MASONIC SECTIONAL TOURNAMENTS 2012

These questions were used at the Masonic Sectional Tournaments on February 18, 2012. They should not be used for any other interscholastic competitions.

These questions were written by David Reinstein and Donald Taylor. Taylor wrote the Brit Lit, World Lit, Religion, and Mythology, and Reinstein wrote the rest.

Question #1: Mathematics – Conceptual Question

15 points

The axiom named after this concept leads to the creation of a set containing all of the natural numbers, and a point named after this concept allows for compactification. This is used to express the perimeter of a Koch Snowflake, and one form of this is represented using the symbol aleph-null. This is used to represent the limit of one over x squared as x approaches zero. Name this concept which is greater than all real numbers.	Infinity (or Infinite) (prompt undefined)

Question #2: Social Studies – U.S. Government

15 points

One Supreme Court case involving this amendment was United States vs. Miller, and some of the debate over this amendment deals with whether or not there should be a comma before the words "being necessary" and also before the words "shall not be infringed". This amendment was used in the case of Printz vs. United States to override certain aspects of the Brady Bill, and it has come up more recently in the cases of District of Columbia vs. Heller and also in McDonald vs. Chicago. Lawyers debating this amendment have argued over the meaning of the word Militia. Name this amendment which according to some readings guarantees the right to keep and bear arms.	2(nd Amendment)

Question #3: Literature & Language Arts – Mythology

15 points

He designed the piping systems at the court of Cocalus, in Sicily. This man was forced from hiding after he used honey and an ant to thread a spiral seashell. This son of Metion was banished from Athens by the Areopagus after tossing his nephew from atop the Acropolis. One of his patrons asked him to build a wooden cow, and he then built another structure to contain the offspring of that patron. Name this mythical craftsman who built the Labyrinth and some wings for himself and his son Icarus.	Daedalus

Question #4: Science – Astronomy

15 points

This planet was supposed to be orbited by the Akatsuki probe, but the probe misfired and will try again in a few years, and this was also the target of the unsuccessful Mariner One mission. Its highest point is on the Maxwell Montes, which is near its Lakshmi Planum. Like Uranus, this planet has retrograde rotation. Its atmosphere is similar in composition to Mars, though much denser and containing clouds of sulfuric acid. Name this bright planet with a year equal to 225 Earth days, the second planet from the Sun.	Venus

Question #5: Fine Arts – Music Theory

15 points

Haydn repeatedly used this type of interval in his string quartet in D minor, and this interval is the difference in pitch between an English horn and an oboe. The end of the Hallelujah Chorus uses the descending form of this interval, which involves two frequencies in a ratio of three to two. Name this interval that begins the song "Twinkle, Twinkle Little Star", where it often consists of a C rising to a G.	(Perfect) Fifth

Question #6: Literature & Language Arts – U.S. Literature

15 points

Some of the presents given in this novel are a ball of twine, chewing gum, a spelling bee medal, and figures carved out of soap. Part of this novel takes place at First Purchase, where Zeebo reads and Reverend Sykes raises money for Helen. Evidence is given that Bob Ewell beat his daughter Mayella in their trial against Tom Robinson. This novel is set in Maycomb, where Dill befriends Jem and Scout Finch. Name this work by Harper Lee.	*To Kill A Mockingbird*

Question #7: Science – Chemistry

10 points per part

Answer the following about gas laws:		
1	The name of which Dutch scientist is used to represent the total attractive or repulsive forces between molecules?	(Johannes Diderik) van der Waals
2	According to Boyle's Law, what quantity varies inversely with pressure?	Volume
3	Which law states that the amount of gas which dissolves in a liquid varies directly with the partial pressure of the gas?	Henry('s Law)

Question #8: Science – Chemistry

10 points per part

Answer these questions about titration:		
1	Titrations sometimes use what type of solution which stabilizes pH levels?	Buffer(s)
2	Titrations often use what type of compound which changes color based on chemical properties? Litmus is a common example.	Indicator
3	Many examples of those compounds other than litmus belong to which group characterized by a CH_3^+ ion?	Methyl

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

10 points per part

The United States did not have a female Secretary of State until 1997. We've now had three.		
1	Name the Secretary who succeeded Warren Christopher in the Clinton Administration who pushed for US involvement in the Kosovo Crisis.	(Madeleine) Albright (accept Korbelová or Korbel)
2	Name the Secretary who succeeded Colin Powell in the George W. Bush Administration who pushed for UN sanctions against Iran.	(Condoleeza) Rice
3	Name the current Secretary in the Obama Administration who pushed for military intervention in Libya.	(Hillary) Clinton (accept Rodham)

Question #10: Social Studies – U.S. History

10 points per part

Answer the following questions about Benjamin Franklin:		
1	What bestseller did Franklin publish on an annual basis?	*Poor Richard's Almanack*
2	In what city did a Congress agree on Franklin's Plan of Union in 1754?	Albany(, New York)
3	Franklin helped publicize letters written by which Massachusetts Governor in 1773? The Governor ended up moving to England.	(Thomas) Hutchinson

Question #11: Mathematics – Analytical Geometry

10 points per part

Find the following for the graph of the equation $x^2+y^2-8x+2y+8=0$:		
1	the center	(4,-1)
2	the radius	3
3	Either x-intercept, giving your answer as a number in simple radical form, not as an ordered pair	$4+2\sqrt{2}$ (or $4-2\sqrt{2}$)

Question #12: Mathematics – Analytical Geometry

10 points per part

Consider Vector P with displacement (1,0,1) and Vector Q with displacement (1,-1,0). Find the following:		
1	3P+4Q	(7,-4,3)
2	P dot Q	1
3	P cross Q	(1,1,-1)

Question #13: Literature & Language Arts – World Literature

10 points per part

Answer the following about the play, *No Exit*.		
1	This existentialist wrote *No Exit*.	(Jean-Paul) Sartre
2	Shot for being a deserter, this character resigns himself to his fate, and fails to try to get the group to shut up.	Garcin
3	After declaring that there is no need for red-hot pokers, the aforementioned figure says this famous four-word quote. Before doing so, the torture chambers and fire and brimstone were called old wives' tales.	"Hell is other people" (or l'enfer c'est les autres)

Question #14: Literature & Language Arts – World Literature

10 points per part

Identify the following novels by Hermann Hesse.		
1	Harry Haller enters the Magic Theater, which is "For Madmen Only", in this work.	(*Die*) *Steppenwolf*
2	The central figure in this work decides to seek nirvana on his own. In a dream, he kisses his friend Govinda, who then turns into a woman.	*Siddhartha*
3	One figure in this work steals apples, then steals money to pay Kromer to keep quiet. His mentor, the title character, challenges the story of Cain and Abel, and also casts doubt on the story of Jesus' crucifixion.	*Demian*

Question #15: Science – Health

15 points

If the concentration of this nutrient in the blood gets too low, one of the symptoms is tetany, which is the involuntary contraction of muscles. The concentration of this nutrient in the blood is increased by parathyroid hormone, and this works in alternation with potassium to control heart muscles. This nutrient's absorption from the small intestine is increased by Vitamin D, and its carbonate is commonly used as an antacid. Name this nutrient which prevents osteoporosis by increasing bone density and which is highly concentrated in dairy products.	Calcium (accept Ca or Ca^{2+})

Question #16: Social Studies – Current Events

15 points

This person founded the company that owns Zondervan and HarperCollins, and one of the subsidiaries owned by the company this person founded is headed by Roger Ailes. This man's son has been in charge of British Sky Broadcasting. One of his employees, Rebekah Brooks, resigned last year after a scandal involving thirteen-year-old Milly Dowler, a British murder victim whose voicemail was hacked. Name this billionaire who inherited the *Adelaide News* and started News Corp, the owner of Fox.	(Rupert) Murdoch

Question #17: Miscellaneous – Consumer Education

15 points

The SAFE Act of 2008 requires states to license organizations that originate these types of transactions. Elderly people sometimes use the equity release form of this transaction, which is known as the reverse type, and many people believe our current economic problems are due to an excessive number of the subprime types of these. Name this type of loan, secured by land and the buildings on it, which is typically used to buy a house.	Mortgage(s) (prompt loan or home loan)

Question #18: Mathematics – Conceptual Question

15 points

Like a quadrilateral, this shape can be used to divide a cube into two congruent parts, and though it is not used for the face of any Platonic solids, it is used for some of the faces of several Archimedean solids, such as the truncated tetrahedron. Uniquely for regular shapes, its circumradius is equal to its side length, and, as with triangles and squares, the regular version of this shape can tessellate the plane alone. The regular polygon of this shape has nine diagonals and interior angles of one hundred twenty degrees. Name this polygon with six sides.	Hexagon (accept 6-gon before six is mentioned)

Question #19: Literature & Language Arts – World Literature

15 points

One of his works consists of a series of three lectures, including "The Empire Fights Back", which contains the parable "The Gentlemen and the Jungle". His speech delivered on the death of James Baldwin was included in his collection, *The Education of a British-Protected Child*. He wrote about a headmaster who orders a wire fence built around an old footpath, but is dismissed over it in "Dead Man's Path". In one of his novels, a student is supported by the Umuofia Progressive Union. In another novel, that student's grandfather is buried as an outcast after his people tear down a church building. Name this Nigerian novelist, the author of *Things Fall Apart*.	(Albert Chinua(lumogu)) Achebe

Question #20: Science – Physics

15 points

The existence of this phenomenon on the surface of certain objects is used to explain the Meissner effect, and the persistent type of this phenomenon exists in metallic rings that are typically less than a micrometer in diameter. The density of this quantity equals the curl of magnetic field. This quantity is added and subtracted in Kirchoff's Junction Rule. Identify this quantity equal to electric potential divided by resistance commonly represented by an upper case I and measured in Amperes.	(Electric) Current

Question #21: Mathematics – Algebra

10 points per part

Evaluate the following expressions:		
1	nine raised to the three-halves power	27
2	the log base two of thirty-two	5
3	two raised to the power of the log base 4 of 3	$\sqrt{3}$

Question #22: Mathematics – Algebra

10 points per part

Find the following coefficients:		
1	Find the coefficient of the x^3 term in the expansion of the quantity x+1 raised to the fifth power.	10
2	Find the coefficient of the x^3 term in the expansion of the quantity x+2 raised to the fourth power.	8
3	Find the coefficient of the x^3 term in the expansion of the quantity x+3 raised to the third power.	1

Question #23: Literature & Language Arts – Vocabulary

10 points per part

Identify these words with the same root:		
1	Workers in a force who maintain order and prevent crime	Police
2	At ease in different cultures, the opposite of provincial	Cosmopolitan
3	A very large populated city	Metropolis

Question #24: Literature & Language Arts – Vocabulary

10 points per part

Identify these words with the same root:		
1	Group of people, especially a group in a church or other religious institution	Congregation
2	To separate people, especially when it is done because of racial differences	Segregate (accept different word forms)
3	Sociable and outgoing	Gregarious

Question #25: Science – Biology

10 points per part

Let's see how much you know about simple organisms:		
1	This name is given to organisms that do not have membrane-bound organelles in their cells like a nucleus.	Prokaryote(s)
2	Though some of those organisms are archaea, many of them are this type of simple organism that is often spherical, spiral, or rod-shaped.	(Eu)bacteria (or Bacterium)
3	Though the definition has changed, organisms were originally classified as archaeans based on their production of which gas?	Methane (or CH_4)

Question #26: Science – Biology

10 points per part

Identify these human hormones:		
1	This is the principal male sex hormone, though it is also produced by ovaries.	Testosterone
2	This hormone is produced by the adrenal glands and is also known as adrenaline.	Epinephrine
3	This hormone produced in the kidney and liver regulates red blood cell production.	Erythropoietin (prompt EPO)

Question #27: Social Studies – World History

10 points per part

Name these English monarchs, all of whom predate the Acts of Union of 1707:		
1	This 16th century king married six times.	Henry the Eighth
2	This 17th century king fled England during the Glorious Revolution.	James the Second
3	This first ruler from the House of York temporarily lost his throne to Henry the Sixth.	Edward the Fourth

Question #28: Social Studies – World History

10 points per part

Answer the following questions about events leading up to the French Revolution:		
1	Who was king when the revolution started?	Louis the Sixteenth
2	What group was called into session by that king for the first time in 175 years to solve a financial crisis?	(E)states-General
3	Name the finance minister fired by the King in 1789. That dismissal led to the storming of the Bastille three days later.	(Jacques) Necker

Question #29: Literature & Language Arts – British Literature

15 points

In this poem, both Cossacks and Russians reeled from the saber stroke. The title group came through the jaws of death, and back from the mouth of hell. The central unit used their weapons on gunners, "plunged in the battery-smoke, right through the line they broke." According to the speaker, someone had blundered, but as to the title group, "theirs not to make reply, theirs not to reason why, theirs but to do and die." Set at the Battle of Balaklava where the title group pushed half a league, half a league, half a league onward, name this poem in which six hundred rode into the valley of death, written by Alfred, Lord Tennyson.	"(The) Charge of the Light Brigade"

Question #30: Social Studies – U.S. History

15 points

James Bonham and Albert Martin tried to get assistance before this battle, but a relief effort led by James Fannin did not reach its destination, and the Gonzales Ranging Company was too small a force. This battle undid the earlier fighting involving General Cos during the Siege of Béxar, which had taken place three months earlier. Louis Moses Rose went down in infamy after this battle for choosing not to cross the line drawn in the sand by Colonel William Travis. Travis and James Bowie commanded the soldiers at this battle who were all killed by troops under General Santa Anna. Name this fort that was overrun in 1836 in present-day San Antonio.	Alamo

Question #31: Science – Biology

15 points

In the nucleus of cells in this tissue, the protein Flowering Locus T binds to the transcription factor FD. The lateral type of this tissue is the same thing as the vascular cambium, and the intercalary type of this tissue is found at the base of grass blades. This tissue is often found at the tip of the radicle and the plumule when plants break from their seeds. Because it is often found at the tips of other tissues, this tissue is often given the adjective apical. Name these undifferentiated cells that exist at the location of plant growth.	Meristem(s)

Question #32: Social Studies – World History

15 points

There were popular uprisings to create this nation during the Napoleonic Wars and World War One, and the modern version was created by the Little Treaty of Versailles. Its capital was the site where Eastern European countries signed an alliance with the Soviet Union in 1955, and this was the home country of about half of the Jews who died during the Holocaust. Its Solidarity Movement headed by Lech Walesa led its break from Communism. Name this country which lost its President Lech Kaczyński in a plane crash two years ago.	(Republic of) Poland (or Polish Republic)

Replacement Question A: Social Studies – U.S. Government

15 points

The person who most recently went through this process was Thomas Porteous, and the only member of Congress to go through it was William Blount. According to Section Four of Article Two of the Constitution, this procedure can be applied to the President, Vice President and all civil officers of the United States, and it can be done for treason, bribery, or other high crimes and misdemeanors. This action can only be taken by the House of Representatives, though it only has meaning when followed by a conviction by the Senate. Name this process that can lead to the removal of an elected officer.	Impeachment (accept other word forms)

