Italy.	<b><u>Aeneas</u></b>
<b>3</b>	Aeneas eventually kills this leader of the <b>Rutuli</b> [roo-TOO-lee] who killed Pallas.	<b><u>Turnus</u></b> (or <b><u>Tyrrhenus</u></b> )



**Question #13: Science – Physics**

*10 points per part*

This quantity is found by adding up mass times the distance squared from the axis for all points on an object.		
1	Name this rotational analogue of mass.	(first) (mass) <b><u>moment of inertia</u></b> (or <b><u>rotational inertia</u></b> or <b><u>polar moment of inertia</u></b> or <b><u>angular mass</u></b> , do not accept partial answers)
2	This quantity equals the ratio of torque to moment of inertia.	<b><u>angular acceleration</u></b> (do not accept partial answers)
3	This value equals the radius of a ring that has the same mass and moment of inertia of a given object.	radius of <b><u>gyration</u></b> (or <b><u>gyradius</u></b> )

**Question #14: Science – Physics**

*10 points per part*

This is noticeable when you are passed by a fast object that makes noise.		
1	Name this effect that explains changes in frequency based on the motion of a source of waves relative to the observer.	<b><u>Doppler</u></b> (effect or shift)
2	This is the name of the Doppler shift often observed in astronomy because objects are generally going away from Earth. Your answer should include the name of a color.	<b><u>redshift</u></b> (accept word forms)
3	The transverse Doppler effect was confirmed and measured in this 1938 experiment.	<b><u>Ives-Stillwell</u></b> experiment



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**Question #15: Social Studies – U.S. History**

*10 points*

In the build-up to this battle, James Neill was chosen as the site's garrison leader, while Green Jameson set up cannon to defend against artillery. Governor Henry Smith ordered William Travis to this site, where the lieutenant colonel would end up leading the regulars, with the volunteers led by Jim Bowie. Name this battle that took place ten years before the Mexican-American War, fought at a fortification in San Antonio, Texas.

Battle of the Alamo

**Question #16: Science – Astronomy**

*10 points*

One group of objects classified for being similar to this body includes 28978 Ixion and 38628 Huya, and another group of objects classified for being similar to this body includes **Makemake** [mah-kee-mah-kee] and **Haumea** [how-MAY-uh]. A flyby of the system in which this is the largest object will take place in 2015 by the New Horizons Spacecraft. This object was discovered at the Lowell Observatory by Clyde Tombaugh, and it was reclassified in 2006. Name this object near Nix, Hydra, and Charon that used to be classified as a planet.

Pluto



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**Question #17: Fine Arts – Classical/Opera**

10 points

The finale of this composer's third symphony was marked Tempo di **polacca** [poe-LAH-kah]. One opera by this composer is based on Pushkin's poem about the Battle of Poltava, and another is based on Friedrich Schiller's poem about Joan of Arc. In addition to *Mazeppa* and *The Maid of Orleans*, this composer wrote a work in which the protagonist confuses the daughter of the sorcerer Von Rothbart with the princess Odette. Name this composer of the ballets *Sleeping Beauty*, *Swan Lake*, and *The Nutcracker*.

Pyotr Ilyich Tchaikovsky

**Question #18: Literature – World Literature**

10 points

In this work, the protagonist is renowned for her ability in dancing the Tarantella. The protagonist is called a "twittering lark" and a squirrel before being accused of wasting money again. In this work, Anne-Marie helps raise the children Bob, Emmy, and **Ivar** [ee-vahr]. At this play's conclusion, the main character claimed that "she could receive nothing from a stranger" before walking out on her husband, Torvald. Name this play concerning Nora Helmer, written by Henrik Ibsen.

A Doll's House (accept A Doll House or Et dukkehjem)



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**Question #19: Science – Chemistry**

10 points

The Planck value of this quantity equals  $\hbar$  divided by the Planck time. The Boltzmann constant is in units of this quantity per unit of absolute temperature, and the Hamiltonian operator gives this quantity. This quantity equals enthalpy minus the quantity pressure times volume. According to the First Law of Thermodynamics, this quantity is constant when no work is done on a system. Name this quantity whose forms include heat, potential, and kinetic.

energy (accept kinetic energy, internal energy, potential energy, chemical energy, accept work before it is mentioned, prompt on “mass”)

**Question #20: Social Studies – Economics**

10 points

John Maynard **Keynes** [**kanes**] argued in *The Economic Consequences of the Peace* that if left unchecked or controlled by force of law, this phenomenon would lead to relaxed production. Several economists incorrectly predicted that quantitative easing would cause this phenomenon to become a major problem. One theory posits that a back-and-forth between wage hikes and price increases creates a “spiral” that leads to the “cost-push” form of this. Name this trend of the supply of money, and subsequently prices, to rise over time.

