Question #1: Fine Arts – Classical Music & Opera

10 points

This composer wrote the books *Practical Manual of Harmony* and *Principles of Orchestration*. One of his works is *Concerto [kun-"CHAIR"-toh] for Trombone and Military Band*. He used an astrologer to address the audience at the beginning and end of his opera *The Golden Cockerel*. Although he was Russian, this composer studied Spanish folk songs to compose *Capriccio Espagnol [kah-PREE-choh es-pahn-YOHL]*. He then returned to Russian themes for *Scheherazade [sheh-HEH-rah-ZAH-deh]* and *Russian Easter Festival Overture*. Name this composer whose *The Tale of Tsar Saltan* includes a fast movement called "Flight of the Bumblebee".	Nikolai **Rimsky-Korsakov**

Question #2: Social Studies – Geography

10 points

The Willard Bay Reservoir is adjacent to this larger body of water. Antelope Island separates most of Farmington Bay from this lake. Two of its tributaries, which start in the Uinta [oo-IN-tah] Mountains, are the Weber [WEE-bur] and Bear Rivers. The Lucin [LOO-sin] Cutoff Railroad Trestle divides this lake in half, and the northern half is often reddish due to algae [AL-jee]. This lake is the largest remnant of Lake Bonneville [BAH-nuh-vil]. Other than the Great Lakes, this is the largest lake by surface area in the United States. Name this lake in Utah.	**Great Salt** Lake

Question #3: Mathematics – Math Concepts

10 points

A pair of elements in a non-Abelian [uh-BEE-lee-un] group have this relationship if one of them can be left-multiplied by some other element and right-multiplied by that other element's inverse to give the other of the pair. If transposing a matrix and performing this operation on each element results in the original matrix, the matrix is Hermitian [air-MEE-shun]. If two numbers have the same magnitude but opposite angle in the complex plane, then they have this relationship. If there is a sum or difference involving a radical in a denominator, the denominator is rationalized by multiplying it by a number with this relationship to it. Name this operation that changes a plus $b\,i$ into a minus $b\,i$.	**conjugate**s [or **conjugation**; accept longer answers like **complex conjugate**s or **complex conjugation**]

Question #4: Literature – U.S. Literature

10 points

In one novel by this writer, Wes Jordan takes Roger Too White on a tour to demonstrate the racial disparities in Atlanta after Elizabeth Armholster accuses Fareek Fanon of rape. Another novel by this writer focuses on a hit-and-run perpetrated in the Bronx by Sherman McCoy, who had been a successful bond trader. This author of *A Man in Full* and *The Bonfire of the Vanities* also wrote nonfiction about the Merry Pranksters and the American space program. Name this New Journalist who wrote *The Right Stuff* and *The Electric Kool-Aid Acid Test*.	Tom **Wolfe** [or **Thomas K**(ennerly) **Wolfe**; do not accept or prompt on "Thomas Wolfe" or "Thomas Clayton Wolfe"]

Question #5: Science – Chemistry

10 points

This metal was the center of one of the first coordination compounds known to be coordinated to an alkene [AL-keen] ligand, Zeise's [ZYE-suh'z] salt. An oxide of this element forms Adams's catalyst. The standard hydrogen electrode is made up of this metal, which in a compound researched by Barnett Rosenberg is coordinated to two ammine [AM-een] ligands and two chloride ions in a *cis* [siss] configuration. This metal is found in the center of the anti-cancer drug cisplatin [sis-PLAT-in]. Like palladium, which is directly above it on the periodic table, it is commonly used as a catalyst. Name this expensive metal whose atomic number is 78 and which is just to the left of gold on the periodic table.	**platinum** [prompt on **Pt**]

Question #6: Social Studies – World History

10 points

This country's Kataeb [kah-TAY-eb] Party was behind the 1982 Sabra and Shatila massacre. In this country's government, the office of Prime Minister can only be held by a Sunni [SOO-nee], while the President must be Maronite. The refusal to renew Emile Lahoud as this country's president led to the 2005 assassination of its Prime Minister, which the Syrian government was accused of plotting. That murder of Rafik Hariri [rah-FEEK hah-REE-ree] led to this country's Cedar Revolution. Name this country currently headed by Tammam Salam, which gained independence the same day as its neighbor Syria.	**Lebanon** [or **Lebanese Republic** or **Liban** or **République libanaise** or **Lubnan** or al-**Jumhuriyya al-Lubnaniyya**]