Replacement Question B: Math – Conceptual Question

15 points

This number is equal to the square root of the quantity of one plus its own square root, and it can be represented as a standard continued fraction using only the number one. It is also equal to two times the cosine of the quantity pi over five, which is why it can be used to compare distances within a pentagon. It solves the quadratic x squared minus x minus one equals zero, and it gives the limit of the ratio of a term to its previous term in the Fibonacci sequence. This number also is used to construct a rectangle which can be broken down into a square and a similar version of itself. Give this irrational value equal to about 1.618 often represented by the Greek letter phi.	Golden Ratio (or golden proportion, divine proportion, golden mean, golden section, or mean of Phidias, accept phi before it is mentioned)

Replacement Question C: Science – Chemistry

15 points

In order to discover the law named after him, this scientist needed to recognize that most gas molecules were not composed of atoms, which this man referred to as elementary molecules. His work explained Gay-Lussac's Law of Combining Volumes and allowed the calculation of molecular masses for gases. This person's name is now associated with a value discovered by Johann Loschmidt which equals the gas constant divided by the Boltzmann constant. Name this Italian scientist whose namesake constant gives the number of molecules in a mole of substance.	(Lorenzo Romano Amedeo Carlo) Avogadro (di Quaregna e di Cerreto)

Replacement Question D: Language Arts – Grammar/Usage

15 points

This process involves writing out the lexeme for certain types of words. It commonly is done in the present tense and indicative mood, starting with the infinitive form and then involving six additional forms of the given word based on whether it is singular or plural and on whether it is in the first, second, or third person. This process is helpful for students learning foreign languages, especially for irregular words. Name this method of writing out the different forms of a verb.	Conjugation (accept different word forms)

Replacement Question E: Literature – U.S. Literature

10 points per part

This author set many of his works in Yoknapatawpha County.		
1	Name this man who wrote *The Sound and the Fury*.	(William) Faulkner
2	Name the member of the Compson family who narrates the first section of *The Sound and the Fury*.	Benjy (or Ben or Benjamin)
3	In the same author's *As I Lay Dying*, this youngest Bundren child confuses his dead mother for a fish.	Vardaman

Replacement Question F: Literature – U.S. Literature

10 points per part

His novels include *The House of the Seven Gables* and *The Scarlet Letter*.		
1	Name this author who also wrote short stories.	(Nathanial) Hawthorne
2	This story by that author involves a doctor who claims to have been sent water from the Fountain of Youth.	"Dr. Heidegger's Experiment"
3	This short story is about a scientist named Aylmer and his almost perfect wife Georgiana.	"(The) Birth-Mark"

Replacement Question G: Social Studies – Geography

10 points per part

Identify these African cities:		
1	This city is the most populous in Egypt and is its capital.	Cairo
2	This city is the second most populous in Egypt and now has a manmade connection to the island of Pharos.	Alexandria
3	While Kinshasa is the capital of the Democratic Republic of the Congo, this city is the capital of the Republic of the Congo.	Brazzaville

Replacement Question H: Social Studies – Geography

10 points per part

Identify these Asian countries:		
1	This country between Russia and China has its capital at Ulan Bator.	Mongolia
2	This country south of Thailand exists on mainland Asia and Borneo.	Malaysia
3	This country includes the autonomous region of Karakalpakstan, which is across the Aral Sea from Kazakhstan.	Uzbekistan

Question #1: Literature & Language Arts – British Literature

15 points

One of his works describes a jackal that eats pieces of leather from rubbish-heaps. That work also contains a character known as Lungri, or the Lame One. That character later burns his feet on a campfire, and enters a wolf den seeking quarry. An unnamed newspaperman narrates a tale concerning the takeover of Kafiristan by Peachey Carnahan and Daniel Dravot in his story *The Man Who Would Be King*. Disko takes on a spoilt brat, and helps him mature in his novel *Captains Courageous*. He wrote a poem about a water-bearer who's a better man than the speaker, "Gunga Din." In a different work, Lungri is given the moniker Shere Khan, and the quarry he was after is Mowgli. Name this British author of *The Jungle Book*.	Rudyard (Kipling)

Question #2: Miscellaneous – Sports

15 points

One athlete who attended this university is basketball hall of famer Adrian Dantley, and its other great basketball players have included Skylar Diggins and Luke Harangody. Its football team has had Heisman Trophy winners such as Johnny Lujack and Paul Hornung and is currently coached by Brian Kelly, having been led in the past by Frank Leahy, Charlie Weis, and Knute Rockne. Name this university located in South Bend, Indiana.	(University of) Notre Dame

Question #3: Science – Earth Science

15 points

These objects often contain interior branch pipes which eventually can lead to parasitic cones. Examples of these were recently found on the dark side of the Moon, and many of these exist on Jupiter's moon Io. One of the most closely observed ones is Sakurajima, and monitoring includes forward looking infrared, listening for harmonic tremors, and measuring for ground deformation. These objects contain a caldera, and these can be classified as cryptodomes, cinder cones, composite, or shield. Name these openings that often form mountains where ash and magma can reach the Earth's surface from below.	Volcano(es)

Question #4: Social Studies – World History

15 points

An assassination attempt against this person was plotted by Gaston d'Orléans, comte de Montrésor, and the Count of Soissons. Much earlier, this person advised Concino Concini (con-CHEE-no con-CHEE-nee) to have Prince Henri of Condé arrested. This person organized the Treaty of Compiègne, which helped the Netherlands fight Spain, but he then used the Treaty of Monzón to make peace with Spain. This person was the commander during the Siege of La Rochelle, which put down a Huguenot Rebellion during the Thirty Years' War. Name this Chief Minister of Louis the Thirteenth who was succeeded by Mazarin.	(Cardinal Armand) Richelieu

Question #5: Mathematics – Conceptual Question

15 points

When this shape is tangent to both a cone and a plane, it is named after Germinal Dandelin and can be used to prove that the intersection of a plane and a cone can be an ellipse. This can be graphed in any of the three common three-dimensional coordinate systems by setting the sum of the squares of the length coordinates equal to a constant, and this can most easily be graphed by setting rho equal to a constant. This shape has the smallest surface area for a given volume, and it can take up two-thirds of a circumscribed cylinder. Name this three-dimensional shape equivalent to all points a fixed distance from its center.	Sphere

Question #6: Literature & Language Arts – U.S. Literature

15 points

This character has a brother Ben who has a diamond mine in Africa, and before saying that he had a big year in 1928, he states, "You can't eat the orange and throw the peel away - a man is not a piece of fruit." This man also states that Charley's son Bernard is liked but not well liked. His older son was a high school football star who failed math, and his younger son is named Happy. Name this protagonist in Arthur Miller's *Death of a Salesman*.	Willy Loman (prompt Willy or Loman)

Question #7: Social Studies – Geography

10 points per part

Identify these African countries:		
1	Which country on the horn of Africa has its capital at Mogadishu?	Somalia
2	Swaziland is almost surrounded by South Africa. Which country is surrounded by South Africa?	Lesotho
3	Which country on the Gulf of Guinea lies between Togo and Nigeria?	Benin

Question #8: Social Studies – Geography

10 points per part

Identify these Florida cities:		
1	Which populous city in south Florida is just south of Fort Lauderdale and Hollywood?	Miami
2	Which populous city near Tampa and Clearwater is just north of Gulfport?	Saint Petersburg (prompt Saint Pete)
3	Which city is at the western end of the panhandle across its namesake bay from Gulf Breeze?	Pensacola

Question #9: Mathematics – Probability

10 points per part

A spinner has a one-third probability of landing on one, a one-third probability of landing on two, and a one-third probability of landing on three. Find the following probabilities if the spinner is spun twice:		
1	getting the number one twice in two tries	1/9
2	getting an odd number twice in two tries	4/9
3	getting a sum of four from the two spins	1/3

Question #10: Mathematics – Probability

10 points per part

Shaina makes three-fourths of her free throws.		
1	If she shoots two free throws, what is the probability that she makes both?	9/16
2	If she shoots two free throws, what is the probability that she misses both?	1/16
3	If she shoots three free throws, what is the probability that she makes exactly one?	9/64

Question #11: Literature & Language Arts – Mythology

10 points per part

Answer the following about the events that will occur at Vigrid.		
1	This chief Norse deity will be consumed by Fenrir, and his death will be avenged by his son using a special boot.	Odin (accept Woden or Wotan, prompt on All-Father)
2	This war deity, whose missing hand was bitten off by Fenrir, will kill and be killed by Garm.	Tyr (accept Tiw, Tiwaz, and Ziu)
3	This fire giant will burn almost everything to a crisp, after which the world will be reborn.	Surt(r)

Question #12: Literature & Language Arts – Mythology

10 points per part

Answer the following about Perseus.		
1	Perseus slew this Gorgon, who was disfigured after sleeping with Poseidon. Pegasus and Chrysaor sprung from her neck.	Medusa
2	After he was done with it, Perseus returned a reflective shield to this goddess of wisdom.	(Pallas) Athena (accept Minerva)
3	Perseus' grandfather, he tried to engineer the death of Perseus and his mother, since Perseus was prophesied to kill him. Eventually, a discus did the trick.	Acrisius

Question #13: Science – Physics

10 points per part

Answer the following questions about linear momentum:		
1	Which quantity is multiplied by mass to calculate linear momentum?	Velocity (or Speed)
2	The change in momentum can be found by integrating force with respect to time. What name is given to this value?	Impulse
3	The momentum of a photon varies inversely with which property of the photon?	Wavelength

Question #14: Science – Physics

10 points per part

Answer the following questions about Isaac Newton:		
1	The unit named after Newton measures what quantity?	Force
2	Newton's First Law is often referred to as the law of what?	Inertia
3	What name is given to the interference pattern when light is reflected between a flat surface and a spherical surface?	Newton's Rings

Question #15: Social Studies – Current Events

15 points

This person serves just above Janet Yellen, and in a 2004 speech he claimed that the United States had entered the New Moderation Era. This person used the financial accelerator theory to explain the Great Depression, and in 2002 he referred to Milton Friedman's idea of solving deflation by throwing money out of helicopters. In 2008, he involved the government in buying assets from banks, and he repeated the process two years later; that policy is known as quantitative easing. Name this man appointed by George W. Bush and reappointed by Barack Obama as Chairman of the Federal Reserve.	(Ben) Bernanke

Question #16: Fine Arts – Art Theory & Technique

15 points

This painting technique was used for the paintings *Children on a Farm* and *View From My Window, Eragny*, which were by Camille Pissarro. It was also used for *The Jetty at Cassis* and *The Bonaventure Pine*, two works by Paul Signac. Researchers believe that this technique was added to *Bathers at Asnieres* three years after the original painting was completed. Name this technique which relies on the viewer's ability to blend colors used in *A Sunday Afternoon on the Island of La Grand Jatte* by Georges Seurat.	Pointillism (or Pointillist)

Question #17: Mathematics – Conceptual Question

15 points

This person is the namesake of the three angles used to describe the orientation of a rigid body, and the continued fraction named after him can be used to calculate the inverse tangent. His name is also attached to the simplest method of approximating solutions to differential equations by linear approximations, and the formula relating vertices, edges, and faces of a polyhedron. His name is also attached to an identity which uses the numbers zero, one, pi, i, and e. Name this eighteenth century mathematician who popularized expressing an important irrational number with the letter e.	(Leonhard) Euler (pronounced 'oiler' but be generous in accepting answers)

Question #18: Literature & Language Arts – U.S. Literature

15 points

Part of this novel takes place in Mill City while the main character and his friend Remi work as nightguards. The main character in this novel has a dream in which he is pursued by a shrouded traveler as he tries to reach the protective city. One of the characters, Carlo Marx, has a lot in common with the real-life poet Allen Ginsberg, and the author's real-life friend Neal Cassady resembles this book's Dean Moriarty. Name this novel narrated by Sal Paradise based on the car trips of its author Jack Kerouac.	*On The Road*

Question #19: Science – Environmental Science

15 points

Exposure to this element can lead to a type of social phobia known as erethism, and this element often enters the environment from its use in small-scale gold mines. This causes neurological problems sometimes known as Minamata disease, and this is found with sulfur in cinnabar. Spills of this element should not be cleaned with a broom, mop, or vacuum cleaner, and there have been controversies about whether the presence of this element in vaccine preservatives or fluorescent light bulbs is a health hazard. Name this element often ingested by eating seafood and often used in thermometers.	Mercury (accept Hg)

Question #20: Social Studies – Geography

15 points

In the 19th century, this city created a Committee of Vigilance to control crime, much of which was blamed on a group of immigrants known as the Sydney Ducks in an area known as Barbary Coast. One of its tourist areas is named after former Mayor Adolph Sutro, while another contains Baker Beach. This city contains the Fillmore Auditorium and Fillmore West, located near Haight-Ashbury, and its largest building is the Transamerica Pyramid. This city also contains Nob Hill and is near the Island of Alcatraz. Name this California city near Oakland at one end of the Golden Gate Bridge.	San Francisco(, California)

Question #21: Mathematics – Statistics

10 points per part

Find the following quantities for the list of numbers that consists of 3, 3, and 81:		
1	the mode	3
2	the geometric mean	9
3	the mean absolute deviation	104/3 (or 34 2/3 or 34.6 repeating)

Question #22: Mathematics – Statistics

10 points per part

Find the following for the list of numbers that consists of 2, 3, and 6:		
1	the median	3
2	the range, giving your answer as a single number	4
3	the harmonic mean, using the definition such that if all the numbers were equal then the harmonic mean would equal that same number	3

Question #23: Literature & Language Arts – British Literature

10 points per part

Answer the following concerning Winston Smith.		
1	Winston is the protagonist of this dystopian George Orwell novel.	*1984*
2	Winston takes this woman as his mistress, but is caught thanks in part to Mr. Charrington.	Julia
3	Winston works in the Records Department of this government branch, where he alters historical documents.	(Ministry of) Truth

Question #24: Literature & Language Arts – British Literature

10 points per part

Answer the following about a couple of mysteries.		
1	In this mystery, Hercule Poirot is in a match of wits against a number of passengers who had a hand in the murder of Mr. Ratchett, who is really Cassetti.	*Murder on the Orient Express*
2	Ten figurines symbolize the characters in this novel, in which people die similarly to the figures in the nursery rhyme *Ten Little Indians*.	*And Then There Were None*
3	This author, who used the pseudonym Mary Westmacott, wrote both works.	(Dame Agatha Mary Clarissa Miller) Christie (accept Mallowan)

Question #25: Science – Health

10 points per part

Answer the following questions about the MMR vaccine:		
1	What does the R stand for in MMR? The M's stand for mumps and measles.	Rubella (accept German measles)
2	In 1998, *The Lancet* published an article falsely claiming that MMR could cause bowel disease and which neurological disease?	Autism
3	MMR is now being combined with the varicella vaccine so it also protects against which fourth disease?	Chickenpox

Question #26: Science – Health

10 points per part

Answer these questions about teeth:		
1	What is the group of teeth towards the back of your mouth? Wisdom teeth are an example of this type of teeth.	Molar(s)
2	What very hard substance is the outermost tooth tissue?	Enamel
3	What name is given to the tissues which support teeth? It includes the gingival, which is commonly known as the gums.	Periodontium (or Periodontia)

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

10 points per part

Name these businessmen who were labeled at one time or another as robber barons:		
1	This man started Standard Oil in 1870.	(John) Rockefeller
2	This man served as Secretary of the Treasury under Presidents Harding, Coolidge, and Hoover.	(Andrew) Mellon
3	This man started the American Tobacco Company in 1890.	(James Buchanan) Duke