(hyper)inflation





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**Question #21: Fine Arts – Art History**

10 points per part

This artist painted the goddess Venus several times, including one work showing her with Mars completed in 1483.		
1	Name this artist from Florence who painted <i>The Birth of Venus</i> .	Sandro <u>Botticelli</u>
2	<b>Botticelli</b> [bo-tih-CHEH-lee] also painted this work showing Venus in the center that is sometimes called <i>Allegory of Spring</i> .	<i>La</i> <u>Primavera</u>
3	The right side of <i>Primavera</i> shows this nymph transforming into Flora.	<u>Chloris</u>

**Question #22: Fine Arts – Art History**

10 points per part

This art movement was at its height during the first decade of the 20 <sup>th</sup> century, and one of its leaders was Andre Derain.		
1	Name this movement whose name is French for wild beasts.	<u>Fauvism</u> (or les <u>Fauves</u> )
2	Another leading <b>Fauvist</b> [FOH-vist] was this painter, some of whose pictures feature naked people dancing in a circle.	Henri <u>Matisse</u>
3	This French painter switched from Fauvism to <b>Cubism</b> [KYOOB-is-um] once he befriended Picasso. His works include <i>Man With A Guitar</i> and <i>The Billiard Table</i> .	Georges <u>Braque</u>



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**Question #23: Literature – U.S. Literature**

10 points per part

After being caught in bed with this woman, bullfighter Pedro Romero is badly beaten.		
1	Name this member of the “lost generation” who ultimately decided to marry the Englishman Michael Campbell.	Lady <u>Brett Ashley</u> (accept either underlined portion)
2	In this novel, Lady Brett Ashley is pursued by Romero as well as former Princeton boxing champion Robert Cohn.	<i>The <u>Sun Also Rises</u></i>
3	<i>The Sun Also Rises</i> was written by this author. He wrote of Harry’s soul flying to the House of God atop a mountain in “The Snows of Kilimanjaro.”	Ernest Miller <u>Hemingway</u>

**Question #24: Literature – U.S. Literature**

10 points per part

This poem describes colonists as “possessing what (they) were unpossessed by.”		
1	Name this poem whose speaker declares that “the land was ours before we were the land’s.”	“The <u>Gift Outright</u> ”
2	The speaker of this other poem owns an apple orchard, while a neighbor owns pine trees. That neighbor spoke that “good fences make good neighbors.”	“ <u>Mending Wall</u> ”
3	“The Gift Outright” and “Mending Wall” were penned by this poet who described taking a path less travelled in “The Road Not Taken.”	Robert Lee <u>Frost</u>



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**Question #25: Science – Chemistry**

*10 points per part*

These materials are found in transistors and most diodes.		
1	Name these substances that include many Group Four elements such as silicon and germanium.	<u>semiconductors</u>
2	The usefulness of semiconductors can often be improved through this process of adding impurities.	<u>doping</u> (accept other word forms)
3	Using a dopant with this number of valence electrons is the most common way to make an n-type semiconductor.	<u>5</u>

**Question #26: Science – Chemistry**

*10 points per part*

These elements form a diagonal line on the periodic table.		
1	Name these elements whose properties generally fall between those of metals and nonmetals. Some of them are sometimes classified as semiconductors or semimetals.	<u>metalloids</u>
2	This quantity, defined as the amount of energy necessary to remove an electron from an atom, is one of the quantities in which metalloids fall between metals and nonmetals.	(first) <u>ionization</u> energy
3	This metalloid often poisons groundwater. It causes changes in fingernail coloring and several more serious symptoms.	<u>Arsenic</u> (prompt on “As”)



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**Question #27: Social Studies – U.S. History**

*10 points per part*

This project was completed at Promontory Summit, Utah.		
1	Name this project, constructed by the Union Pacific east of the Great Salt Lake, while the Central Pacific built the other side.	<u>Transcontinental Railroad</u>
2	The Union Pacific Railroad was the target of this corporation, which attempted to take advantage of the generous land grants offered by the government.	<u>Credit Mobilier</u>
3	This President laid the ceremonial golden spike at Promontory Point to complete the Transcontinental Railroad. His Vice President Schuyler Colfax was implicated in the Credit Mobilier scandal.	Hiram Ulysses (S) <u>Grant</u>

**Question #28: Social Studies – U.S. History**

*10 points per part*

For the losing side at this battle, General Alfred Terry took his forces up the Yellowstone River.		
1	Name this 1876 battle, where the strategic retreat of Major Marcus Reno proved to be the downfall for US troops.	Battle of <u>Little Bighorn</u> (accept <u>Custer's Last Stand</u> , but do not mention it)
2	The Battle of Little Bighorn is also known as this Lieutenant Colonel's "Last Stand." He died along with his entire 200-man troop; only one horse, Comanche, survived.	George Armstrong <u>Custer</u>
3	The victorious forces at Little Bighorn were a combination of Northern <b>Cheyenne</b> [shy-ann] and this tribe.	Eastern <u>Sioux</u> (accept <u>Santee</u> or <u>Nadouessioux</u> )



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**Question #29: Mathematics – Math Concepts**

10 points

Proving that a space is a vector subspace requires proving that it has this property. The transitive type of this property determines whether any path exists between graph vertices. An interval with this property contains its limit points, which means that it includes both of its endpoints. This property refers to an operation on a set if every result of the operation is in the set. Name this property that does not hold for subtraction of positive numbers because the difference of two positive numbers can be negative.

closed (or (topological) closure)

**Question #30: Literature – British Literature**

10 points

This poet wrote that “The things which I have seen I now can see no more” in a poem in which the speaker asks “Where is it now, the glory and the dream?” This poet wrote of a Hermit sitting alone in his cave in a poem that describes the mind as “a mansion for all lovely forms.” The speaker of that poem described sitting under a dark sycamore near the river **Wye** [why]. Name this author of “Ode: Intimations of Immortality” and “Tintern Abbey” who collaborated on *Lyrical Ballads* with Samuel Coleridge.