Question #7: Science – Biology

10 points per part

	Kayser-Fleischer [KYE-sur "FLY"-shur] rings appear to form in this structure in patients with Wilson's disease.	
1	Name this structure responsible for controlling the diameter of the pupil. The color of the eye is found in this structure.	**iris**
2	Kayser-Fleischer rings are caused by copper in Descemet's [DES-uh-may's] membrane, which covers the inner surface of this transparent layer in front of the eye. This object's limbus separates it from the sclera [SKLAIR-uh].	**cornea**
3	These almond-shaped glands at the sides of the eyes are responsible for producing the liquid portion of tears.	**lacrimal** glands

Question #8: Science – Biology

10 points per part

	This disease is spread by the *Anopheles* [uh-NAH-fuh-lees] mosquito.	
1	Name this disease that was originally treated with quinine [KWYE-"nine"].	**malaria**
2	Malaria is caused by protozoa [proh-tuh-ZOH-uh] in this genus, which includes species such as falciparum [fal-SIP-uh-rum] and vivax [VYE-vaks].	***Plasmodium***
3	An attempt to control malaria involved the use of this pesticide to kill mosquitoes, but its use was discontinued after the publication of Rachel Carson's *Silent Spring*.	**DDT** or **dichlorodiphenyltrichloroethane**

Question #9: Literature – U.S. Literature

10 points per part

	The protagonist of this novel is moved to tears by Mademoiselle Reisz's ["rice"'z] piano-playing.	
1	Name this novel in which Edna Pontellier [pahn-tay-yay] swims out into the Gulf of Mexico.	*The **Awakening***
2	This author of *The Awakening* wrote of Louise Mallard's "shocking" death in "The Story of an Hour".	Kate **Chopin** ["show-pan"] [or Katherine **O'Flaherty**]
3	In another story, Chopin wrote about this woman, a daughter of Madame Valmonde who was thrown out by her husband Armand Aubigny [aw-bin-yee] for supposedly having black ancestry.	**Désirée** [accept "**Désirée's Baby**"]

Question #10: Literature – U.S. Literature

10 points per part

	This poem's "Footnote" features the word "holy" repeated fifteen times.	
1	Name this poem dedicated to Carl Solomon, who is told "I'm with you in Rockland." It opens with the line "I saw the best minds of my generation destroyed by madness."	"**Howl**"
2	This Beat poet wrote "Howl".	(Irwin) Allen **Ginsberg**
3	The second section of "Howl" condemns this demon "whose mind is pure machinery". This demon is also tied to a "sphinx of cement and aluminum" that "bashed open skulls" and "ate up brains and imagination".	**Moloch**

Question #11: Social Studies – Religion

10 points per part

	These sayings are called "weak", or da'if [dah-EEF], if they cannot be linked directly to the person alleged to have originated them.	
1	Give the term for these sayings that are collected in the Six Books by some believers, and into the Four Books by other believers.	**hadith** [hah-DEETH] [or **ahadith**]
2	The hadith are a collection of sayings uttered by this man, the founding prophet of Islam.	**Muhammad** [or **Mohammed**]
3	According to Shi'a [SHEE-uh] Islam, the warning hadith demonstrates that this person was the rightful successor of Muhammad.	**Ali** ibn Abi Talib

Question #12: Social Studies – Religion

10 points per part

	In this religion, each half of the cosmic time cycle features 24 tirthankaras [tir-tan-KAR-uhz].	
1	Name this eastern religion whose followers adhere to the doctrine of ahimsa, or non-violence.	**Jain**ism [accept **Jain dharma**]
2	Svetambaras [sveh-TAHM-buh-rahz], the majority sect of Jainism, is distinguished by its practitioners wearing robes of this color, in contrast to the Digambaras [di-GUM-buh-ruhz], who wear nothing.	**white** robes
3	Svetambaras also believe that these people can attain moksha, and that the tirthankara Mallinath was this type of person. First Corinthians in the Christian Bible states that it is a shame for these people to speak in church.	**women** [accept equivalents such as **female**s]

Question #13: Mathematics – Statistics

10 points per part

	This type of average is also known as the quadratic mean.	
1	Name this average whose name refers to the steps used to calculate it, which are very similar to the steps used to measure spread using the standard deviation.	**root-mean-square** average or **RMS** average
2	The root-mean-square is often used for continuous distributions, though it can also be used for discrete distributions. What is the RMS average of 1 and 7?	**5**
3	In contrast to the root-mean-square average, what is the *arithmetic* [air-ith-MET-ik] mean of 1 and 7?	**4**