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

10 points per part

Name these Presidents who were never elected President:		
1	This President tried to hold onto the office in 1976, but he lost to Jimmy Carter.	(Gerald) Ford
2	This man became President when Garfield was assassinated but was not nominated by his Party to keep the office in 1884.	(Chester) Arthur
3	This President lost two Cabinet Members from an explosion on the USS Princeton and was the first President to have a veto overridden.	(John) Tyler

Question #29: Science – Biology

15 points

This process is called inverted in species with holokinetic systems such as mealybugs, and a major part of it can be mediated by the synaptonemal complex. One part of this process ends with diakinesis, which is when the chiasmata (kai-AS-mah-tah) become visible. Those chiasmata form during the pachytene (PAK-ee-teen) stage and are the location of crossing over. Abnormal occurrences during this process lead to Klinefelter Syndrome, Down Syndrome, and several other conditions caused by nondisjunction. This process creates spores and gametes (GAM-eets). Identify this process of cell division that is often contrasted with mitosis.	Meiosis (do not accept Mitosis)

Question #30: Social Studies – U.S. Government

15 points

Starting with the Omnibus Budget Reconciliation Act of 1993, this program requires the implementation of Estate Recovery. Arizona became the final state to have this program in 1982, which includes an Early and Periodic Screening, Diagnostic, and Treatment requirement. This program is funded by a combination of federal and state funds, and though some eligibility details are covered by states, by 2014 everybody with income below one hundred thirty-three percent of the poverty line will be eligible. Name this program that funds health care for people with low incomes.	Medicaid

Question #31: Science – Chemistry

15 points

William Jensen ended up with a triangle when he graphed the average of this quantity on the x-axis and its spread on the y-axis, and Leland Allen devised a new way to measure this quantity which he called configuration energy. This quantity was subtracted, squared, multiplied by twenty-three, and then added to the original amount of enthalpy to find the enthalpy of a new compound according to the person who discovered this concept, Linus Pauling. Name this quantity that measures the ability of an element to attract electrons, which is extremely low for francium and extremely high for fluorine.	Electronegativity (accept other word forms)

Question #32: Literature & Language Arts – Mythology

15 points

This figure reveals to Io that the ghost of Argus is a gadfly sent to punish her. For refusing to tell Zeus who would beget the child that would overthrow him, he was sent to Tartarus. Through the use of rocks, his son and daughter-in-law repopulated the earth after the deluge. As part of his punishment for defying Zeus, his liver is eaten daily, until Heracles rescues him. With a name meaning "forethought," name this Titan who stole fire and gave it to humans.	Prometheus

Replacement Question A: Science – Physics

15 points

Together with Albert Hibbs, this scientist published a work describing his relativistic chessboard, and he used what became as his namesake integral to improve on the work of Dirac. He worked with John Wheeler to develop a time-independent model of electrodynamics, and much of his work used sum-over-paths formulations based on mathematics developed by Mark Kac. This scientist often represented quantum interactions by drawing two straight lines and a squiggly line in his namesake diagrams. Name this eccentric physicist who shared the 1965 Nobel Prize with Schwinger and Tomonaga.	(Richard) Feynman

Replacement Question B: Social Studies – U.S. History

15 points

This city was the main site of the Rebellion of 1768, which was in reaction to the Treaty of Fontainebleau. This city is where the Plessy vs. Ferguson case originated, and during the Civil War, Mansfield Lovell was unable to stop a Union takeover of this city led by Benjamin Butler and David Farragut. This city elected Ray Nagin as Mayor in 2002, who was criticized when this city was badly damaged in 2005. Name this major American city known for its French Quarter that was flooded by Hurricane Katrina.	New Orleans

Replacement Question C: Math – Conceptual Question

15 points

One of these named after Bruno Buchberger is used to find a Gröbner basis, and there are several different types of these things that find a minimum spanning tree, including ones named after Borůvka, Kruskal, and Prim. The one commonly used to find shortest paths is named after Dijkstra, and several of these are classified as greedy. The one commonly used to find greatest common divisors is named after Euclid. Give this word referring to a specific set of instructions.	Algorithm (prompt, procedure, method, technique, and other synonyms)

Replacement Question D: Literature – U.S. Literature

15 points

In one story by this writer, a Chinese emperor executes a man for building a flying machine. A novel by this author, in which the main character agrees to work so he can have some Cream-Sponge Para Litefoot Shoes, describes Leo's efforts to build a Happiness Machine. In another novel by this author, Mr. Dark runs a traveling carnival. In another novel by this author, the protagonist, who works for Captain Beatty, is a different type of fireman named Guy Montag. Name this author of *Dandelion-Wine*, *Something Wicked This Way Comes*, and *Fahrenheit 451*.	(Ray) Bradbury

Replacement Question E: Literature – Mythology

10 points per part

Vishnu has ten distinct avatars that appear in each yuga, or every 4.32 million years.		
1	The ninth, he appeared on earth as Siddhartha Gautama, after his earth mother dreamt about him coming down as a white elephant.	Buddha
2	The eighth, he plays a major role in the war depicted in the *Mahabharata* as Arjuna's charioteer.	Krishna
3	The fifth, Vamana, was a dwarf who was given as much land as he could cover using this many paces.	three

Replacement Question F: Literature – Mythology

10 points per part

Answer the following about the labors of Hercules.		
1	This is the total number of labors he completed.	twelve
2	While fetching the golden apples of the Hesperides (hes-PEHR-ih-deez), Hercules had to give this Titan a respite by holding up the Earth for a short time.	Atlas
3	This cousin, who Hera made sure was made king of Mycenae over Hercules, issued the labors to Hercules.	Eurystheus

Replacement Question G: Mathematics – Geometry

10 points per part

	Find the following values for an isosceles trapezoid with edge lengths of 10, 4, 6, and 4:	
1	the area	$16\sqrt{3}$
2	the length of its median	8
3	the sum of its interior angles in degrees	360 (degrees)

Replacement Question H: Mathematics – Geometry

10 points per part

	Answer the following about supplementary angles:	
1	What is the measure of the angle supplementary to an angle that measures 37 degrees and 42 minutes?	142 degrees 18 minutes
2	If you consider one of the eight angles formed when a transversal intersects two parallel lines, how many of the eight angles are supplementary to that angle?	4
3	Exterior angles are supplementary to interior angles. What is the largest exterior angle for any regular polygon?	120 (degrees)

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

15 points

This President successfully pushed for the impeachment of Judge John Pickering, but he was unable to remove Supreme Court Justice Samuel Chase. This President made the ban on international slave trade permanent, and he was President during the Chesapeake-Leopard Affair and the Lake Champlain Insurrection. After he retired, he restarted the Library of Congress after its books were destroyed, and before becoming President this person wrote *Notes on the State of Virginia*. Name this signer of the Embargo Act and author of the Declaration of Independence who served as our third President.	(Thomas) Jefferson

Question #2: Literature & Language Arts – Vocabulary

15 points

This noun derives from the Old French word for harshness, and its adjectival form was used in Latin to describe foods that made the tongue dry. This noun is now related to words meaning self-denial, and it is being used to describe actions such as cutting public payrolls and government payments being put into place in countries like Greece and Portugal that are worried about defaulting on their national debt. Give this noun that refers to a simple or plain quality.	Austerity

Question #3: Mathematics – Conceptual Question

15 points

If one of these segments is the angle bisector between two others, then the sum of the lengths of the original two is equal to twice the middle one times the cosine of the angle between the middle segment and either of the two originals. The Butterfly Theorem involves one of these segments that is bisected by two others. The perpendicular distance from a shape to this segment is called a sagitta, and this segment divides a sector into an isosceles triangle and a circular segment. One of these segments is split in two pieces when using the power theorem inside a circle. Give the name for a segment connecting two points on a circle.	Chord

Question #4: Science – Health

15 points

One of the treatments for this disease is cognitive processing therapy, and, as with depression and personality disorders, the best medical treatments are selective serotonin reuptake inhibitors. Two of the three categories of symptoms for this disease are hyperarousal and avoidance, and it is not supposed to be diagnosed until at least four weeks after it begins. Name this disease whose other type of symptom is re-experiencing and which is generally suffered by victims of violence and by veterans.	PTSD (or post-traumatic stress disorder, prompt Anxiety (Disorder(s))

Question #5: Fine Arts – Art History

15 points

This artist painted himself hugging his father on the left side of a painting subtitled *My Mother, My Mother, My Mother*. In addition to that work, *The Enigma of Desire*, he showed a huge white hand on the right side of his *Metamorphosis of Narcissus*. In a sequel to one of his famous works, much of the landscape is under water, though part of the surface of the water hangs on a tree. That famous work, which shows ants crawling on a closed watch and a distorted head lying on its side, is *The Persistence of Memory*. Name this surrealist whose works include melting clocks.	(Salvador) Dali

Question #6: Social Studies – Religion

15 points

His father explicitly ordered that this man's wife was not to be a Canaanite. This man's wife is first encountered at a well when she offers water to a servant and his ten camels. As his wife conceived, God told her that two peoples would be separated from her body, but this was not told to him. After he was weaned, his mother ordered the exile of Hagar. One of his sons became a skillful hunter, while the other simply lived in tents. On the way to Jehovahjireh, he is told that God will provide him a lamb. The father of Jacob and Esau, name this biblical figure who was almost sacrificed by his father Abraham.	Isaac

Question #7: Science – Physics

10 points per part

Answer these questions about the bending of light:		
1	What name is given to the bending of light when it moves from one medium to another?	Refraction
2	Based on a shortened version of a Dutch astronomer's name, what name is given to the equation used to calculate the amount of bending?	Snell('s Law)
3	What name is given to the phenomenon of light bending different amounts in the same material based on its polarization?	Birefringence (accept different word forms)

Question #8: Science – Physics

10 points per part

Answer these questions about sound:		
1	What unit based on logs is commonly used to measure sound volume? Normal conversation is typically around 60 of these units.	Decibel(s)
2	What name is given to the change in sound frequency based on whether a source is moving towards or away from a listener?	Doppler (Effect or Shift)
3	Though sound consists of longitudinal waves, it is often imagined to travel as what quasiparticle?	Phonon

Question #9: Social Studies – Economics

10 points per part

Identify these terms related to the stock market:		
1	A strong market is considered a bull market. On the other hand, this animal symbolizes a weak market.	Bear
2	This name is applied to well known companies whose stocks are considered to be reliable investments.	Blue Chip(s)
3	This is the practice of taking advantage of a stock that is selling for different prices in different markets.	Arbitrage

Question #10: Social Studies – Economics

10 points per part

Identify these terms related to the economic term monopoly:		
1	A monopoly occurs when there is a single seller. This term refers to a general situation with a small number of sellers.	Oligopoly
2	When those sellers make a formal agreement to collude with each other, they become this type of organization. OPEC is a prominent example.	Cartel
3	This term applies to situations which have only one buyer as opposed to only one seller.	Monopsony

Question #11: Literature & Language Arts – U.S. Literature

10 points per part

He wrote the novels *Typee* and *Omoo*.		
1	Name this author of *Billy Budd* and *Moby-Dick*.	(Herman) Melville
2	This short story by that author is about a person who repeatedly says, "I would prefer not to."	Bartleby, the Scrivener
3	In this story by the same author, the title character is the captain of the San Dominick, which had a slave rebellion.	Benito Cereno

Question #12: Literature & Language Arts – U.S. Literature

10 points per part

Identify these Edgar Allan Poe poems about men obsessed with dead women:		
1	This poem is about a bird that supposedly says 'Nevermore' when the narrator thinks about Lenore.	(The) Raven
2	This poem is about a girl who lived in a kingdom by the sea.	Annabel Lee
3	This poem is about a man who mistakenly walks to the title woman's tomb one year after burying her.	Ulalume

Question #13: Mathematics – Trigonometry

10 points per part

Find the following values:		
1	the sine of thirty degrees	1/2 (or .5)
2	the sine of fifteen degrees; do not give a value that includes a square root within a square root	$\frac{\sqrt{6}-\sqrt{2}}{4}$ or equivalents
3	the sine of fifteen degrees times the cosine of fifteen degrees	1/4 (or .25)

Question #14: Mathematics – Trigonometry

10 points per part

Find the following values. Just give the principle positive value.		
1	the sine of the arccosine of four-fifths	3/5 (or .6)
2	the tangent of the arcsine of twelve-thirteenths	12/5 (or 2.4)
3	the cosine of the quantity the arctangent of three-fourths plus the arcsine of five-thirteenths	33/65

Question #15: Science – Astronomy

15 points

Astronomers have recently debated whether or not our region of the universe is in a type of bubble named after this scientist. This astronomer is the namesake of a region of space in Fornax and another in Ursa Major that are blocked by few Milky Way stars and are thus good locations to observe early galaxies. This person is the namesake of speed divided by proper distance, which is typically measured in kilometers per second per megaparsec to give a value of approximately seventy for his namesake constant. Name this person whose namesake telescope has been orbiting Earth since 1990.	(Edwin) Hubble

Question #16: Literature & Language Arts – Grammar/Usage

15 points

This term is used to differentiate between majuscule and minuscule letters. In some languages, the sorting of nouns into this type of category is called declension. Example of these categories, which are determined by the roles that nouns play in a sentence, include instrumental, ablative, genitive, or nominative. Give this term that can also refer to a legal dispute as well as to a university that merged with Western Reserve University in Cleveland.	Case(s)

Question #17: Miscellaneous – Sports

15 points

This sport developed from the game of town ball, and its professional organization was founded by William Hulbert and Byron Johnson. Its first set of rules was written by Manhattan bookseller and fireman Alexander Cartwright, and the leaders of its professional league have included Happy Chandler and Kenesaw Mountain Landis. Its championship for younger players takes place in Williamsport, Pennsylvania. Name this sport which has been played by Goose Gossage, Minnie Minoso, Lou Brock, Cal Ripken, and Babe Ruth.	Baseball

Question #18: Mathematics – Conceptual Question

15 points

This person's primary work was based on a point on a segment that begins at one end and moves at a rate proportional to its remaining distance. Using the best trig tables he had available, he started with a value of ten to the seventh power, though he changed that when he started working with Henry Briggs. This person also developed a method for performing multiplication he called rabdology that uses a set of rods or bones. Name this Scottish mathematician credited with developing the first log table.	(John) Napier

Question #19: Social Studies – World History

15 points

This Roman Emperor supported Caecilian (suh-SILL-yun) in a dispute against Majorinus, leading to his attempted suppression of a group of unforgiving Christians called Donatists. This emperor had a long rivalry with Licinius, whom he defeated at Adrianople. Along with Alexander of Alexandria, this man presided over the Council of Nicaea (nye-SEE-uh), which took place several years after his Edict of Milan. This leader's best known victory came over Maxentius at the Battle of Milvian Bridge, before which he instructed his soldiers to place crosses on their shields. Name the first Roman Emperor to convert to Christianity.	Constantine the First (accept Constantine the Great or Saint Constantine, prompt Constantine)

Question #20: Science – Biology

15 points

Decreased concentrations of a compound in this organelle result in Wolman disease, while on the other hand this organelle contains acid phosphatase, which has an elevated concentration in people with Gaucher's disease. It inherits molecules containing mannose-6-phosphate, and it is very acidic. This organelle also contains phosphoric acid, protease (PROH-tee-ase), amylase (A-muh-lase), and lipase (LYE-pase). Name this organelle, the animal counterpart to vacuoles in plants, which digests macromolecules, membranes, and other organelles.	Lysosome(s)