William Wordsworth



**Question #31: Science – Physics**

*10 points*

This principle, which can be derived from **Euler's** **[OY-ler's]** continuity and momentum equations, is used to explain the Venturi effect. This applies to **inviscid** **[in-VIH-sid]** situations, meaning a lack of viscosity, and can be derived from the Navier-Stokes equation. This principle is based on the conservation of energy along a streamline, including the energy attributable to pressure. Identify this equation named for a Swiss scientist showing that a decrease in pressure leads to an increase in speed for fluid flow.

**Bernoulli's** Principle (accept **Bernoulli Equation** or similar answers)

**Question #32: Social Studies – World History**

*10 points*

Resistance to Italian rule in this nation was halted upon the appointment of **Giuseppe Volpi** **[juh-SEH-pay VOLE-pee]** as governor, but was followed by a revolt led by Umar al-Mukhtar. Prior to its overthrow, the head of the Sanusi movement held the title of "King of" this nation. After this was declared independent by King **Idris** **[ID-ris]** the First, a military **coup** **[koo]** was led in this country by the author of *The Green Book*. This country has been headed recently by Ali **Zeidan** **[zee-DAN]**. This country's leader of 42 years was killed by rebels in 2011. Name this nation led until 2011 by Muamar Gaddafi, with capital Tripoli.

**Libya** (accept The **Libyan Republic** or Al-**Jumhuriyyah al-Libiyvah**)



**Extra Question #1: Science – Physics**

*10 points*

In the first component of four-force, this quantity is divided by the opposite of the speed of light. The SI unit of this quantity per square meter is divided by ten to the negative twelfth in decibel calculations. For circular motion this quantity equals torque times angular velocity, and for linear motion this quantity equals force times velocity. Name this quantity that equals energy per time and that is often measured in watts.

power

**Extra Question #2: Fine Arts – Art History**

*10 points*

This person designed an opera house in Baghdad for King **Feisal [FIE-sahl]** the Second, but after Feisal was assassinated he used those plans for Gammage Auditorium at Arizona State University. This person's fame increased when he designed the Johnson Wax Headquarters in **Racine [ray-SEEN]**, Wisconsin, and a house on the Bear Run mountain stream in southwest Pennsylvania. Name this Prairie School architect who named his studios **Taliesin [ta-lee-EH-sen]** and who designed Fallingwater.

Frank Lloyd Wright



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**Extra Question #3: Literature – U.S. Literature**

*10 points*

Near the end of this novel, it is revealed that the descendants of Joy, Nellie, and Aranea stay with the protagonist. In this novel, Templeton has to be bribed with food in order to help. Most of its action takes place on the farm of Mr. Zuckerman, the uncle of Fern Arable. Name this E.B. White novel in which the pig Wilbur befriends the title spider.

*Charlotte's Web*

**Extra Question #4: Mathematics – Math Concepts**

*10 points*

In graph theory, this adjective is synonymous with stable and refers to a set of vertices that are not connected to each other by any edges. In statistics, this adjective applies to variables that have a correlation coefficient near zero. In probability, this adjective applies to events if the probability of both events occurring is the product of the individual probabilities. Name this adjective that in algebra refers to a variable that is input into a function.

**independent** (or **independence**)  
(do not accept “dependent” or  
“dependence”)





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**Extra Question #5: Social Studies – U.S. History**

*10 points*

In one battle, this leader erected a post at Great Meadows before leading an attack that killed **Coulon [koo-lon]** de Jumonville. This person ordered the court-martial of Charles Lee following the Battle of Monmouth. Following the death Edward Braddock, this aide-de-camp took command of the Virginia troops fighting in the French and Indian War. Name this leader of the Continental Army and the first United States President.

George Washington



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**Extra Question #6: Literature – U.S. Literature**

10 points per part

In this story, the local Baptist minister wrote to the title character's Alabama cousins concerning an alleged relationship between a construction supervisor and an aristocrat.		
1	Name this story in which the protagonist gives china-painting lessons to Jefferson youth sent by their parents.	"A <u>Rose for Emily</u> "
2	"A Rose for Emily" was written by this writer, who set many works in the fictional county of Yoknapatawpha.	William Cuthbert <u>Faulkner</u>
3	At the end, it is established that Emily Grierson had a relationship with Homer Barron even after death. Next to Homer's skeleton, one of these from Emily was found.	gray strand of <u>hair</u>

**Extra Question #7: Literature – U.S. Literature**

10 points per part

In one play by this author, Larry knew of his father's complicity in shipping defective engine parts.		
1	Chris Keller shoots himself to atone for his actions in <i>All My Sons</i> , written by this author.	Arthur Asher <u>Miller</u>
2	At the conclusion of this Arthur Miller play, a man from New York fatally crashed his car in order to ensure a large insurance payoff for his family.	<u>Death of a Salesman</u>
3	Arthur Miller wrote <i>The Crucible</i> , drawing inspiration from being blacklisted in Hollywood for refusing to testify in front of this Congressional group chaired by Martin Dies.	House <u>Un-American Activities Committee</u> (accept <u>HUAC</u> )