Question #14: Mathematics – Statistics

10 points per part

	This quantity equals the expected value of the square of the difference between a value and the mean.	
1	Name this measure of spread, equal to the standard deviation squared.	**variance** [prompt on **sigma squared**]
2	Find the population variance of the set of two numbers that consists of six and fourteen.	**16**
3	Find the sample variance of the same set of two numbers, namely, six and fourteen.	**32**

Question #15: Literature – British Literature

10 points

This character made a sketch of a "woman, draped and blindfolded, carrying a lighted torch". A Russian known as "the Harlequin" credited this character for "enlarging his mind." This trader worked at the Inner Station and was described as "hollow at the core." He wanted to "exterminate all the brutes," and the announcement that he died is used as an epigraph in T. S. Eliot's "The Hollow Men." This character's last words were "the horror! the horror!". Name this Joseph Conrad character whom Charles Marlow seeks in *Heart of Darkness*.	Mr. **Kurtz**

Question #16: Science – Biology

10 points

An enzyme in this pathway is made more active through the activity of PFK2 [P-F-K "two"]. PFK1 catalyzes the rate-limiting step of this pathway, and is part of its investment phase, which consumes two molecules of ATP. Gluconeogenesis [GLOO-koh-NEE-oh-"genesis"] is effectively the reverse of this pathway. This pathway results in a net gain of two ATP [A-T-P], two NADH [N-A-D-H], and twp pyruvates ["pie"-ROO-vayts], and occurs in the cytosol [SYE-toh-sawl]. This process can occur with or without the presence of oxygen. The Krebs cycle and electron transport chain follow this pathway in aerobic respiration. Name this process named for the fact that it breaks down a molecule of glucose.	**glycolysis** [or **Embden-Meyerhof** pathway]

Question #17: Miscellaneous – Consumer Education

10 points

This type of agreement is treated like a checking account in a CMG Plan. Those whose rates are periodically adjusted relative to a market index are called ARMs. In the "reverse" form of this arrangement, the owner of the collateral can access its equity, and no monthly payments are required. Fannie Mae and Freddie Mac are involved in the secondary market for these agreements. Almost a decade ago, a large number of "subprime" ones led to a financial crisis and a spike in foreclosures. Name these loans secured by real property, such as a house.	**mortgage**s or **mortgage** loans [prompt on **loan**s]

Question #18: Literature – World Literature

10 points

At this play's conclusion, the protagonist describes a locale as a "den of thieves vice reigns among", and vows to find a place where "one is free to be an honest man". At the beginning of this play, Philinte [fee-lant] is criticized for praising a man. In this play, a sonnetteer asks a man who is "more sincere than suits the case" for feedback, only to accuse the protagonist of libel. The discovery of gossipy letters ruins Célimène's [say-lee-men'z] social standing in this play. Name this drama in which Alceste [al-sest] detests everyone, by Molière.	*The **Misanthrope**(, or the Cantankerous Lover)* [or *Le **Misanthrope**(, ou l'Atrabilaire amoureux)*]

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

10 points

In an op-ed regarding gays in the military, this person argued "You don't have to *be* straight, you just need to *shoot* straight." A bill named for this senator and Bill Nichols restructured the Defense Department in 1986. Brent Bozell ghostwrote this person's book *The Conscience of a Conservative*. Ronald Reagan's "A Time for Choosing" speech was an endorsement of this politician, who in accepting his party's nomination said "extremism in the defense of liberty is no vice." Name this U.S. senator from Arizona who lost to Lyndon Johnson in the 1964 presidential election.	Barry (Morris) **Goldwater** (Jr.)

Question #20: Science – Earth Science

10 points

This is the most common rock used for dusting coal mines to prevent explosions. This rock, especially if it has silicon dioxide impurities, is combined with clay to make Portland cement, the most common type of cement. This rock and dolomite are the most common constituents of speleothems [SPEE-lee-oh-themz], which are cave formations like stalactites. Chemically, this rock is very similar to marble, and travertine [TRAV-er-teen] and chalk are types of it. This rock is made of aragonite and calcite [KAL-site]. Name this sedimentary rock made of calcium carbonate.	**limestone** [prompt on **calcium carbonate** before the end]