Question #21: Literature & Language Arts – Mythology

10 points per part

Answer the following about Helen of Troy's family.		
1	Helen's twin, she married and later killed Agamemnon.	Clytemnestra
2	Helen's husband, he led the Greek forces during the Trojan War.	Menelaus
3	Helen's brothers; after Theseus kidnapped Helen, these two rescued Helen after she was kidnapped by Theseus. After one died, the other gave up half his immortality so they could always be together.	Castor and Pollux (accept Dioscuri)

Question #22: Literature & Language Arts – Mythology

10 points per part

Answer the following about Thor.		
1	Thor's hammer, it was made by Brok and Eitri.	Mjollnir
2	Thor's eternal enemy, he once had him hooked, but Hymir cut the line. At Ragnarok, this creature's poison will kill Thor.	Jormungandr (accept Iornumgandr or Midgard Serpent)
3	Thrym stole Thor's hammer and attempted to use it to get this goddess as his wife. Instead, Thor came disguised as this goddess, and ended up killing lots of giants.	Freya (accept Freyja, do not accept Frey, Frigg, or Frigga)

Question #23: Mathematics – Geometry

10 points per part

Find the area of each isosceles triangle. You can ignore units:		
1	base of length six, the other sides are each of length five	12
2	base of length six, the base angles are each forty-five degrees	9
3	base of length six, the base angles are each thirty degrees	$3\sqrt{3}$

Question #24: Mathematics – Geometry

10 points per part

Triangle PQR is similar to Triangle XYZ. Segment PQ is three units, Segment PR is five units, Segment XY is twelve units, and Angle QPR is sixty degrees. You can ignore units.		
1	Find the length of Segment XZ.	20 (units)
2	Find the measure of Angle YXZ in degrees.	60 (degrees)
3	Find the length of Segment YZ.	$4\sqrt{19}$

Question #25: Science – Chemistry

10 points per part

Answer these questions about substances with a pH above 7:		
1	What is the common name for these substances, a synonym of alkali and generally considered the opposite of acid?	Base (accept other word forms)
2	About forty years before the Brønsted–Lowry and Lewis definitions were published, who devised a theory of classification based on which ions were produced in solution?	(Svante) Arrhenius
3	According to that theory, alkali solutions have an excess of which ion?	Hydroxide (or OH^-, prompt OH)

Question #26: Science – Chemistry

10 points per part

Identify these measures of radioactivity:		
1	This measure, named after a husband and wife who shared a Nobel Prize with Henri Becquerel, is similar to the unit named after Becquerel in that it is based on decays per second.	Curie(s)
2	This measure, named after the discoverer of X-Rays, is based on the amount of charge that the radiation can liberate.	Roentgen(s)
3	This is the SI unit of dose equivalent radiation and is equivalent to a gray for beta and gamma radiation.	Sievert(s)

Question #27: Social Studies – World History

10 points per part

Identify these explorers who often get confused with other explorers:		
1	This man was the first European to round the Cape of Good Hope. He then helped Vasco de Gama use that route to reach India.	(Bartholomew) Dias
2	This man was the first European to see the Pacific Ocean from the Americas, but a poem by Keats seems to confuse him with Hernán Cortés.	(Vasco Núñez de) Balboa
3	Henry Hudson is often associated with the Northwest Passage, but this person was the first European to traverse it completely many years later.	(Roald) Amundsen

Question #28: Social Studies – World History

10 points per part

Answer the following questions about a country in Southeast Asia:		
1	Which modern-day country is most closely associated with the Khmer Empire and Kampuchea?	Cambodia
2	Name the person who led that country when it was known as Kampuchea from 1975 to 1979. His party was the Khmer Rouge, and he has been blamed for millions of deaths.	(Pol) Pot
3	Name the person who led the country as a King from 1953 to 1970.	(Norodom) Sihanouk

Question #29: Literature & Language Arts – U.S. Literature

15 points

One character in this novel is told about a scam artist named B.F. Mason and is then criticized for being too demanding on his sons Hamilton, Karl Marx, and Willie. Another character, Harry Minowitz, wonders if Mozart is a Nazi. At the end of Part One of this novel, one of the characters leaves to visit Spiros Antonapoulos in an asylum. Name this work about Dr. Benedict Mady Copeland, Biff Brannon, Mick Kelly, Jake Blount, and deaf-mute John Singer written by Carson McCullers.	(*The*) *Heart is a Lonely Hunter*

Question #30: Science – Chemistry

15 points

At high temperatures, some of this compound breaks down into biphenyl and hydrogen gas. This chemical can be alkylated with propylene to make cumene, and it is alkylated (al-kuh-LAI-ted) with ethylene (EH-thi-leen) to form styrene. It can be created from toluene, and exposure to this hydrocarbon can cause aplastic anemia. Its structure was theorized by Friedrich August Kekulé, who claimed that he had a dream of a snake eating its tail. Name this ring-structured aromatic compound with formula C_6H_6.	Benzene (prompt C_6H_6)

Question #31: Social Studies – Geography

15 points

One of the islands belonging to this country, Icaria, is nicknamed Red Rock because of its residents' support of Communism, and an archipelago belonging to this country is known as the Saronic Islands. Its capital includes a museum of Cycladic Art. Cities near its center include Lamia and Larissa, and this country extends east to the island of Rhodes and west to the island of Corfu. Its largest island is Crete. Name this European country located between the Ionian and Aegean Seas whose capital is Athens.	Greece (or Hellas or Hellenic Republic)

Question #32: Literature & Language Arts – World Literature

15 points

In a work by Miguel de Unamuno, this figure assumes the virtues of Christ. In a story by Jorge Luis Borges, Pierre Menard attempted to write an imitation of a work about this character. During a discussion with a student and ex-soldier, he calls artillery a diabolic device. Sanson fails to attempt to defeat this figure, and shortly afterwards, his partner serves as governor of the Island of Barataria. This figure believes that one item he owns used to belong to Mambrino. He intervenes when Fernando attempts to betray Cardenio, who ends up going mad. His niece, Antonia, burns most of his books, which serve as inspiration for his adventures. Accompanied by Sancho Panza, name this knight errant created by Miguel de Cervantes.	Don Quijote [prompt partial answer, accept Don Quixote or Alonso Quijano]

Replacement Question A: Science – Physics

15 points

This physicist is the namesake of the highest energy level of a group of electrons and, relatedly, an energy level that has a fifty percent chance of being occupied by an electron. This scientist and Dirac working independently developed a statistical model for the behavior of particles that obey the Pauli Exclusion Principle, and those particles are named after this man. At the University of Chicago, this scientist worked on developing the first nuclear reactor. The Gamma-ray Large Area Space Telescope has been named in honor of this person, as has the largest particle accelerator in the United States.	(Enrico) Fermi

Replacement Question B: Social Studies – U.S Government

15 points

This status was the subject of the Supreme Court Case Schneider vs. Rusk, and two of the principles involved with this status are jus sanguinis and jus soli. Two of the laws that apply to this status are the McCarran-Walter Act of 1952 and the first section of the 14th Amendment. Oversight of this status was transferred from the Department of Justice to the Department of Homeland Security, and it often is gained by passing a test after five years of residency. Name this status conferred on people whose parents already have it, who are born in the United States, or who go through the process of naturalization.	Citizen(ship) (prompt any variant of Naturalization)

Replacement Question C: Math – Conceptual Question

15 points

This operator of a field's gradient equals the Laplacian of that field. The theorem named after this operator states that a double integral of flux is equal to the triple integral of this operator on the field. It is calculated by adding the partial derivatives of a field, which can be expressed as del dot the field vector. For magnetic fields this operator gives a value of zero, and for electric fields this operator gives the free charge density. Name this operator on two- or three-dimensional fields that often is contrasted with curl.	Divergence (accept Div, do not accept Del)

Replacement Question D: Language Arts – Grammar/Usage

15 points

People disagree as to whether this symbol was first used to represent an Italian unit of measure, as a shorthand device by Latin scribes, or in more recent commerce. Referred to in some languages as a monkey's tail, its most common current usage is credited to Ray Tomlinson in the early nineteen seventies. It should not be confused with the sign for anarchy, which uses a capital letter rather than lower case. Name this symbol formed on most keyboards using Shift Two used to separate the user name from the domain name in email addresses.	At (sign) (accept atmark, at symbol, at rate, or commercial at)

Replacement Question E: Social Studies – U.S. History

10 points per part

Identify these members of the Republican Party when it was getting started:		
1	This first Republican nominee for President was nicknamed The Pathfinder.	(John) Frémont
2	This Lincoln and Johnson Secretary of State is often associated with the purchase of Alaska.	(William) Seward
3	This former Free Soil Party member served as Lincoln's Treasury Secretary before becoming a Supreme Court Justice.	(Salmon Portland) Chase

Replacement Question F: Social Studies – U.S. History

10 points per part

Answer these questions about the 9/11 attacks:		
1	In addition to the World Trade Center towers, what other building was hit?	Pentagon
2	What was the number of the flight that crashed into a field in Pennsylvania?	(United) 93
3	Who crashed American Flight 11 into the North Tower of the World Trade Center? He is considered the leader of the hijackers.	(Mohamed) Atta

Replacement Question G: Literature – U.S. Literature

10 points per part

Identify these works by Ernest Hemingway.		
1	This story is about Santiago, who goes 84 days without catching a fish.	(The) Old Man and the Sea
2	This novel is about Jake Barnes, who is in love with the divorced Lady Brett Ashley.	(The) Sun Also Rises
3	This short story involves an injured Mexican named Cayetano and a writer named Frazer.	(The) Gambler, the Nun, and the Radio

Replacement Question H: Literature – U.S. Literature

10 points per part

Answer the following questions about Rip Van Winkle, a story that appeared in the collection *The Sketch Book of Geoffrey Crayon*.		
1	Who wrote the story?	(Washington) Irving
2	Rip VanWinkle lived at the foot of what mountain range?	Catskill(s) (do not accept or prompt on Appalachians)
3	What is the name of Rip's dog?	Wolf

Question #1: Social Studies – Current Events

15 points

This person, who holds a doctorate in quantum chemistry, was President of the European Union when the Treaty of Lisbon was signed leading to the creation of a President of the European Council. The political party headed by this person recently had a local leader resign after admitting to an affair with a sixteen-year-old. This person, who leads the country with the largest economy in Europe, took over the Christian Democratic Union in 2000, soon after Helmut Kohl became less popular. Name this current Chancellor of Germany.	(Angela) Merkel

Question #2: Mathematics – Conceptual Question

15 points

Two groups of axioms for handling these entities are Kripke-Platek and Zermelo Fraenkel. When these are created from a countable number of operations, they are named after Émile Borel, and under certain circumstances these entities can be a ring. One of these can be combined with two operations to form a field or with one operation to form a group. The universal example includes all objects within the given axioms, including possibly itself, while the complement of one of these entities includes everything except what is in that entity. Name these unordered lists which can be combined using union or intersection.	Set(s)

Question #3: Miscellaneous – Technology

15 points

This organization has produced a JavaScript engine named Rhino and a JavaScript debugger based on XPCOM named Venkman. Many of its applications use Gecko, including Camino. Its calendar Sunbird works with its email client Thunderbird. Its work led to SeaMonkey, and it was based on the work of Netscape, whose Navigator used to be the most popular internet browser. Name this organization best-known for the browser Firefox.	Mozilla (Foundation)

Question #4: Literature & Language Arts – Mythology

15 points

At the Modena Cathedral, he is depicted rescuing his wife, and in another story his wife was kidnapped by King Melwas. Some sources indicate that this figure's advisor was born from an incubus and also went by Ambrosius. After this figure's death, his wife ends up at Amesbury, where she turns away her lover. His final battle was at Camlann, after which he was taken to Avalon. The owner of Excalibur, name this legendary king and head of the Round Table.	(King) Arthur

Question #5: Science – Biology

15 points

This organ is attached to the body by the falciform (FAL-si-form) ligament, which borders what remains of a person's umbilical vein. This produces the most abundant blood plasma protein, albumin, and this is where albumin (al-BYOO-min) and bilirubin (BIL-ee-roo-bin) are made water soluble, preventing jaundice. One of its sections is the caudate lobe, and it is located above the gallbladder, which stores the bile created by this organ. Name this organ directly affected by the hepatitis virus whose advanced degeneration is known as cirrhosis.	Liver

Question #6: Social Studies – World History

15 points

One of this person's biggest failures was an attempt to capture Fort Paso Alto. This person disregarded the orders of John Jervis at the Battle of Cape Saint Vincent, and he disobeyed Hyde Parker at the Battle of Copenhagen. This person lost sight in one eye at the Siege of Calvi and part of his arm at the Battle of Santa Cruz de Tenerife. This leader's great victories were at the Battle of Aboukir (ah-BOO-kir) Bay, also known as the Battle of the Nile, and the Battle of Trafalgar, during which he was shot dead. Name this British Vice Admiral who severely damaged Napoleon's navy.	(Horatio) Nelson

Question #7: Mathematics – Analytical Geometry

10 points per part

Given three out of four vertices of a rectangle, find the fourth vertex of the rectangle:		
1	(2,4), (2,1), and (9,1)	(9,4)
2	(1,5), (5,1), and (12,8)	(8,12)
3	(-1,6), (1,2), and (2,4)	(0,8)

Question #8: Mathematics – Analytical Geometry

10 points per part

Find the following for the triangle with vertices located at (q,0), (0,q), and (2q,q):		
1	the measure of the largest angle in degrees	90 (degrees)
2	the length of the longest side	2q
3	the area	q^2

Question #9: Social Studies – Geography

10 points per part

Identify these mountain ranges:		
1	This is the longest above-ground range in the world, spanning much of the Pacific coast of South American.	Andes
2	This range, also known as the Eastern Highlands, runs near the east coast of Australia and includes Mount Kosciuszko.	Great Dividing
3	This name is shared by several mountain ranges. The one in the United States is west of the Rockies and includes Mount Whitney and Yosemite Valley.	Sierra Nevada(s)

Question #10: Social Studies – Geography

10 points per part

Answer these questions about the Republic of Turkey:		
1	What is the most populous city in Turkey? Give the modern name rather than Byzantium or Constantinople.	Istanbul
2	Which sea separates European Turkey from Asian Turkey? It is between the Bosporus and the Dardanelles.	(Sea of) Marmara
3	Other than Greece, which European country borders Turkey northwest of that sea?	Bulgaria

Question #11: Science – Chemistry

10 points per part

Answer these questions about metals:		
1	What name is given to metals which have an incomplete d-shell? They take up the middle of the Periodic Table.	Transition (Metals or Elements)
2	Under standard conditions, what is the lightest metal? Its ion is used in psychotropic drugs.	Lithium (prompt Li)
3	The pentoxide of which metal is used as a catalyst in sulfuric acid production? Together with aluminum, this metal is often used in titanium alloys.	Vanadium (prompt V)

Question #12: Science – Chemistry

10 points per part

Answer these questions about states of matter:		
1	Which state of matter is created by the freezing of liquid or the deposition of gas?	Solid
2	What name is given to the heat absorbed by a substance as it changes its state but does not change its temperature?	Latent (Heat)
3	What name is given to the process of melting due to pressure rather than temperature or the reverse process when pressure is removed?	Regelation (accept other word forms)