### Extra Question #8: Mathematics – Geometry

10 points per part

These shapes have a base that is a polygon and an apex in a different plane.		
1	Name these shapes formed by connecting the vertices of the base to the apex.	<u>pyramids</u>
2	Find the slant height of the pyramid if it has a square base with side lengths of 6, and it has an apex located four units above the center of the square. Do not worry about units.	<u>5</u>
3	That pyramid has four triangular faces. Find the area of any one of those faces. Do not worry about units.	<u>15</u>

### Extra Question #9: Mathematics – Geometry

10 points per part

This is the distance halfway around a shape.		
1	Name this distance found by adding the side lengths of a shape and dividing by two.	<u>semiperimeter</u> (prompt on “s”)
2	The semiperimeter is used in this triangle area formula named for a first century mathematician.	<u>Heron</u> ’s formula (or <u>Hero</u> ’s formula)
3	Find the semiperimeter of a pentagon if the <b>arithmetic</b> [ar-ith-MA-tik] mean of its side lengths is 10.	<u>25</u>



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Toss-up Questions

**Question #1: Fine Arts – Art History**

10 points

One work by this artist, showing armored soldiers on the right and naked villagers on the left, is *Massacre in Korea*. Some of his works portray Dora Maar, including a work in which yellow and green is lacking from the center of the painting, *The Weeping Woman*. His work showing a musician looking down with his legs crossed is *The Old Guitarist*, which was part of his Blue Period. Name this artist who portrayed the destruction of the Spanish Civil War in *Guernica*.

Pablo Picasso

**Question #2: Literature – British Literature**

10 points

This character met his brother at the **Diogenes** [die-O-jeh-nees] Room, where he offered to help Mr. Melas. Earlier, this character claimed that his brother Mycroft was greater than he was but averse to interruptions. This character lured Chicago crook Abe Slaney out of hiding by using drawings of dancing men. He caught John Clay breaking into a vault after Clay had created a fictional league as part of the scheme. Name this fictional detective created by Sir Arthur Conan Doyle.

Sherlock Holmes (accept either underlined part)



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**Toss-up Questions**

**Question #3: Social Studies – U.S. History**

*10 points*

In 1992, this state's citizens voted to add a "taxpayer bill of rights" to its state constitution. A gold rush along the South Platte River in this state led to the founding of towns like Central City and Cripple Creek, but it sparked a conflict with natives that led to the Sand Creek massacre. In 2008, this state hosted the Democratic National Convention where Barack Obama was nominated. Name this state with capital Denver.

Colorado

**Question #4: Mathematics – Math Concepts**

*10 points*

The substitution named for this mathematician is used to take the integral of the square root of a quadratic expression. The path visiting each edge of a graph is named for this person because he proved that the Seven Bridges of Konigsberg Problem is unsolvable. The characteristic named for this person equals the number of vertices minus edges plus faces, which equals two for any simple polyhedron. Identify this namesake of the identity  $e^{i\pi} + 1 = 0$ , and of the number  $e$ .

(Leonhard Paul) Euler



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**Question #5: Literature – World Literature**

10 points

This person wrote that “one day’s absence is as long as three years” in a poem concerning **kudzu [KUD-zoo]** vine. He described a poem as “the place to which one’s preoccupations go” in the preface to his *Book of Songs*. This person’s philosophical teachings espouse the concepts of the ideal person, the rules of propriety, and ideal relationships, also known as **junzi [joon-zee]**, *li*, and *ren*. Name this author of the *Analects*, an ancient Chinese philosopher.

**Confucius** (accept **Kong** Qiu, **K’ung** Ch’iu; **K’ung** Chung-ni; **K’ung**-Fu-Tzu; **K’ung**-Tzu; **Kongfuzi**; **Kongzi**; Master **Kung** or **Zhong Ni**)

**Question #6: Science – Physics**

10 points

A shortened version of this person’s name is used for the CGS unit of acceleration. The spacecraft named for this person, launched from the Space Shuttle *Atlantis*, was the first orbiter of Jupiter. This person stated that mathematics is the language of science in his book *The Assayer*, and he supported the work of Copernicus in his *Dialogue Concerning the Two Chief World Systems*. Name this scientist who was put under house arrest and who, according to legend, dropped cannonballs from the Leaning Tower of Pisa.