Question #21: Mathematics – Geometry

10 points per part

	This term is taken from the name of a 17th- and 18th-century Italian mathematician.	
1	Give the *general* name of any segment that connects the vertex of a triangle to its opposite side.	**cevian** [CHAY-vee-un, but be generous] [prompt on **Ceva** [CHAY-vuh]]
2	This type of cevian connects a vertex of a triangle to the midpoint of its opposite side.	**median**
3	Find the length of the median of an equilateral triangle if each of its sides has a length of eight units.	**4 root 3** units [or **4 times the square root of 3** or **4 radical 3** units or equivalents]

Question #22: Mathematics – Geometry

10 points per part

	The regular examples of these shapes are called Platonic solids.	
1	Name these three-dimensional solids whose faces are polygons and whose edges are straight. This category of solids includes, among many other solids, pyramids with any base.	**polyhedra** [accept **polyhedron**]
2	This class of polyhedra ["poly"-HEE-drah] contains shapes with multiple different shapes as faces, but all the vertices [VER-tuh-sees] have the same structure.	**Archimedean** solid [accept **Archimedes'** solid]
3	Find the total number of faces of a truncated tetrahedron, which is the Archimedean solid with the fewest number of faces.	**8** faces

Question #23: Fine Arts – Art History

10 points per part

	This statue was created by Paul Landowski, Heitor da Silva Costa, and Albert Caquot [ka-kwoh]. It is on Corcovado [kor-koe-VAH-doe] mountain and is about 100 feet tall.	
1	Name this statue, completed in 1931, whose outer layers are soapstone.	**Christ the Redeemer** [or **Cristo Redentor**]
2	*Christ the Redeemer* is in this country, in the city of Rio de Janeiro.	(Federative Republic of) **Brazil** [or República Federativa do **Brasil**]
3	Rio de Janeiro was the capital of Brazil until Lucio Costa and this architect designed Brasilia. With advice from Le Corbusier [lay kor-boo-see-ay], this architect also designed the headquarters of the United Nations.	Oscar **Niemeyer**

Question #24: Fine Arts – Art History

10 points per part

	This artist made portraits of Adele Bloch-Bauer.	
1	Name this Vienna Secession artist who made the Beethoven Frieze ["freeze"] and who showed a woman with her head turned sideways and her knees bent in *The Kiss*.	Gustav **Klimt**
2	*The Kiss* and *Adele Bloch-Bauer One*, like many of Klimt's works, are embossed with foil made of this metal.	**gold** foil [or **gold** leaf]
3	This is the name of the central part of Klimt's *Stoclet Frieze*, which appears between a woman and an embracing couple. The object depicted in this section contains many spirals.	**Tree of life** [or **Lebensbaum**; prompt on **tree** or **baum**]

Question #25: Science – Chemistry

10 points per part

	Fluorine has the highest value for this quantity on the Pauling scale.	
1	Name this quantity, the tendency for an element to attract electrons in a bond.	**electronegativity**
2	High values for electronegativity are what allow nitrogen, oxygen, and fluorine to participate in these interactions, named for the element they interact with.	**hydrogen bond**s
3	Electronegativity increases as toward the right on the periodic table in part due to the increase in this quantity, which can be estimated using Slater's rules. This quantity is caused in part due to shielding electrons.	**effective nuclear charge** [prompt on answers involving the letter **Z**; do not accept incomplete answers]

Question #26: Science – Chemistry

10 points per part

	For glucose, CH_2O ["C H two O"] is this type of formula—the same as for ribose ["RYE"-bohss] and formaldehyde.	
1	Name this formula that shows the *ratios* of atoms present in a compound, not the exact numbers.	**empirical** formula
2	The percent masses of elements used to determine the empirical formula may be determined through this method, in which a sample is combusted and the masses of the products are measured.	**elemental** analysis [or **CHN** analysis]
3	Empirical formulas are commonly used to represent these compounds, as they do not typically exist with a fixed molecular formula. These compounds typically dissolve in water and have high melting points due to their strong intermolecular attractions.	**ionic** compounds or **ionic** solids

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

10 points per part

	This speech compares the merchant at the crossroads to the one in New York, and claimed income taxes became unconstitutional when a judge changed his mind.	
1	Name this speech delivered by a man who claimed to have the backing of the commercial and laboring interests, as well as the "toiling masses".	**Cross of Gold** speech
2	This Nebraskan gave the "Cross of Gold" speech at the 1896 Democratic National Convention.	William Jennings **Bryan**
3	Bryan's support of bimetallism ["bye-metal-ism"] was attacked by this campaign manager for William McKinley. A political cartoon showed this man wearing a suit covered with dollar signs.	(Marcus Alonzo) Mark **Hanna**