Question #13: Literature & Language Arts – World Literature

10 points per part

Answer the following concerning a certain telling of the Faust legend.		
1	This German author of *The Sorrows of Young Werther* penned three stories concerning the Faust tragedy.	(Johann Wolfgang von) Goethe
2	This figure disguises himself as a dog and man, and helps Faust kill Valentin. Wagner helps him create the Homunculus.	Mephistopheles
3	Valentin's sister, she is tempted by caskets of jewels. She ends up killing her child and is condemned to death.	Gretchen (accept Margarete or Grete)

Question #14: Literature & Language Arts – World Literature

10 points per part

Identify the following people Dante (DAHN-tay) encounters during his journey in *The Divine Comedy*.		
1	This poet guides Dante through Hell and Purgatory.	Virgil
2	Matilda takes Dante to this figure in Paradise. One of Mary's handmaids, his love for this figure is turned into divine love.	Beatrice
3	This figure is depicted as a companion of Saints Peter, James, and John. Seated at the left hand of the Virgin, he is described as the prototype of fallen man.	Adam

Question #15: Science – Health

15 points

Surgical treatments for this disorder include the removal of some soft tissue with UPPP, a pillar palatal implant, and the correction of facial abnormalities such as a deviated septum. This disorder is diagnosed by a combination of an electro-oculogram, electromyogram, and similar tests collectively known as a polysomnogram. Its most successful treatment is continuous positive airway pressure, and when this disorder is not caused by a brain disorder it is classified as obstructive. Name this disorder consisting of interrupted breathing.	(Sleep) Apnea

Question #16: Literature & Language Arts – British Literature

15 points

She took shots at HG Wells and John Galsworthy in "Mr. Bennett and Mrs. Brown," which can be found in her diary. One of her characters wrote "Aetherbert: A Tragedy in Five Acts", and at one point sleeps for seven days, and is revealed to have turned into a beautiful woman. One work by her takes place during a single day in the life of the wife of an MP who imagines the suicide of Septimus Smith. In another novel, Lily Briscoe encounters the title location in a portrait, and after the death of the matriarch, the Ramsays end up picnicking there. The author of *Mrs. Dalloway* and *To the Lighthouse*, her name is found in a title of an Edward Albee play. Name this British author who killed herself by drowning after putting rocks in her pocket.	(Virginia) Woolf [or (Adele Virginia) Stephen]

Question #17: Miscellaneous – Composers of Modern Era

15 points

This composer was inspired by Ernst Krenek to write a composition using the words from the Book of Lamentations, his *Threni*, and in 1930 he composed his *Symphony of Psalms*. He also wrote both a symphonic poem and an opera based on Hans Chistian Andersen's "The Nightingale", and he composed an opera based on a series of paintings by William Hogarth. This man composed one ballet about a puppet who comes to life, another ballet about a legendary bird, and another in which a girl dances herself to death. Name this composer of *The Rake's Progress*, *Petrushka*, *The Firebird*, and *The Rite of Spring*.	(Igor) Stravinksy

Question #18: Science – Astronomy

15 points

This phenomenon is being measured to determine whether or not there are bubble universes, and one of the instruments used to study this is the Planck Spacecraft. Detected with anisotropy (an-AYE-so-tro-pee) probes, this was created at about the same time as the first hydrogen atoms, less than a million years after the Big Bang. Discovered by Arno Penzias and Robert Woodrow Wilson in 1964, the existence of this phenomenon severely weakened Steady State theories of the universe. Name this radiation used to give credence to the Big Bang Theory that gives the universe a temperature around 2.7 Kelvins.	Cosmic Microwave Background (Radiation) (accept CMB, CMBR, CBR, MBR or relic radiation)

Question #19: Literature & Language Arts – Mythology

15 points

His brother tried to be worshipped as Zeus but was killed with a bolt of lightning. To honor Melicertes (meh-lee-KER-tees), this mortal set up the Isthmian games. He is sometimes called the father of Odysseus. Aegina was turned into an island after this figure told Asopus of Zeus' affair. He instructed his wife to not place a coin under his tongue were he to die. He also drew the ire of Hades after chaining the god of death to a tree. Name this Corinthian king, forever destined to roll a boulder up a hill in Hades.	Sisyphus

Question #20: Social Studies – Economics

15 points

This economist wrote that no matter how selfish a person is, there is some amount of pity and compassion in them in *Of the Propriety of Action*, the first section of one of his books. Another work by this economist, one of the earliest criticisms of mercantilism, begins with *Of the Causes of Improvement in the Productive Powers of Labor*, using the example of a pin factory. Each of those works refers to an invisible hand. Name this 18th century Scottish thinker who wrote *The Theory of Moral Sentiments* and *An Inquiry into the Nature and Causes of the Wealth of Nations*.	(Adam) Smith

Question #21: Science – Astronomy

10 points per part

Identify these natural satellites, or moons, in our solar system.		
1	The larger moon of Mars is Phobos. Name the smaller one.	Deimos
2	This is the largest moon of Neptune.	Triton
3	This is the smallest of the five major moons of Uranus and has a high inclination.	Miranda

Question #22: Science – Astronomy

10 points per part

Answer these questions about the first moon landing:		
1	What was the name of the lunar module? Neil Armstrong famously announced that it had landed.	Eagle
2	In what year did the landing take place?	1969
3	Which astronaut stayed in the command module while Armstrong and Aldrin walked on the Moon?	(Michael) Collins

Question #23: Social Studies – World History

10 points per part

Answer the following about the Holy Roman Empire:		
1	Though he wasn't considered a Holy Roman Emperor at the time, which leader was later considered the first Emperor due to his coronation by Pope Leo the Third in 800 CE?	Charlemagne (or Charles the Great or Charles the First or Carolus Magnus or Karolus Magnus, prompt Charles)
2	Which ruling house or dynasty supplied all Holy Roman Emperors from 1438 to 1740?	Habsburg
3	Who was Holy Roman Emperor from 1433 to 1437? A member of the House of Luxembourg, he organized the Council of Constance before becoming Emperor.	Sigismund

Question #24: Social Studies – World History

10 points per part

Answer the following questions about Ancient Babylon:		
1	Which king from the 18th century BCE is known for a set of laws written on eight foot tall stone tablets?	Hammurabi
2	Which of the Seven Wonders of the Ancient World was in Babylon?	Hanging Gardens (of Babylon)
3	Which King ruled just before Nebuchadnezzar the Second, who built that Wonder? He is the first ruler of the Neo-Babylonian or Chaldean Dynasty after the fall of the Assyrians.	Nabopolassar (or Nabu-apla-usur)

Question #25: Literature & Language Arts – U.S. Literature

10 points per part

John Steinbeck wrote sixteen novels and several other books.		
1	Name the Steinbeck novel about the Joad family setting out for California from Oklahoma.	(*The*) *Grapes of Wrath*
2	Name the member of the Joad family who marries Connie Rivers.	Rose of Sharon (prompt partial answers)
3	Name the Steinbeck novella based on Mexican folklore about the family of Kino, Juana, and Coyotito, who believe they are suddenly wealthy.	(*The*) *Pearl*

Question #26: Literature & Language Arts – U.S. Literature

10 points per part

Answer the following questions about *Uncle Tom's Cabin*.		
1	Who wrote the novel?	(Harriet Beecher) Stowe (accept Beecher or Stowe)
2	Name the Kentucky farmer who owns Tom at the beginning of the novel.	Arthur Shelby (accept Arthur or Shelby)
3	Name the vicious Louisiana plantation owner who is cruel to Tom.	Simon Legree (accept Simon or Legree)

Question #27: Mathematics – Probability

10 points per part

Find the following probabilities if you roll two dice. Give your answers as simplified fractions:		
1	Getting a sum of exactly 10	1/12
2	Getting a product of exactly 6	1/9
3	Getting a prime number on one die and a composite number on the other die. Keep in mind that the number one is neither prime nor composite and that order does not matter.	1/3

Question #28: Mathematics – Probability

10 points per part

You are dealt two cards from the same deck of 52 cards. Expressing your answers as reduced fractions, find the probability of the following:		
1	If the first card is dealt, looked at, and put back in the deck, and then the second card is selected at random, what is the probability that both cards are in the same suit?	1/4 (or .25)
2	If the two cards are dealt without replacement, what is the probability that the two cards are in the same suit?	4/17
3	If the two cards are dealt without replacement, what is the probability that the two cards are both spades?	1/17

Question #29: Social Studies – U.S. History

15 points

This was the home state of losing Presidential candidates Alf Landon and Bob Dole. This state's nickname comes from the anti-slavery forces who fought its Border Ruffians. One Senator from this state, James Henry Lane, was targeted by Quantrill's Raiders when they burned down part of a town in this state, and that town was also the center of the Wakarusa War. This adopted the Wyandotte Constitution after the failure of the Lecompton Constitution, and it is the site of the Pottawatomie Massacre involving John Brown. Name this state where the case of Brown vs. The Board of Education of Topeka originated.	Kansas

Question #30: Mathematics – Conceptual Question

15 points

Each of these figures corresponds to an extouch version. A theorem relating the length of a segment in one of these figures to its side lengths is named for Apollonius, while ratios involving a directed line through this figure multiply to give negative one according to Menelaus' Theorem. Their areas can be calculated using Heron's Formula, and attempts to solve these figures can lead to the ambiguous case, though they often can be solved based on knowing two sides and an angle. Name these shapes whose interior angles add up to one hundred eighty degrees.	Triangle(s)

Question #31: Literature & Language Arts – U.S. Literature

15 points

One work by this poet refers to yellow fog, yellow smoke, and the eternal footman. Another work by this poet begins with the line, "Time present and time past are both perhaps present in time future." That poem was joined with "Little Gidding", "The Dry Salvages", and "East Coker" to form this man's *Four Quartets*. Another work by this poet begins with the section "The Burial of the Dead", whose first line is, "April is the cruelest month," while another claims that world ends, "Not with a bang but a whimper." Name this poet who wrote "The Waste Land" and "The Hollow Men".	(Thomas Stearns) Eliot

Question #32: Science – Physics

15 points

For an ideal gas, this quantity varies directly with the square root of temperature when volume is held constant and inversely with the square root of temperature when pressure is held constant. For a coil of wire, the derivative of this type of quantity with time equals the opposite of electromotive force divided by the number of coils. This quantity is typically represented by an upper-case Greek phi. The magnetic type is measured in webers, and this quantity is sometimes considered a rate of diffusion. Name this quantity that represents flow per unit area.	Flux

Replacement Question A: Science – Chemistry

15 points

The release of this element from the body is caused by aldosterone, and it is concentrated thirty times more inside cells than outside cells. It combines with chlorine to make sylvite, and the amount of one of its isotopes is measured relative to an isotope of argon to determine the age of some minerals. Like nitrogen, phosphorus, and sulfur, this element is used in many fertilizers. Its chemical behavior is very similar to sodium, which it is immediately below in a Periodic Table. Name this alkali metal that used to be known as kalium which is symbolized by the letter K.	Potassium (prompt K)

Replacement Question B: Literature – U.S. Literature

15 points

This author wrote one novel in which the narrator was taught two sayings by his old man: "Mind own business" and "Always cut cards". The third part of that novel about Wyoh and Mannie is an abbreviation for "There Ain't No Such Thing As A Free Lunch". Another work by this author is about a well-known writer named Jubal Harshaw and Church of All Worlds founder Valentine Michael Smith. Smith, who has the ability to grok, was born and raised on Mars. Name this author of *The Moon Is a Harsh Mistress* and *Stranger in a Strange Land*.	(Robert) Heinlein

Replacement Question C: Math – Conceptual Question

15 points

This value can be calculated using the relative mean difference and was first described in the article "Variability and Mutability". Another way to calculate it is to integrate the difference between the Lorenz curve representing the cumulative distribution function and the line of equality. A value of one can only be achieved if all values in the distribution are zero with one exception, while a value of zero can only be achieved if all values in the distribution are equal. Name this quantity used to measure income disparity or wealth inequality within a society.	Gini (coefficient)

Replacement Question D: Social Studies – World History

15 points

This leader was ousted from power for two days by the August Coup, which tried to appoint Gennady Yanayev as President. He resigned a few months later after the signing of the Belavezha Accords. Before becoming a national leader, this person received the support of Yuri Andropov, and some people claimed that his elevation to power was because his youth contrasted with Konstantin Chernenko. His best known programs were openness, which was called Glasnost, and restructuring, which was called Perestroika. Name the last leader of the Soviet Union who ruled until 1991.	(Mikhail or Michael) Gorbachev

Replacement Question E: Social Studies – U.S. History

10 points per part

Answer the following about President George W. Bush:		
1	Bush was Governor of what state before becoming President?	Texas
2	What was the name of Bush's education proposal that became law in 2002?	No Child Left Behind (Act) (or NCLB)
3	After the Enron collapse, Bush signed what 2002 bill that regulated financial reporting? It is named after a Senator and a Representative.	Sarbanes-Oxley (Act)

Replacement Question F: Social Studies – U.S. History

10 points per part

Identify the following about the Fourteen Points:		
1	Which President proposed them in 1918?	(Thomas Woodrow) Wilson
2	The last point led to the creation of which international body which was disbanded in 1946?	(The) League of Nations
3	The Fourteen Points promised two nations access to the sea. Name either one of them.	Poland or Serbia

Replacement Question G: Mathematics – Algebra

10 points per part

Find all solutions for the following equations:		
1	$\frac{3}{x}=\frac{2}{5}$	7.5 (or 7 ½ or 15/2)
2	$\frac{x+1}{x+3}=\frac{3}{4}$	5
3	$\frac{x+1}{3}=\frac{6}{x-2}$	5, -4 (both answers in either order, do not prompt)

Replacement Question H: Mathematics – Algebra

10 points per part

Simplify the following roots:		
1	the square root of 75	$5\sqrt{3}$
2	the cube root of 32	$2\sqrt[3]{4}$
3	the fourth root of one billion	$100\sqrt[4]{10}$

Question #1: Mathematics – Conceptual Question

15 points

Though this property does not hold for all groups, when it does hold all subgroups are normal. Though this property does not always hold for multiplication in a ring, it does always hold for addition. Groups with this property are called abelian (uh-BEEL-yun). The opposite, or anti, of this property holds for cross products, and this property does not hold for matrix multiplication. When this property holds, reversing the order of the inputs into a binary operation has no impact on the output. Name this property, one version of which states that x plus y equals y plus x.	Commutative (accept word forms such as commutativity, accept abelian before it is mentioned)

Question #2: Social Studies – Psychology

15 points

This person built on the theories of Ivan Sechenov to develop the theory of nervism. This person's research required him to develop pancreatic fistulas, and he demonstrated that the phenomena he studied are controlled by the cerebral cortex. His work formed the basis of classic conditioning by investigating what he called the psychic secretions of the salivary glands. Name this Russian who won the 1904 Nobel Prize for his studies on dogs.	(Ivan) Pavlov

Question #3: Science – Biology

15 points

The Bunya types of these particles contain both positive and negative-sense nucleotide sequences and are therefore classified as ambisense. Their life cycle is typically classified as lytic or lysogenic. They are covered by protomers which often arrange into a helical or icosahedral shape when forming capsids, structures which get uncoated so these particles can release their genomes (JEE-nomes). Some of them work by reverse transcribing, and the early part of their life cycle involves attachment and penetration. Identify these particles, examples of which include Epstein-Barr, Ebola, and HIV.	Virus(es)