**Galileo Galilei** (accept either)



**Question #7: Mathematics – Geometry**

*10 points per part*

This shape has the same number of sides as a cross with an interior.		
<b>1</b>	Given the name of a twelve-gon, which is a polygon with twelve sides.	<u><b>duodecagon</b></u> (or <u><b>dodecagon</b></u> )
<b>2</b>	Each vertex of a regular duodecagon has this number of diagonals that have that vertex as an endpoint.	<u><b>9</b></u>
<b>3</b>	This is the total number of diagonals in a regular duodecagon.	<u><b>54</b></u>

**Question #8: Mathematics – Geometry**

*10 points per part*

This name is given to a line that passes through at least two other lines.		
<b>1</b>	Name this line. Several straightforward theorems relate the angles between this line and two parallel lines.	<u><b>transversal</b></u> (line)
<b>2</b>	In this pair of congruent angles created by a transversal going through two parallel lines, neither angle is between the two parallel lines.	<u><b>alternate exterior</b></u> angles (accept <u><b>alternating exterior</b></u> angles, prompt partial answer)
<b>3</b>	If one of the exterior angles created by a transversal through two parallel lines is 20 degrees, this is the angle of the other exterior angles that are not alternate exterior angles.	<u><b>160</b></u> degrees



**Question #9: Fine Arts – Classical/Opera**

10 points per part

This composer wrote many songs but few operas, one of the few being <i>Die Zwillingsbruder</i> [dee zvil-lings-broo-der].		
1	Name this composer of the “Trout” Quintet and the song cycles <i>Winterreise</i> [vin-ter-rise-uh] and <i>Die schone Mullerin</i> .	Franz <u>Schubert</u>
2	Schubert’s 8 <sup>th</sup> symphony, which has two complete movements, is given this nickname.	<u>Unfinished</u>
3	Schubert added this nickname to his fourth symphony.	<u>Tragic</u>

**Question #10: Fine Arts – Classical/Opera**

10 points per part

Robert Schumann composed Studies in the Form of Free Variations on a Theme by this composer.		
1	Name this composer whose nine symphonies include <i>Eroica</i> , which was almost dedicated to Napoleon.	(Ludwig van) <u>Beethoven</u>
2	This opera, about a woman who disguises herself as a prison guard, was the only one written by Beethoven.	<u>Fidelio</u>
3	This is the name of the woman who disguises herself in Fidelio. Earlier operas based on the same story used this name for their titles, as did the overtures Beethoven wrote for his opera.	<u>Leonore</u> (accept <u>Leonora</u> )





**Question #11: Literature – British Literature**

10 points per part

The protagonist of this play is a former chancellor who was alleged to have conspired with the Pope and the French king.	
<b>1</b>	Name this play in which the group committing the title act later claimed that it must be considered suicide, as the Archbishop of Canterbury was of unsound mind. <i><u>Murder in the Cathedral</u></i>
<b>2</b>	<i>Murder in the Cathedral</i> was penned by this author of “The Love Song of J. Alfred Prufrock” and “The Waste Land.” Thomas Stearns <u>Eliot</u>
<b>3</b>	Upon returning to Canterbury, Thomas Becket was approached by this number of tempters. In the end, this same number of knights slew him. <u>four</u>

**Question #12: Literature – British Literature**

10 points per part

The father of this cabin boy owns the Admiral Benbow.	
<b>1</b>	Name this character who managed to shoot Israel Hands shortly after being struck in the shoulder with a knife. Jim <u>Hawkins</u>
<b>2</b>	In this novel, Jim Hawkins travelled with Squire Trelawney aboard the <i>Hispaniola</i> in search of riches. <i><u>Treasure Island</u></i>
<b>3</b>	<i>Treasure Island</i> was penned by this Scottish author of <i>The Strange Case of Dr. Jekyll and Mr. Hyde</i> . Robert Louis Balfour <u>Stevenson</u>



**Question #13: Science – Biology**

*10 points per part*

These organs contain a <b>gel [jel]</b> called the vitreous humor.		
<b>1</b>	Name these organs that are used to see.	<u><b>eyes</b></u>
<b>2</b>	This membrane that lines the eye contains Jacob's membrane, which is also known as the layer of rods and cones.	<u><b>retina</b></u>
<b>3</b>	Other than the optical nerve, this nerve not connected to the eye is the only cranial nerve that does not join the brainstem.	<u><b>olfactory</b></u> nerve

**Question #14: Science – Biology**

*10 points per part*

Types of this process include fission and budding.		
<b>1</b>	Give the general name for this process in which a new organism is produced from one parent.	<u><b>asexual</b></u> reproduction (or <u><b>agamogenesis</b></u> )
<b>2</b>	This term, based on the Greek words for virgin birth, refers to the process of an organism growing from an unfertilized egg.	<u><b>parthenogenesis</b></u>
<b>3</b>	Parthenogenesis is sometimes studied in these insects also known as plant lice, greenflies, or ant cows that have cornicles, cooperate with ants, and eat plant sap.	<u><b>aphids</b></u>



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**Question #15: Social Studies – World History**

*10 points*

Around the turn of the 16th century, this structure was split into Inner and Outer Lines, each featuring three key passes. The predecessors to this were ordered destroyed following the Warring States period. In later years, beacons, towers and forts were built with a fixed distance of a number of *li*. The longest section of this stretches from Mount Hu to **Jiayu [JYAH-yoo]** Pass. Name this series of bulwarks stretching across China and Mongolia.