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

10 points per part

	Civilians harmed by this attack constructed a series of dugouts that the victorious soldiers nicknamed "Prairie Dog Village."	
1	Name this attack followed by the capture of Port Hudson. This Civil War victory for the Union was important to the Anaconda Plan.	Battle of **Vicksburg** [or Siege of **Vicksburg**]
2	This man's forces at Vicksburg, nicknamed the "Forlorn Hope," failed to capture the Stockdale Redan. Later, his forces would burn Atlanta to the ground before "marching to the sea".	William Tecumseh **Sherman**
3	As Mississippi was about to fall, this Confederate general ordered the abandonment of Vicksburg. John Pemberton failed to follow his order. This leader was later replaced by General Hood just before Atlanta was burned.	**J**oseph E(ggleston) **Johnston** [prompt on **Johnston**]

Question #29: Science – Physics

10 points

This quantity is related to a substance's polarizability ["polar-eye"-zuh-BIL-ih-tee] and number density by the Lorentz-Lorenz formula. This quantity is equal to the square root of the product of relative permeability and permittivity. Differences in this phenomenon cause the path-length differences that result in the coloration of a thin film. Icelandic spar has two different values for this quantity, which results in birefringence [bie-ree-FRIN-juns]. These values for two different media are multiplied by the sines of of the angles of incidence and reflection in Snell's law. Name this quantity equal to the ratio of speed of light in vacuum to the speed of light in a given medium.	**index of refraction** [or **refractive index**; prompt on **_n_**; prompt on local **speed of light** or **_c_**]

Question #30: Literature – U.S. Literature

10 points

After he shot Tim Johnson, this man's nickname was revealed by Miss Maudie to be "One-Shot". Newspaper editor Braxton Underwood held up a shotgun to defend this man when Walter Cunningham Senior organized a mob against him. In one case, this character argued that his client's slung hand could not have left incriminating marks on the left side of a woman's face. He was unable to convince a jury that Mayella Ewell was not raped by Tom Robinson in Maycomb County. Name this father of Jem and Scout in Harper Lee's *To Kill a Mockingbird*.	**Atticus** Finch [prompt on **Finch**; prompt on "One-Shot" before it is mentioned]

Question #31: Mathematics – Math Concepts

10 points

Fermat's [fair-mah'z] right triangle theorem states that a triangle whose three sides are each this type of number cannot have an area that is a square of this type of number. These numbers give a nonzero output for Thomae's [toh-MAY'z] function. This set of numbers is both continuous and countable, and its countability can be demonstrated by "spiraling outward" in a lattice depiction of *Z* cross *Z*. Examples of the kind of function defined and named by analogy to these numbers consist of a polynomial divided by another polynomial. When written in decimal form, these numbers terminate or repeat. Name this type of real number, examples of which can be written as a quotient of integers.	**rational** numbers or **rationals** [prompt on **Q**]

Question #32: Social Studies – World History

10 points

At one battle in this conflict, the strong wind aided the archers of Lord Fauconberg, while the Earl of Warwick inspired his troops by killing his own horse. At this war's Battle of Tewkesbury [TOOKS-bur-ee], English heir apparent Edward of Westminster was killed. Featuring two distinct battles at St. Albans, this war saw the imprisonment of King Edward the Fifth and his brother Richard, the "Princes in the Tower". The Stanleys support for the eventual winner helped turn the tide in this conflict's decisive battle at Bosworth Field. Name this conflict in which the Houses of Lancaster and York were represented by red and white flowers.	War(s) of the **Roses**

Extra Question #1: Literature – British Literature

10 points

One of this writer's poems is set during the title figure's annual day off from silk-winding, and its protagonist proclaims "God's in his heaven / All's right with the world." This author of *Pippa Passes* wrote a poem in which the speaker is told not to catch men with show, "Fra Lippo Lippi". In another poem by this author, a statue of Neptune is near Fra Pandolf's painting of the title woman. Name this author of "My Last Duchess", the husband of the poet who wrote "Sonnets from the Portuguese".	**R**obert **Browning** [prompt on **Browning**]

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

10 points

Ernest Gruening, one of the U.S. Senators from this state, was one of two senators to vote against the Gulf of Tonkin Resolution. Ernest Gruening's successor as senator from this state, who moved to enter the Pentagon Papers into the Congressional Record, was Mike Gravel [gruh-VEL]. The aborted Gravina Island bridge in this state became known as the "Bridge to Nowhere", and was championed by its then-governor Sarah Palin. Name this state formed from the territory purchased from Russia in "Seward's Folly".	**Alaska**