Question #4: Literature & Language Arts – Speech

15 points

The last part of this speech was changed at the last second due to encouragement from Mahalia Jackson, and it was followed by A. Philip Randolph and Bayard Rustin reading ten demands. This speech uses the analogy of cashing a check that comes back marked insufficient funds, and it also mentions the "fierce urgency of now". It ends with the words, "Free at last! Free at last! Thank God Almighty, we are free at last!" Name this speech delivered at the March on Washington for Jobs and Freedom in 1963 in front of the Lincoln Memorial by Martin Luther King, Junior.	"I Have A Dream"

Question #5: Fine Arts – Art History

15 points

The Palestrina version of this work is no longer believed to be by the same artist as the other versions, and the one worked on by that artist at the end of his life is nicknamed Rondanini. The most famous version of this work contains the only signature of its creator, who was worried that this work would be attributed to somebody else. This sculpture was attacked by a deranged geologist in 1972, and there is much speculation as to why the woman in this work looks so young. Name this Michelangelo sculpture located in St. Peter's Basilica showing Mary holding the body of Jesus.	Pietà

Question #6: Social Studies – Geography

15 points

The bottom half of this river used to be called the Quorra, and it is fed by the Bani River where it bends at its inner delta, the Macina. Its actual delta has a region known as the South South Zone and used to be known as the Oil Rivers, which are formed after it leaves the western end of the Sahel. This long river begins in the Fouta Djallon (FOO-tah JAHL-on) Mountains in Guinea just like the Gambia and Senegal Rivers. It goes through Mali and its namesake countries. Name this river of Northwest Africa.	Niger (River)

Question #7: Science – Astronomy

10 points per part

Identify these stars:		
1	This star is commonly called the Dog Star.	Sirius
2	This star, also known as Alpha Ursa Minor, is commonly called the North Star.	Polaris
3	This star, also known as Epsilon Orionis, is the middle star in Orion's Belt.	Alnilam

Question #8: Science – Astronomy

10 points per part

Identify these limits of telescopes:		
1	This distortion of images is caused because light of different wavelength bends slightly differently.	Chromatic Aberration (prompt partial answer)
2	This distortion of images is caused because light that hits near the outside of a lens tends to bend too much.	Spherical Aberration (prompt partial answer)
3	This problem is caused by the long-term effect of gravity on glass.	(Lens) Sag(ging)

Question #9: Literature & Language Arts – Mythology

10 points per part

Answer the following about the god Hades.		
1	This daughter of Demeter was kidnapped by Hades. After Zeus intervened, she was to live with Hades six months out of the year.	Persephone
2	In his role as psychopomp, this son of Zeus and Maia guided souls to the underworld.	Hermes (accept Mercury)
3	Hades loved this nymph, who he turned into a white poplar when she died.	Leuce (or Leuka)

Question #10: Literature & Language Arts – Mythology

10 points per part

Answer the following about the Greek god of smithing, Hephaestus.		
1	Hephaestus was married to this goddess, who he caught in an affair with Ares.	Aphrodite (accept Venus)
2	Hephaestus created some bronze clappers to help Heracles deal with these metal-winged birds.	Stymphalian birds
3	After this giant hunter was blinded by Oenopion (oh-NOH-pee-ohn), Hephaestus lent him a boy to guide him to the east.	Orion

Question #11: Mathematics – Geometry

10 points per part

Find the following for a rhombus with each side length eight and an interior angle of sixty degrees:		
1	the perimeter	32
2	the area	$32\sqrt{3}$
3	the length of the longer diagonal	$8\sqrt{3}$

Question #12: Mathematics – Geometry

10 points per part

Find the following for a rectangular prism with edge lengths of 3, 4, and 5. Ignore units:		
1	the volume	60
2	the length of a diagonal going through the figure	$5\sqrt{2}$
3	Find the sum of all the edge lengths in the figure. The same edge length is used more than once, so the answer is bigger than 12.	48

Question #13: Social Studies – Religion

10 points per part

Thomas Paine called it destructive of morals, absurd, and impious.		
1	This doctrine claims that everything has been willed by God, particularly that certain people will achieve salvation.	predestination
2	This theologian dedicated an entire chapter on it in *Institutes of the Christian Religion*.	(John) Calvin
3	In Chapter 9 of this book, Paul is asked why God still finds fault, and subsequently compares God to a potter having a right over the clay.	Romans

Question #14: Social Studies – Religion

10 points per part

Answer the following about three of the five Pillars of Islam.		
1	The pillar of *salah* mandates that Moslems do this five times a day and attend congregation on Friday.	pray [accept use of the term God in an answer]
2	This pillar involves throwing stones at a devil and only needs to be done once during a person's lifetime.	Hajj [prompt on pilgrimage to Mecca, do not accept Hajira]
3	The pillar of *sawm* mandates this month-long activity, which is broken daily at sunset by *iftar*. Its ultimate conclusion is marked by three days of celebration, known as *Eid al-Fitr*.	fasting during Ramadan [accept equivalents, prompt on partial answer]

Question #15: Mathematics – Conceptual Question

15 points

This Greek letter represents a function that equals zero everywhere except where its two inputs are equal. This Greek letter is also used to name a function that has a value of zero everywhere except when the input equals zero and has a magnitude at zero large enough to cancel out integration when it is multiplied inside the integrand. Those values are named after Kronecker and Dirac, respectively. When an output can be off by a value of epsilon, the input can be off by an amount represented by this letter in proofs of limits. Name this Greek letter often used to represent uncertainty or change of a variable.	Delta

Question #16: Literature & Language Arts – Grammar/Usage

15 points

One of the earliest people to study this topic in the English language was Stephen Skinner, and this term comes from the Greek words for the study of true sense. Similar to toponymy (tuh-POU-nuh-mee), the folk type of this phenomenon occurs when people change unfamiliar sounds. A fallacy associated with this field is the sense that ancient meanings correspond to current meanings. Give this term for the study of the histories of words.	Etymology (accept Etymologist)

Question #17: Science – Health

15 points

Attempts to screen this disease are the most common use of Interferon Gamma release allays, though a more common screen for this is sometimes called the Mantoux (man-TOO) test. The World Health Organization believes that one-third of the world population has been infected with this and labels it the leading cause of death of people infected by HIV. It is generally caused by mycobacteria located at a person's pulmonary alveoli. Name this disease often diagnosed with a skin test and chest X-ray which used to be known as consumption.	Tuberculosis (prompt TB or Consumption)

Question #18: Miscellaneous – Industrial Arts

15 points

Some types of this process, including the friction stir type, are classified as solid-state. Thirty-eight houses in San Bruno, California were destroyed in 2010 when a natural gas line exploded because this technique had been performed poorly in the line's construction. Another type of this process uses a combination of oxygen and acetylene (uh-SEE-tuh-leen). Name this process that often uses an electric arc to fuse metals.	Weld(ing)

Question #19: Literature & Language Arts – U.S. Literature

15 points

This writer wrote, "You may write me down in history with your bitter, twisted lies," in her poem "Still I Rise". She wrote, "Men themselves have wondered what they see in me," in her poem "Phenomenal Woman". Her book *A Song Flung Up to Heaven* is her sixth and final autobiography, while her second autobiography was *Gather Together in My Name*. Name this poet of "On the Pulse of Morning" whose first autobiography was *I Know Why the Caged Bird Sings*.	(Maya) Angelou

Question #20: Social Studies – Religion

15 points

Its author says that he "heard behind him a loud voice like a trumpet". Also found within it are locusts commanded by Abaddon who are forbidden from touching the grass. The writer of this sees seven lampsteads, and is then ordered to write to the seven churches of Asia. Included in it is a portrait of a throne surrounded by twenty-four elders, and a lamb who is able to break the seven seals. One figure within this is aided by "the beast from the sea" as well as "the beast from the land". Later, the "beast from the sea" is said to be a depiction of the Roman Emperor Domitian. Likely written by John the Elder, name the last book of the New Testament.	(The Book of the) Revelation (of St. John the Divine) [accept Book of the Revelation of Jesus Christ, Apocalypse of John, or Revelation to John, do not accept Revelations]

Question #21: Mathematics – Algebra

10 points per part

Find the following for the arithmetic sequence that begins 4, 7, 10, 13, etcetera:		
1	the 10^{th} term	31
2	the 100^{th} term	301
3	the sum of the first 20 terms	650

Question #22: Mathematics – Algebra

10 points per part

Consider the line that goes through the points (2,4) and (6,5):		
1	What is its slope?	¼ (or .25)
2	What is its y-intercept?	7/2 (or 3 ½ or 3.5 or (0,7/2) or (0,3 ½) or (0,3.5))
3	What is the y-intercept of the perpendicular bisector of the segment whose endpoints are the original two points?	41/2 (or 20 ½ or 20.5 or (0,41/2) or (0, 20 ½) or (0,20.5))

Question #23: Social Studies – U.S. Government

10 points per part

Answer these questions about the Constitution:		
1	What name is given to the introductory statement of the Constitution beginning, "We the people"?	Preamble
2	How many articles are in the Constitution?	7
3	Which section of the first article contains the copyright, elastic, general welfare, and interstate commerce clauses? Give your answer as a number.	8

Question #24: Social Studies – U.S. Government

10 points per part

Answer these questions about the US national public debt:		
1	What nickname is given to the limit that Congress places on public debt? It is raised often and provoked a major debate this past summer.	(debt) ceiling
2	If you wrote the debt as a dollar amount, how many digits would be in the number?	14
3	Which agency of the legislative branch makes debt projections?	CBO (or Congressional Budget Office)

Question #25: Science – Biology

10 points per part

Answer these questions about RNA:		
1	Which of the three main types of RNA contains codons?	Messenger (RNA) (or m(RNA))
2	Which nucleobase exists in RNA but not DNA?	Uracil (prompt U)
3	What single word term is used for catalytic RNA, which usually can play a role in hydrolysis?	Ribozyme(s)

Question #26: Science – Biology

10 points per part

Answer these questions about genotype frequencies:		
1	What principle states that genotype frequencies in a population remain constant unless specific disturbances occur?	Hardy-Weinberg
2	What name is usually applied to changes in frequency caused by random events?	(Genetic or Allelic) Drift
3	What name is given to the different genotype frequencies in a new subpopulation that is separated from a larger population?	Founder (Effect)

Question #27: Literature & Language Arts – U.S. Literature

10 points per part

Answer the following questions about Tom Sawyer.		
1	Name Tom's close friend who witnesses a murder with him.	Huckleberry Finn (accept Huck, Huckleberry, or Finn)
2	Name the daughter of a judge who Tom tries to impress, though he suffers a setback when she learns of Amy Lawrence.	Becky Thatcher (accept Becky or Thatcher)
3	Name the friend of Injun Joe who is framed for murder.	Muff Potter (accept Muff or Potter)

Question #28: Literature & Language Arts – U.S. Literature

10 points per part

You'll be given the last line of a Robert Frost poem except for the last word. You should fill in the last word.		
1	From "The Road Not Taken": And that has made all the…	Difference
2	From "Stopping by Woods on a Snowy Evening": And miles to go before I…	Sleep
3	From "Fire and Ice": And would…	Suffice

Question #29: Science – Chemistry

15 points

Carl Scheele moistened this element to separate nitrogen from air, and Antoine Lavoisier combined this element with water to demonstrate the conservation of mass. This element and ruthenium are the two most common catalysts in the Haber Process. The sulfide of this element is the primary component of marcasite and pyrite. A concentration of this element with nickel is typically seen in stars undergoing a supernova, and this element together with nickel makes up most of the Earth's core. Oxides of this element in the presence of moisture form rust. Name this element whose Latin name is ferrum.	Iron (prompt Fe)

Question #30: Social Studies – U.S. History

15 points

Early in this person's career, he devised combined reconnaissance and commando training, and for his biggest job during his career he replaced Paul Harkins and was replaced by Creighton Abrams. After 155 Americans were killed at Landing Zone Albany, this American General declared, "I consider this an unprecedented victory." After this general's career, a lawsuit he made against Sixty Minutes was settled with a joint statement. Name this General who commanded US troops in Vietnam until 1968.	(William) Westmoreland

Question #31: Literature & Language Arts – British Literature

15 points

In this novel, a pair of glasses is used to light a fire, which are partly broken after it goes out. The glasses' owner is killed by a boulder set loose by Roger. An air war is fought in the skies above the main setting of this novel, and two characters are frightened when one casualty falls onto the island via parachute. One leader in this work is elected based on his possession of a conch shell, while the other has the support of the choir. One figure is obsessed with killing a wild pig, and the head of one is the title entity. The naval officer who appears at the end thinks that the boys in this novel were playing a game of war. Name this novel containing Piggy, Simon, Ralph, and Jack, written by William Golding.	*Lord of the Flies*

Question #32: Science – Physics

15 points

When this value is multiplied by the square of the Josephson constant and the von Klitzing constant, the product is four, and this value was first developed to explain Wien's (veen's) displacement law. This value equals wavelength times momentum for a de Broglie wave, and when this value is divided by four pi it gives the product of the error margins in Heisenberg's Uncertainty Principle. This value is also equal to wavelength times energy divided by the speed of light for photons, and in the photoelectric effect it is multiplied by frequency to calculate energy. Name this constant that reflects the size of quanta.	Planck('s Constant) (prompt h)

Replacement Question A: Social Studies – World History

15 points

One Prime Minister from this country died in the Soviet Union the day after signing the Tashkent Declaration. This country's constitution was drafted by B.R. Ambedkar, and its current economy is often credited to P. V. Narasimha Rao. One of this country's Prime Ministers ordered Operation Blue Star, and in retaliation she was assassinated by her bodyguards in 1984. This country has been led by Lal Bahadur Shastri, and its current Prime Minister is Manmohan Singh. Name this country whose first Prime Minister Jawaharlal Nehru was the father of Indira Gandhi.	(Republic of) India

Replacement Question B: Science – Biology

15 points

This classification contains all of the organisms that contain both glucan and chitin (KAI-tin) in their cell walls, and the examples that have cells with two nuclei are called Dikarya. While Arthrobotrys are capable of trapping nematodes, most of these organisms are saprophytes, meaning they feed off of dead or decaying matter. Many of them are characterized by a group of cells surrounded by a cell wall, a tubular structure known as a hyphae, and their study is called myphology. Name this kingdom that includes yeasts, molds, and mushrooms.	Fungi (accept Fungus)

Replacement Question C: Literature – Mythology

15 points

This god's epithets included *Soter* and *Eleutherios*, and the Theogamia was a celebration of his marriage to his wife. Two of his children were born on a floating island, as their mother could not get shelter on land or at sea. He implanted another of his children in his thigh after he accidentally killed the mother, Semele. Raised on Mt. Dicte, the Aegis was made from the creature that raised him, Amalthea. Name this chief deity of the Greek pantheon.	Zeus [accept Jupiter]

Replacement Question D: Math – Conceptual Question

15 points

Like Georg Cantor, this man described a fractal before the concept of fractals was developed. This person discovered a surface which does not have a maximum despite meeting standard criteria for doing so. Building on the work of Richard Dedekind and starting with the statement that zero is a natural number, he formulated the now standard axioms for natural numbers. Name this Italian mathematician who is the namesake of the most common space filling curve, a fractal path that includes all of the points within a square.	(Giuseppe) Peano