**Great Wall** of China (accept **Wanli Changcheng** or **10,000-Li Long Wall**)

**Question #16: Science – Astronomy**

*10 points*

In 2012, David Turner claimed that this star was significantly closer than 434 light-years away, which is the distance found by the satellite Hipparcos in the 1990s. This is the closest **Cepheid [SHE-fee-id]** variable to Earth, though it is actually a triple star. This can be located by drawing a line starting in Merak and going through **Dubhe [DOOB-hee]**, and it is also at the end of the handle of the Little Dipper. This star plays a role that used to be played by **Draco [DRAY-koe]**. Name this star useful to navigators because of its Northern location.

**Polaris** (or **Alpha Ursae Minoris**) (prompt on “North Star” or “Ursa Minor”)



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**Question #17: Literature – U.S. Literature**

10 points

This playwright wrote of the gardener Seth boarding up the Mannon home with Lavinia in it. In another play, he wrote of the captain of the coal barge *Simeon Winthrop* and his suspicion of Mat Burke. In addition to writing *Mourning Becomes Electra* and *Anna Christie*, this playwright wrote *A Moon for the Misbegotten*, about an alcoholic actor named James Tyrone. Name this playwright who also included Tyrone in *Long Day's Journey into Night*.

Eugene Gladstone O'Neill

**Question #18: Miscellaneous – Pop Culture**

10 points

In German folklore, this character's companions include Farmhand Rupert and Black Pete. In a Weird Al Yankovic song, this figure ended up in Federal Prison after being pursued by the National Guard and FBI. A misprinted telephone number in a Sears ad led to NORAD developing a program that "tracks" this legend. Name this legendary deliverer of Christmas toys.

Santa Claus (accept St. Nicholas, Father Christmas, Sinterklaas or Kris Kringle)



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**Question #19: Social Studies – U.S. History**

10 points

During this presidential campaign, the eventual victor allowed for the networks to cut him off during the middle of a speech as a ploy to raise funds. In this election, the incumbent overcame the Progressive Henry Wallace and the Dixiecrats, who were led by Strom Thurmond. The day after this election's conclusion, the <i>Chicago Tribune</i> ran a headline that described the wrong outcome. Name this election in which Thomas Dewey lost to Harry Truman.	United States Presidential Election of <u>1948</u>
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**Question #20: Science – Biology**

10 points

This phylum includes the proposed <b>serialia clade</b> [seh-ree-A-lee-uh klade], which in turn includes monoplacophora, which were once thought to be extinct. Though it does not exist in protobranchia and heterodonta, most of the animals in this phylum use a radula to take in food. These animals have a mantle that secretes <b>conchiolin</b> [kon-KIE-uh-lin] and calcium carbonate. Name this phylum that includes <b>cephalopods</b> [SEH-fuh-loe-pods] such as octopus and squid and also includes bivalves and snails, a phylum whose animals are often covered by shells.	<u>Mollusca</u> (or <u>Mollusks</u> )
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**Question #21: Social Studies – World History**

*10 points per part*

He forced Ahmed Hassan al-Bakr to resign following a failed attempt by the President to unite with Syria.		
1	Name this leader who ordered an invasion of the <b>Khuzestan [KOO-zeh-stan]</b> region in order to head off a potential <b>Shia [SHEE-uh]</b> revolution following Iran's 1979 uprising.	Saddam <b>Hussein</b> Abd al-Majid al-Tikriti
2	Saddam Hussein ruled this Mid-East nation until being overthrown by US forces in 2003.	<b><u>Iraq</u></b>
3	Hussein and al-Bakr rose to power within this party, which was behind the attempted assassination of Iraqi president <b>Abd al-Karim Qasim [ah-bid ahl kah-REEM kah-SEEM]</b> .	<b><u>Ba'athist</u></b> Party

**Question #22: Social Studies – World History**

*10 points per part*

This organization's Charter of Fundamental Rights drew on conventions published by the UN and International Labor Organization.		
1	Name this political entity that admitted Croatia as its 28 <sup>th</sup> member in 2013.	<b><u>European Union</u></b> (accept <b><u>EU</u></b> )
2	Since signing a trade agreement with Singapore in 2012, the EU has been moving towards free trade agreements with other members of this organization, which includes Brunei, Cambodia, and Laos.	<b><u>Association of South East Asian Nations</u></b> (accept <b><u>ASEAN</u></b> )
3	In 2009, the EU signed a Memorandum of Understanding with this political body currently headed by Secretary-General Jose Miguel Insulza of Chile.	<b><u>Organization of American States</u></b> (accept <b><u>OAS</u></b> , <b><u>Organizacion de los Estados Americanos</u></b> , or <b><u>OEA</u></b> )



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**Question #23: Mathematics – Trigonometry**

*10 points per part*

The common meaning of this word is ‘next to.’		
1	Give this term used to label certain sides of right triangles that share a vertex with a given angle. This term is often contrasted with opposite and hypotenuse.	<b><u>adjacent</u></b> (side or leg)
2	If the tangent of an angle in a right triangle is 3, and the length of the opposite leg is 6, this is the length of the adjacent leg.	<b><u>2</u></b>
3	If the cosine of an angle in a right triangle is one-third, and the length of the opposite leg is the square root of 2, this is the length of the adjacent leg.	<b><u>1/2</u></b> (or <b><u>0.5</u></b> )