Extra Question #3: Mathematics – Math Concepts

10 points

A cube named for these numbers is built by looking for numbers whose binary representation does not contain consecutive ones. The polynomial expansion of one divided by the quantity one minus x minus x squared has these numbers as coefficients. As these numbers get larger, their ratio of consecutive values approaches the golden ratio. These numbers, which form a specific example of a Lucas [loo-kah] sequence, are named for a 13th-century Italian who used them to model the growth of populations of rabbits. Identify this sequence in which each number is the sum of the previous two, beginning 1, 1, 2, 3, 5, 8.	**Fibonacci** sequence [accept **Fibonacci** numbers]

Extra Question #4: Science – Astronomy

10 points

Before William Herschel resolved it into stars, this person discovered a globular cluster in Canes Venatici [KAY-neez vih-NAA-tih-"sigh"]. This person also discovered Lexell's comet, which made the closest measured comet approach to Earth, and he discovered at least ten other comets. During his searches, this person often saw nebulous objects that needed close inspection to determine whether they are comets. The first such object was the Crab Nebula, and the 31st such object was the Andromeda Galaxy. Name this French astronomer whose list of 110 objects became a commonly used astronomical catalogue.	Charles **Messier** [mess-yay]

Extra Question #5: Fine Arts – Art History

10 points

This artist's triptych ["TRIP-tick"] *Resistance, Resurrection, Liberation* is at a museum in Nice ["niece"] that was originally dedicated to his religious works. This artist showed himself lying down, wearing a blue shirt and black pants, at the bottom of *The Poet Reclining*. An oversized man wearing black with a brown bag over his shoulder is facing steeply downhill near this artist's early hometown in *Over Vitebsk*. He designed three tapestries for the Knesset [k'NEH-set] and the ceiling for the Paris Opera. Name this artist who showed a white goat facing a green-faced man in *I and the Village*.	Marc (Zakharovich) **Chagall** [shuh-GAHL]

Extra Question #6: Literature – British Literature

10 points per part

	The Allens invite this protagonist on a journey to Bath.	
1	Name this protagonist of *Northanger Abbey*, whom Isabella Thorpe advises to read *Mysterious Warnings* and *Castle of Wolfenbach*.	**Catherine** **Morland** [accept either]
2	*Northanger Abbey* is by this author, whose other protagonists include Elizabeth Bennet and Fanny Price.	Jane **Austen**
3	Catherine has an affinity for romance novels in this genre, which includes *The Mysteries of Udolpho*.	**Gothic** novels [or **Gothic** fiction or **Gothic** romances]

Extra Question #7: Literature – British Literature

10 points per part

	This mock epic was inspired by John Dryden's *MacFlecknoe*. A fourth book was later added to it along with revisions to the original text changing the hero to Colley Cibber [KIB-bur] from Lewis Theobald.	
1	Name this mock epic whose hero is found to be the favorite of the goddess Dulness.	*The **Dunciad** ["DUNCE"-ee-ad]*
2	*The Dunciad* was written by this English author of *The Rape of the Lock*.	Alexander **Pope**
3	*The Dunciad* parodies this ancient Roman poem about the son of Anchises [an-KIE-sees] and Venus.	(the) ***Aeneid*** [uh-NEE-id]

Extra Question #8: Mathematics – Algebra

10 points per part

The *x*-axis and *y*-axis divide the plane into regions called quadrants.		
1	What is the name of the regions formed by the division of space by the *xy* plane, the *yz* plane, and the *xz* plane?	**octant**s
2	Find the maximum possible number of octants that a single plane in three-space can enter. The axes do not count as part of any octant.	**7**
3	If four-space was divided up using a method corresponding to the division of the plane into quadrants or three-space into octants, how many sections would there be?	**16**

Extra Question #9: Mathematics – Algebra

10 points per part

These formulas are named for a French mathematician who pioneered the use of letters to represent variables.		
1	Name these formulas that give the relationship between a polynomial's coefficients, and the sum and the product of its roots.	**Vieta**'s formulas [or **Viète**'s formulas]
2	Find the sum of the solutions to the quadratic equation two *x* squared, minus ten *x*, plus 1, equals zero.	**5**
3	Find the discriminant of the same equation. Again, that equation is two *x* squared, minus ten *x*, plus 1, equals zero. Do not take the square root of the discriminant.	**92**