Replacement Question E: Science – Physics

10 points per part

Answer the following questions about acceleration:		
1	Acceleration is the derivative of which quantity with respect to time? Its average can be expressed as the change in this quantity divided by the change in time.	Velocity (or Speed)
2	What name is given to acceleration that keeps objects moving in constant circular motion?	Centripetal
3	Acceleration is used to resolve which paradox of relativity theory involving a person travelling at high speeds for a long time?	Twin (Paradox)

Replacement Question F: Science – Physics

10 points per part

Answer these questions about torque (tork):		
1	What other net quantity must be zero for a system to be in equilibrium other than no net torque?	(Net) Force
2	When a torque is applied to an object, what quantity equals torque divided by angular acceleration?	(Mass) Moment of Inertia (accept rotational inertia, polar moment of inertia of mass, or the angular mass, prompt I)
3	What motion exhibited by a gyroscope is classified as torque-free or torque-induced?	Precession

Replacement Question G: Literature – U.S. Literature

10 points per part

This poet wrote the words, "One if by land, and two if by sea."		
1	Name this poet of "Paul Revere's Ride" and "The Song of Hiawatha".	(Henry Wadsworth) Longfellow
2	Name Hiawatha's bride in "The Song of Hiawatha".	Minnehaha
3	This poem by the same writer is about a love triangle that includes Priscilla Mullens and John Alden.	"(The) Courtship of Miles Standish"

Replacement Question H: Literature – U.S. Literature

10 points per part

Name these characters from J.D. Salinger's *The Catcher in the Rye*.		
1	This is the protagonist, a student at Pencey Prep.	Holden Caulfield (accept Holden or Caulfield)
2	This is the protagonist's former English teacher from Elkton Hills, whom he visits one night.	(Mr.) Antolini
3	The protagonist gets in a fight with Stradlater after Stradlater dates this girl.	Jane Gallagher (accept Jane or Gallagher)

Question #1: Science – Physics

15 points

Scientists in Innsbruck are using these objects to manipulate highly cooled calcium atoms to simulate a wide variety of phenomena, and scientists in Geneva are using these to control rain. These objects put more particles into excited states than grounds states, which is known as population inversion, by pumping energy into a gain medium. These devices generally contain an output coupler at one end of an optical resonator, allowing a beam of photons to pass out of them. Name these items that produce a stimulated emission of radiation.	Laser(s)

Question #2: Social Studies – U.S. Government

15 points

This organization did not have its own director until 2004, when Porter Goss took over, though people who directed this group in addition to taking on other responsibilities include George Tenet, Roscoe H. Hillenkoetter, Allen Dulles, and George H.W. Bush. The successor of the Office of Strategic Services, it is headquartered in Langley, Virginia. Responsible at least in part for the Phoenix Program in Vietnam, the 1953 Iranian coup d'etat, and the Bay of Pigs invasion, this agency has been blamed for not stopping Al Qaeda earlier. Name this government agency that can engage in covert operations.	CIA (or Central Intelligence Agency)

Question #3: Literature & Language Arts – Vocabulary

15 points

This term is based on an old French expression for foot of a crane because of the shape many of these documents look like. One of its meanings is that witnesses are allowed to establish their own identities. These charts have been used many times for humans in Europe to keep track of royal titles, and they are used by geneticists to track various genetic characteristics. Give this term associated with purebred plants and animals that is similar to a family tree.	Pedigree

Question #4: Miscellaneous – Agriculture

15 points

This animal, classified as Anthonomus grandis, is attracted into traps using the pheromone grandlure. In the late 1890s, this species migrated to the United States from Mexico, causing significant agricultural damage. An eradication program started in 1978 has almost eliminated this pest from the US. This type of beetle feeds on immature buds of cotton plants, which during the 20th Century greatly damaged America's cotton crop. Name this subject of a monument in Enterprise, Alabama.	Boll Weevil

Question #5: Mathematics – Conceptual Question

15 points

This set of numbers is commonly expressed using exponents as a phasor, and their magnitude can be used to represent impedance in circuit design. These numbers are commonly represented on an Argand diagram, where multiplication can be represented by both magnitude changes and rotations and addition can be represented by translation in two dimensions. The conjugate of this type of number can be found by multiplying negative one times their imaginary components. Name these numbers with real and imaginary components.	Complex (numbers) (accept C, do not accept i or imaginary numbers)

Question #6: Science – Environmental Science

15 points

One symptom of exposure to this element is found in the gums and called the Burton line. Devon colic was caused when this element was present in apple cider. Tests for this element in a home often involve taking dust samples from the floor and a window sill. This element was used to control engine knocking, but its use in gas has been eliminated due to environmental concerns. Because this causes anemia and neurological problems, its use is now banned in plumbing and paints. Name this element once known as Plumbum.	Lead (accept Pb)

Question #7: Social Studies – Current Events

10 points per part

Name these countries:		
1	In this country, Nicolas Sarkozy is running for re-election as President.	France
2	This country recently elected Dilma Rousseff as its first woman President.	Brazil
3	The President of this country, Jacob Zuma, angered his three wives by fathering a child out of wedlock.	South Africa

Question #8: Social Studies – Current Events

10 points per part

Name these states:		
1	This state recently elected Jerry Brown, who served previously from 1975 to 1983, as its Governor. He replaced Arnold Schwarzenegger.	California
2	This state elected Chris Christie as its governor in 2010, and he declared a fiscal state of emergency.	New Jersey
3	Andrew Cuomo became governor of this state at the beginning of 2011. A few months later, he signed same-sex marriage legislation.	New York

Question #9: Mathematics – Pre-Calculus

10 points per part

Given an equation of a polar graph, name the shape:		
1	r = 2	Circle
2	r = 2 secant theta	Line
3	r = 4 + cosine theta	Limacon (of Pascal) (the c can be soft or hard)

Question #10: Mathematics – Pre-Calculus

10 points per part

Given two points in polar coordinates, find the distance between them, giving your answer in simplest form:		
1	(5, pi over four) and (8, pi over four)	3
2	(8,zero) and (6,pi over two)	10
3	(4,pi over two) and (6,pi over six)	$2\sqrt{7}$

Question #11: Science – Biology

10 points per part

Identify these arteries:		
1	This is the root artery which receives oxygenated blood directly from the heart.	Aorta
2	These are the only arteries which carry deoxygenated blood.	Pulmonary
3	This artery is between the femoral artery and the tibial arteries and is located at the back of the knee.	Popliteal

Question #12: Science – Biology

10 points per part

Answer these questions about urine:		
1	Which major organ extracts urine from the blood?	Kidney(s)
2	That organ contains about one million of what functional units?	Nephron(s)
3	What is the name for the capillary bed inside the Bowman's capsule inside those functional units?	Glomerulus

Question #13: Literature & Language Arts – British Literature

10 points per part

Identify the following odes from descriptions.		
1	According to this John Keats ode, "beauty is truth, truth beauty – that is all / Ye know on earth, and all ye need to know".	"Ode on a Grecian Urn"
2	In this poem by Percy Shelley, the speaker asks, "if Winter comes, can Spring be far behind?	"Ode to the West Wind"
3	This Coleridge poem opens with the Ballad of Sir Patrick Spence and describes "viper thoughts, that coil around my mind / Reality's dark dream!"	"Dejection(: an Ode)"

Question #14: Literature & Language Arts – British Literature

10 points per part

Identify the following shady figures from *Oliver Twist*.		
1	Assisted by Charley Bates, his real name is Jack Dawkins.	(The) Artful Dodger (prompt partial answer)
2	Monks plots with this figure to disinherit Oliver. In the end, he is executed for his part in a murder.	Fagin
3	The leader of the band of thieves, he kills Nancy, but ends up accidentally hanging himself.	Bill Sikes (accept Bill or Sikes)

Question #15: Science – Chemistry

15 points

This person's name is sometimes used to represent one atomic mass unit, and the fact that he had Deuteranopia led him to write the first paper about color blindness. His rule of greatest simplicity stated, "If two elements form only one compound, assume the compound atom has only one atom of each element." This person defined atoms as the ultimate particles that could never be divided. This person's namesake law states that the total pressure of a gaseous mixture is the sum of the partial pressures of its constituents. Name this English chemist who is also sometimes the namesake of the Law of multiple proportions.	(John) Dalton

Question #16: Fine Arts – Classical Music & Opera

15 points

This composer tried to continue a tradition started by Joseph Haydn of composing a mass for the Esterhazy family, but his work was poorly received by the family. He used a libretto by Salvatore Vigano to compose his ballet *The Creatures of Prometheus*, and he wrote incidental music for Goethe's play *Egmont*. He was the first composer to use a chorus in a symphony, using as a text Friedrich Schiller's "Ode To Joy". Name this composer who wrote the opera *Fidelio* and whose nine symphonies include the Choral, Pastoral, and Eroica.	(Ludwig van) Beethoven

Question #17: Literature & Language Arts – World Literature

15 points

This novel opens with the protagonist in front of a firing squad reminiscing about seeing ice for the first time. Following thirty-two failed revolts, one character resigns himself to making fish of gold and melting them down. After a family patriarch dies, yellow flowers rain from the sky. Another figure descends to heaven while hanging laundry. One member of the central family in this work is adopted after she is discovered in a canvas sack with her parents' bones. The last member of the central family in this work is born with a pig's tail. Set in Macondo, name this novel about the Buendia family written by Gabriel Garcia-Marquez.	*One Hundred Years of Solitude* (or *Cien años de soledad*)

Question #18: Mathematics – Conceptual Question

15 points

A limit on this value under certain conditions was found by Jacques Hadamard, and a common method for calculating this quantity is known as the Laplace (luh-PLAHS) Method. A value of zero for this quantity can be used to show that vectors are dependent and the existence of a nonempty nullspace, and this quantity together with derivatives is used to calculate a Wronskian. This quantity can be used to calculate the effect of a transformation on area or volume. Give this value used in Cramer's Rule that is associated with a matrix.	Determinant

Question #19: Social Studies – Economics

15 points

This type of gap gives the ratio between the money gained from an equity divided by the money gained by a bond. This type of curve shows the relationships between interest rates on government bonds with different maturities. This quantity is sometimes calculated by dividing the dividend by the price of stock, and it is equivalent to the interest rate on a bond. Give this term referring to the internal rate of return of an investment. Give this term that can also refer to an act of surrender.	Yield

Question #20: Literature & Language Arts – Mythology

15 points

He once killed the god of death after the latter tried to drag away a devotee clinging to this god's symbol. A robber was reborn as a king after his life was spared by this god, due to a mix-up involving "Hara," an alternate name for this god. During the Churning of the Ocean, this god swallowed the poison that came forth, which is why his throat is blue. He once hurled a trident at one of his sons, which resulted in a tusk being broken off. The father of Kartikeya and Ganesha, name this member of the Hindu trimurti, the god of destruction.	Shiva (accept Siva, accept Hara before it is mentioned)

Question #21: Social Studies – U.S. History

10 points per part

Identify these US Marine operations:		
1	This World War Two battle, known as Operation Detachment, is now famous for the Joe Rosenthal photograph of Marines raising a flag.	Iwo Jima
2	This battle, known as Operation Chromite during the Korean War, switched momentum towards the UN forces in September 1950.	Inchon
3	This 1847 battle is named after a castle west of Mexico City and probably is the inspiration of the lyrics, "From the halls of Montezuma."	Chapultepec

Question #22: Social Studies – U.S. History

10 points per part

Answer the following questions about the Polk Presidency:		
1	Polk agreed to set the boundary of what territory at the 49th Parallel North as opposed to fifty-four forty.	Oregon (Territory)
2	Polk agreed to what treaty with Mexico after the Mexican War?	Guadalupe Hidalgo
3	Who was Polk's Treasury Secretary? His name is attached to the reduced tariffs during Polk's Presidency.	(Robert) Walker

Question #23: Science – Physics

10 points per part

Answer these questions about work and energy:		
1	What SI MKS unit, named after an English scientist, is used for work and energy?	Joule
2	What name is given to the derivative of work with respect to time? It can be measured in Watts.	Power
3	What name is given to the amount of useful work obtainable from a system with constant temperature and volume? It is often calculated as U minus TS.	Helmholtz (Free Energy) (prompt Free Energy)

Question #24: Science – Physics

10 points per part

Identify these units of measure:		
1	This unit of frequency is an inverse second.	Hertz
2	This unit of distance is ten to the negative tenth meters.	Angstrom
3	This base SI unit measures luminous intensity.	Candela (or Candle)

Question #25: Literature & Language Arts – U.S. Literature

10 points per part

This poet wrote a few poems collectively called "Memories of President Lincoln".		
1	Name this poet of the collection *Leaves of Grass* who wrote "Song of Myself".	(Walt) Whitman
2	This poem remembering Lincoln refers to a bush with "heart-shaped leaves of rich green".	"When Lilacs Last in the Dooryard Bloom'd"
3	Fill in the blank from another *Leaves of Grass* poem: "O captain! My Captain! Our [blank] trip is done."	Fearful

Question #26: Literature & Language Arts – U.S. Literature

10 points per part

Answer the following about the poet Langston Hughes.		
1	Hughes is closely associated with what movement that used to be known as the New Negro Movement?	Harlem Renaissance
2	One Hughes poem ends with the line, "I, too, am America." The first line is similar to the last line but has a different verb. What verb is in the first line and is sometimes in the title.	Sing
3	Identify the Hughes poem about a piano player on Lenox Avenue who sings that he can't be satisfied.	"(The) Weary Blues"

Question #27: Mathematics – Geometry

10 points per part

Find the following for an equilateral triangle with side length six. Ignore units:		
1	the height	$3\sqrt{3}$
2	the radius of an inscribed circle	$\sqrt{3}$
3	the radius of a circumscribed circle	$2\sqrt{3}$

Question #28: Mathematics – Geometry

10 points per part

Find the following for a right triangle with leg lengths of one and the square root of three. Ignore units:		
1	the length of the hypotenuse	2
2	the length of the median to the right angle	1
3	the length of the altitude to the right angle	$\frac{\sqrt{3}}{2}$ or $\frac{1}{2}\sqrt{3}$

Question #29: Science – Astronomy

15 points

Using soundwaves from the Michelson Doppler Imager, scientists believe they can anticipate these object two days before they appear. Attempts to track the locations of these objects results in a butterfly diagram described by Spörer's law. Alexander Wilson discovered that these items are deep depressions on a surface, and we now know these objects reduce convection, which lowers temperature. The center of these objects is their umbra, and they exist on the photosphere. Name these objects associated with coronal mass ejections and solar flares.	Sunspot(s)

Question #30: Social Studies – Geography

15 points

Part of this country's northeast border is formed by Lake Zorkul, which lies by its Wakhan Corridor. The western part of this country includes the city of Farah and the Mosallah Complex at Herat, while the northern part includes the Shrine of Hazrat Ali in Mazar-i-Sharif (mah-ZAHR ee shah-REEF). This country includes Foladi Mountain in the Baba Range, which is a southwestern arm of the Hindu Kush. Its second largest city is Kandahar, and its eastern border contains the Khyber Pass linking it to Pakistan. Name this landlocked country whose capital is Kabul.	Afghanistan