**Question #24: Mathematics – Trigonometry**

*10 points per part*

When functions are used this way, their derivative can be found using the chain rule.		
1	What is the term for a function made by putting the output of one function into another function?	<b><u>composition</u></b> (accept word forms such as <b><u>composite</u></b> or <b><u>composed</u></b> )
2	This prefix is used to show that you are taking the inverse of a trigonometric function. As a separate word, this refers to the distance part of the way around a circle.	<b><u>arc</u></b>
3	Find the sine of the arctangent of nine fortieths.	<b><u>9/41</u></b>



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**Question #25: Science – Physics**

*10 points per part*

This quantity equals electromotive force divided by current.		
<b>1</b>	Name this quantity measured in ohms. Give the term used in DC circuits.	(electrical) <b><u>resistance</u></b>
<b>2</b>	This measure of how well a given material resists electric current equals resistance times cross-sectional area divided by length.	(electrical) <b><u>resistivity</u></b>
<b>3</b>	Often used in alternating current circuits, this complex number is the effective resistance once reactance is taken into account.	(electrical) <b><u>impedance</u></b>

**Question #26: Science – Physics**

*10 points per part*

Identify these units of pressure.		
<b>1</b>	This is the SI derived unit of pressure, equal to a Newton per square meter.	<b><u>Pascal</u></b>
<b>2</b>	This unit, slightly larger than a bar, is equal to 101,325 Pascals.	(standard) <b><u>atmosphere</u></b>
<b>3</b>	This unit, almost equal to a millimeter of mercury, equals 1/760 atmospheres.	<b><u>torr</u></b> (do not accept “Torricelli”)





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**Question #27: Literature – U.S. Literature**

10 points per part

A trip to Russia inspired this author's <i>Eimi</i> [AY-mee].		
1	This poet contrasted “anyone” and “noone” with “someones and everyones” in “Anyone lived in a pretty how town.”	Edward Estlin <u>Cummings</u>
2	E.E. Cummings was inspired to write the autobiographical <i>The Enormous Room</i> after being imprisoned on suspicion of disloyalty while serving in World War One in this country.	<u>France</u>
3	During World War One, E.E. Cummings served in the Norton <i>Harjes</i> [HAR-jes] Corps in this role. John Dos Passos and Ernest Hemingway also volunteered in this role during the conflict.	<u>ambulance driver</u>

**Question #28: Literature – U.S. Literature**

10 points per part

The title features in this poem are “older than the flow of blood in human veins.”		
1	Name this poem in which the speaker describes one entity singing as “Abe Lincoln went down to New Orleans,” and “its’ muddy bosom turn(ing) all golden in the sunset.”	“The <u>Negro Speaks of Rivers</u> ”
2	“The Negro Speaks of Rivers” was penned by this Harlem Renaissance poet and author of the “Simple” series of novels.	James Mercer Langston <u>Hughes</u>
3	In “The Negro Speaks of Rivers,” twice the speaker claims that <i>this</i> of his has grown deep like the rivers.	his <u>soul</u>



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**Question #29: Mathematics – Math Concepts**

10 points

This is the ratio of the area of an inscribed circle to the area of a circumscribed circle for a square. This number is hypothesized to be the real part of solutions in the **Riemann [REE-mahn]** hypothesis. Multiplying this number by a whole number and one more than that whole number gives a triangular number. This number equals the cosine of the quantity pi over three. Raising a number to this power is equivalent to taking a square root. Give this number that is multiplied by the base and height of a triangle to find its area.

one-half (or 0.5)

**Question #30: Science – Chemistry**

10 points

After an attempt to use this element instead of tungsten in lamp filaments was unsuccessful, the Westinghouse Lamp Plant in New Jersey supplied this element to the government during World War Two. An isotope of this element decays into barium, krypton, and three neutrons. This element's depleted form is used in dense weapons, while its enriched form is used by nuclear power plants. Name this element just before neptunium and plutonium on the Periodic Table whose 235 isotope is used in chain reactions.

uranium (prompt on "U")



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**Question #31: Social Studies – U.S. History**

10 points

In the build-up to this battle, two of the Combined Fleet's forces were sent north as a diversion, while the main force was met by a Task Force led by Frank Fletcher and Raymond Spruance. At this battle, the *Enterprise* set the *Hirpu* afire, but not before the *Yorktown* went down. Name this World War Two battle fought northwest of Hawaii, seen as a turning point in the Pacific theater.

Battle of Midway

**Question #32: Literature – World Literature**

10 points

This person wrote that “if prophecies of living birds are ever truthful, I shall be living, always.” He wrote of two children of **Aeolus** [ay-OE-lus] having an incestuous relationship in one section of his *Heroides* [heh-ROE-ih-dees]. In one of this writer's poems, the speaker compares himself to **Tiphys** [TIH-fis] and **Automedon** [ow-toe-MEH-don]. He advocated seducing a maid to advance cause with a lady in *Art of Love*. Name this author of the *Metamorphoses*.

Ovid (accept Publius Ovidius Naso)



**Extra Question #1: Fine Arts – Art History**

10 points

Many of this artist's paintings showed **Lise Trehot [LEE-suh TRAY-hot]**, including one work in which she wears a white dress with a black belt and holds a parasol. One of his works showing a young girl with flowers in her hair and a teen-ager wearing a red hat is *Two Sisters on the Terrace*. That work is set at the **Maison Fournaise [may-son for-nase]**, which is also the setting of a work showing **Aline Charigot [uh-leen cha-ree-goe]**, this man's future wife, holding up a dog. Name this French impressionist who painted *Girl With a Hoop* and *Luncheon of the Boating Party*.

Pierre-Auguste **Renoir**

**Extra Question #2: Science – Biology**

10 points

Different types of these body tissues contain nebulin and myosin proteins. A small example of these tissues attached to hair follicles are the arrector **pili [PIH-lie]**, which create goosebumps. Three pairs of these tissues in the neck are called scalene. These tissues have fibrils that contain myosin and actin, which work in conjunction to change the lengths of these. These can be classified as cardiac, skeletal, or smooth, and these can also be classified by whether or not they are **striated [STRIE-ay-ted]**. Name this tissue often connected to a bone with a tendon, including the trapezius, deltoid, and biceps.

**muscles**



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**Extra Question #3: Mathematics – Math Concepts**

10 points

This person's *The Chemical Basis of Morphogenesis* modeled cell differentiation. A thesis originally named for somebody else states that any computable problem can be solved using a type of machine named for this person. The machine in that thesis originally named for Alonzo Church is only allowed to use a strip of tape. Name this person who imagined a computer able to carry on a conversation in a way that could not be distinguished from human conversation in his namesake test of artificial intelligence.

(Alan) Turing

**Extra Question #4: Social Studies – World History**

10 points

The defending side in this battle utilized the Chain Home system to great effect. The defensive capabilities afforded Marshal Hugh Dowding in this engagement were severely curtailed by Eagle Attack, the main offensive undertaken by the losing side. The victorious side had superior firepower in its Hurricanes and Spitfires, and on the ground utilized newly-developed radar technology. Name this failed attempt by the **Luftwaffe** [LOOFT-wahf] to cross the Channel and conquer an island.

Battle of Britain (accept Operation Sea Lion)



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**Extra Question #5: Literature – World Literature**

*10 points*

In one of this writer's stories, the title moniker was a nickname given to a Prussian commandant that stemmed from a phrase used for sovereign contempt. In another story, the title is a nickname given to members of the courtesan class, one of whom gives herself to an officer before being snubbed by fellow travelers. He also wrote of an item worth five hundred francs that was replaced with one bought for much more. Name this author of "The Necklace."

Henri-René-Albert-Guy de  
**Maupassant**



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**Extra Question #6: Social Studies – World History**

10 points per part

Before studying at the French War College, this person won the <i>Virtuti Militari</i> for his actions during a civil war in Poland.		
1	Name this founder of the right-wing Rally of the French People. After two courts martial, he was sentenced to death <i>in absentia</i> by the government of Vichy France.	Charles <u>de Gaulle</u>
2	Charles de Gaulle was publicly denounced by this leader of the Vichy France government. He was convicted of treason for aiding Germany, and sentenced to life in prison.	Henri-Philippe <u>Pétain</u>
3	Charles de Gaulle and Michael Debré collaborated on the constitution for this government. In 1962, its constitution was modified to allow direct election of the President.	<u>Fifth Republic</u>

**Extra Question #7: Social Studies – World History**

10 points per part

This was on the verge of collapse when Gustav Stresemann formed the Great Coalition, which only staved off its fall from power.		
1	Name this interim government that eventually fell when America began demanding repayment on money lent via the Dawes and Young plans.	<u>Weimar</u> Republic
2	The Weimar Republic was the direct replacement of this country's imperial government, which fell when Kaiser Wilhelm the Second abdicated following World War One.	Federal Republic of <u>Germany</u> (accept <u>Deutschland</u> )
3	This successor to Friedrich Ebert as President of the Weimar Republic dismissed Heinrich Brüning as chancellor and appointed Franz von Papen to succeed him.	Paul von <u>Hindenburg</u>



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**Extra Question #8: Science – Physics**

*10 points per part*

This scientist compiled the <b>Rudolphine [ROO-dol-feen]</b> Tables using observations made by <b>Tycho Brahe [TIE-koe BRAH-hay]</b> .		
<b>1</b>	Name this scientist who devised three laws of planetary motion.	Johannes <u><b>Kepler</b></u>
<b>2</b>	Kepler's first law states that planetary orbits are this shape.	<u><b>ellipses</b></u>
<b>3</b>	Kepler's third law states that the period of an orbit is proportional to the length of the semi-major axis raised to this power.	<u><b>3/2</b></u> (accept <u><b>1 ½</b></u> or <u><b>1.5</b></u> )

**Extra Question #9: Science – Physics**

*10 points per part*

There are generally considered to be six of these devices, including the lever.		
<b>1</b>	Give the two-word phrase for mechanical devices used to impact the direction of magnitude of force.	<u><b>simple machines</b></u>
<b>2</b>	This is the name for the simple machine that consists of a wheel with a rope around part of its circumference.	<u><b>pulleys</b></u>
<b>3</b>	This machine invented in the 18 <sup>th</sup> century, which is not a simple machine, uses two weights hanging from a pulley to measure gravitational field strength.	<u><b>Atwood</b></u> machine