Question #31: Literature & Language Arts – U.S. Literature

15 points

This author wrote a book about a man who marries a Communist named Celia and has an affair with Liza before becoming more religious. In addition to that work about Joseph Shapiro, this author wrote a novel about a man who is surprised when his wife Tamara, like him, moves to New York City. He also wrote a short story about a man who runs outside upon hearing that his parents have risen from their graves. That character, who believes everything he is told, is Gimpel the Fool. Name this author of *The Penitent* and *Enemies, A Love Story* who also wrote *The Magician of Lublin* and often wrote in Yiddish.	(Isaac Bashevis) Singer

Question #32: Social Studies – World History

15 points

This leader explained his policies in his speech "On the Correct Handling of Contradictions Among the People". As a military leader, he used a combination of positional warfare and guerilla warfare known as Mobile Warfare, and it was his decision to capture Luding Bridge. His policies encouraged the formation of the Red Guard, and his widow was one member of the Gang of Four. This leader is associated with the Long March, the Cultural Revolution, and the Great Leap Forward. Name this Chairman who ruled China from 1943 to 1976.	Mao (Zedong or Tse-Tung) (prompt Zedong or Tse-Tung)

Replacement Question A: Social Studies – U.S. History

15 points

This leader commanded Johann de Kalb at his final battle, and he had an earlier power struggle with Philip Schuyler over Fort Ticonderoga. Place in charge of the Southern Department in 1780, this General suffered a major defeat at the Battle of Camden. This general apologized to George Washington after the Conway Cabal, which many people saw as an attempt to place this man in charge of American forces. Name this General who removed Benedict Arnold from command while winning the Battles of Saratoga.	(Horatio) Gates

Replacement Question B: Science – Biology

15 points

One part of this process can be represented by a z-scheme diagram, which contains upward arrows from P680 and P700. These lead to the production of ferredoxin, and then the other part of this process receives both NADP and NADPH molecules. That other part converts ATP into ADP using reduction and carbon fixation and is sometimes called the Calvin Cycle. Overall, this process turns water and carbon dioxide into sugars and oxygen. Name this process which takes place in plants.	Photosynthesis (prompt Light(-dependent) Reaction(s))

Replacement Question C: Math – Conceptual Question

15 points

The property named after this mathematician applies to a set if the product of any two numbers in the set plus a fixed constant is always a perfect square, a famous example of which was found by Pierre de Fermat. He wrote a famous several-volume work titled *Arithmetica*, which became famous in mathematical lore because a copy of it contained the famous note that became known as Fermat's Last Theorem. In an odd twist of history, he always rejected negative solutions but was one of the first mathematicians to accept fractional answers. Name this Greek mathematician whose name is now associated with problems requiring integer solutions.	Diophantus (prompt Diophantine)

Replacement Question D: Language Arts – Grammar/Usage

15 points

These types of adjectives generally are only found in Indo-European and Semitic languages, and in Scandinavian languages their meaning is determined based on whether they appear before or after the noun they are modifying. A few European languages have partitive types of these determiners, and linguists debate whether or not the word Some is this type of word in English. Similar to demonstratives, these words are usually classified as definite or indefinite. Give this term that refers to the words The and A.	Article(s)

Replacement Question E: Mathematics – Algebra

10 points per part

Find the coefficients for the following terms in the expansion of (x+1) times (x+2) times (x+3) times (x+4):		
1	the constant term	24
2	the x term	50
3	the x^3 term	10

Replacement Question F: Mathematics – Algebra

10 points per part

Factor the following:		
1	$x^2+13x+30$	(x+10)(x+3) (or (x+3)(x+10))
2	$2x^2-5x-3$	(2x+1)(x-3) (or (x-3)(2x+1))
3	$8x^2-13x-6$	(8x+3)(x-2) (or (x-2)(8x+3))

Replacement Question G: Language Arts – Grammar/Usage

10 points per part

Identify these punctuation marks:		
1	This is used at the end of an interrogative sentence.	Question Mark
2	This is used before a list and is also used to separate chapter and verse numbers for Biblical passages.	Colon
3	This mark represents the omission of a word or phrase from a quotation. Give your answer as a single word.	Ellipsis

Replacement Question H: Language Arts – Grammar/Usage

10 points per part

Identify these parts of speech:		
1	These are used to modify verbs and adjectives.	Adverb(s)
2	These are used to express exclamations.	Interjection(s)
3	These are followed by nouns to form their namesake type of phrase.	Preposition(s) (prompt Adposition(s))

Question #1: Miscellaneous – Journalism

15 points

For many years, the main book critic at this newspaper was Jonathan Yardley, and for over fifty years it employed a political cartoonist known as Herblock. This has been controlled by Philip, Katharine, and Donald Graham, and its editor Benjamin Bradlee oversaw Bob Woodward and Carl Bernstein's coverage of the Watergate scandal. Name this newspaper based in our nation's capital.	(*The*) *Washington Post* (prompt Post)

Question #2: Social Studies – World History

15 points

This king called an abbot named Suger "Father of the Country" after appointing him as a regent for two years. He became king because his brother, who would have been Philip the Second, died young, and this man's son later became Philip the Second. Early in his reign, this king burned the town of Vitry over a dispute with Theobald the Second of Champagne. Name this 12th century French king who, along with Conrad the Third of Germany and this king's first wife Eleanor of Aquitane, went on the Second Crusade.	Louis the Seventh (prompt Louis)

Question #3: Literature & Language Arts – Speech

15 points

The first time this speech was formally read aloud was by John Forney sixty-three years after its writer died. This speech states, "Of all the dispositions and habits which lead to political prosperity, Religion and morality are indispensable supports." It originally was published in David Claypoole's *American Daily Advertiser*, but it was quickly reprinted by several sources. This speech also states, "The Nation which indulges towards another an habitual hatred or an habitual fondness is in some degree a slave." This document helped establish the two term tradition. Identify this announcement that our first President would not seek another re-election.	(George) Washington('s) Farewell (Address) (prompt partial answers and accept equivalents)

Question #4: Science – Earth Science

15 points

The perched type of this is smaller but otherwise similar to the unconfined type. The discharge rate of these objects depends on the materials inside them according to Darcy's Law. Examples of these include Edwards in Texas, Guarani in South America, and Ogallala in Nebraska and seven other states. The confined type of this is covered with an impermeable layer, while these objects primarily consist of silt or permeable rock containing fluids such as groundwater. Name these objects which are typically the sites of Artesian wells.	Aquifer(s) (prompt Water Table(s))

Question #5: Social Studies – Economics

15 points

This writer classified employment that has to do with ownership or acquisition as pecuniary. He examined the increasing role of industrial processes in his book *The Theory of Business Enterprise*, and his name is associated with goods for which there is an increase in demand when there is an increase in price. His book *The Theory of the Leisure Class* described goods that were purchased primarily to display wealth. Name this writer associated with the phrase Conspicuous Consumption.	(Thorstein) Veblen

Question #6: Literature & Language Arts – British Literature

15 points

In one of his works, the speaker notes that "the music in my heart I bore, long after it was heard no more" and describes a cuckoo-bird breaking a silence in the Hebrides (HEB-ri-dees) in "The Solitary Reaper". He wrote that "little we see in Nature that is ours" in "The World Is Too Much With Us". In one work, he described three phases of life, and described them in relation to nature. One of his poems was inspired by a tour of Ullswater he took with his sister Dorothy; that poem is "I Wandered Lonely As a Cloud". The title structure of one of his poems is found on the banks of the Wye. He teamed up with Samuel Taylor Coleridge for the volume *Lyrical Ballads*. For 10 points, name this poet of "Tintern Abbey".	(William) Wordsworth

Question #7: Mathematics – Analytical Geometry

10 points per part

Find the following for the graph of the equation $\frac{(y-1)^2}{16} - \frac{(x+2)^2}{4}=1$: (Read the quantity y minus one quantity squared over sixteen minus the quantity x plus two quantity squared over four equals one.)		
1	the x- and y-coordinates of the vertex located above the center	(-2,5)
2	the slope of the asymptote with a positive slope	2
3	the y-intercept of the asymptote with a positive slope	5 (accept (0,5))

Question #8: Mathematics – Analytical Geometry

10 points per part

Find the following for the shape with equation $2x+2y+z=6$:		
1	the name of the shape formed	Plane
2	the x-intercept	3 (or (3,0,0))
3	the distance from the origin	2

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

10 points per part

Identify the following about the period after the Civil War:		
1	Identify the name commonly applied to the era from 1865 to 1877.	Reconstruction
2	Give the nickname applied to Southerners who supported freedmen and the 14th Amendment. They generally got along with carpetbaggers and joined the Republican Party.	Scalawag(s)
3	Name the 1864 bill that passed Congress but was pocket vetoed that would have required majorities in each state to swear that they had not supported the Confederacy.	Wade-Davis (Bill)

Question #10: Social Studies – U.S. History

10 points per part

Answer the following about Andrew Jackson:		
1	What nickname is given to the relocation caused by the Indian Removal Act of 1830 signed by Jackson? It is also sometimes nicknamed the Death March.	(The) Trail of Tears
2	When Jackson lost the Election of 1824 to John Quincy Adams, his supporters accused Adams of making a corrupt bargain that made this man the Secretary of State.	(Henry) Clay
3	During Jackson's Presidency, this South Carolina Senator had a famous debate with Daniel Webster about tariffs and states' rights.	(Robert) Hayne

Question #11: Science – Astronomy

10 points per part

Answer these questions about the Sun:		
1	What is the most abundant element in the Sun?	Hydrogen
2	What is the thin layer between the photosphere and corona?	Chromosphere
3	Who determined the solar rotation rate in the 1850s? The solar calendar is based on rotation dates named after him.	(Richard Christopher) Carrington

Question #12: Science – Astronomy

10 points per part

Answer these questions about comets:		
1	What is the region of ice and dust around the nucleus of a comet?	Coma (accept an answer that sounds like Comma)
2	Though it has never been observed, what region is believed to be the origin of long-period comets?	(Öpik–)Oort cloud
3	Which comet was visited twice by spacecraft, in 2005 by Deep Impact and in 2011 by Stardust?	Tempel One (or 9P/Tempel (One), prompt Tempel)

Question #13: Literature & Language Arts – World Literature

10 points per part

Identify the following poems by William Butler Yeats.		
1	The speaker declares that he shall never take his bodily form from any natural thing. He compares the young to birds in the trees, calling them dying generations.	"Sailing to Byzantium"
2	Chinua Achebe took the title for "Things Fall Apart" from this poem, in which the center cannot hold.	"(The) Second Coming"
3	At the end of three stanzas in this poem, the speaker laments that a terrible beauty is born. The inspiration for it was an uprising in the author's homeland.	"Easter, 1916"

Question #14: Literature & Language Arts – World Literature

10 points per part

Identify the following plays written by George Bernard Shaw.		
1	The title character of this work is a member of the Salvation Army. Her father is an arms dealer who tries to eliminate poverty.	*Major Barbara*
2	This play centers on a linguistic scientist who bets another scientist that he can pass off a Cockney flower girl as a duchess.	*Pygmalion*
3	This play, whose title comes from the first line of the *Aeneid*, focuses on an upper-class Bulgarian family.	*Arms and the Man*

Question #15: Science – Physics

15 points

The impedance of these objects varies inversely with frequency, and their potential difference lags current. These objects are often filled with mica, plastic, or glass, though they also work well when they contain a vacuum. Filling materials must be chosen that have a high permittivity and high breakdown voltage to serve as dielectrics inside these objects. The strength of these objects is measured by dividing charge by electric potential difference and is often stated in farads. Name these components consisting of chargeable plates that are often used together with inductors and resistors.	Capacitor(s)

Question #16: Fine Arts – Art History

15 points

When writing about this building, Fiske Kimball said wall surface was abandoned for a system of pier and spandrel. It has several small circular windows surrounded by floral ornamentation just under its large cornice, and a similar design was used by one of its architects for the Prudential Guaranty Building in Buffalo a few years later. Name this ten-story building created in 1891 that was designed by Dankmar Adler and Louis Sullivan which is in St. Louis.	Wainwright (Building)

Question #17: Mathematics – Conceptual Question

15 points

This person is associated with the solution of the integral of dx over the square root of the quantity one minus x to the fourth, and he is the namesake of a mapping from every point on an oriented surface to points on a unit sphere based on unit normal vectors. He is also the namesake of imaginary surfaces used to calculate flux, and depending on how far the process is carried out, this mathematician's name can stand alone or be combined with Wilhelm Jordan to describe the process of putting a matrix into row echelon form. Name this German mathematician whose name is sometimes used for bell curves.	(Carl Friedrich) Gauss

Question #18: Literature & Language Arts – U.S. Literature

15 points

This author wrote a novel about a boy who often carries a corkscrew-bottle-opener and is supposed to bury his great-uncle, Mason Tarwater. A story by this writer is about a typewriter salesman who escorts her mother to her weight-loss class on an integrated bus. Another story by this writer features a grandmother who once dated a man with the initials E.A.T. That grandmother wants to vacation in Tennessee rather than Florida to avoid The Misfit. Name this author of *The Violent Bear It Away*, "Everything That Rises Must Converge", and "A Good Man Is Hard to Find".	(Flannery) O'Connor

Question #19: Science – Biology

15 points

This protein can be prepared in a lab using the Lundblad procedure, and it possesses an A Chain and a B Chain, the latter of which is similar to trypsin (TRIP-sin). It activates Protein C as well as Factors Five and Eight. This is a serine (SEHR-een) protease (PRO-tee-ase) that is deactivated by hirudin, which is found in the salivary glands of leeches. This protein cleaves fibrinogen (figh-BRIN-oh-jen) to create fibrin (FIGH-brin) and initiates reactions that cause inflammation and activate blood platelets. Name this protein that plays a major role in blood coagulation.	Thrombin

Question #20: Social Studies – Geography

15 points

One branch of this river begins at Lake Toma, and the branches join together by the town of Tamins. It helps form Lake Constance, and it is fed by the Neckar River near Mannheim. In the early 20th century, canals were built to keep this river separate from the Meuse by their deltas, where they flow into the North Sea. This river forms the western border of Liechtenstein, and it travels through Cologne and Rotterdam. Name this river, the longest in Germany.	Rhine (River)

Question #21: Mathematics – Algebra

10 points per part

Give all three solutions to each equation:		
1	$x^3-x=0$	-1,0,1 (any order)
2	$x^3-2x^2-35x=0$	-5,0,7 (any order)
3	$x^3-5x^2-9x+45=0$	-3,3,5 (any order)

Question #22: Mathematics – Algebra

10 points per part

Convert the following repeating decimals into reduced fractions:		
1	the repeating decimal that starts out point four four four four etcetera	4/9
2	the repeating decimal that starts out point four five four five etcetera	5/11
3	the repeating decimal that starts out point four five five five etcetera, with just the fives repeating	41/90

Question #23: Literature & Language Arts – Vocabulary

10 points per part

Identify these English words with German origins:		
1	A class before first grade	Kindergarten
2	A feeling of deep anxiety or dread or of continuous worry	Angst
3	A banded or foliated metamorphic rock similar to granite	Gneiss

Question #24: Literature & Language Arts – Vocabulary

10 points per part

Identify these English words with Italian origins:		
1	A musical direction to play softly also commonly used for the name of a keyboard instrument	Piano
2	A common technique of using light and shade in painting	Chiaroscuro
3	A railing and its supporting posts often found at the front of a gallery	Balustrade

Question #25: Social Studies – World History

10 points per part

Answers these questions about rulers of Russia from 1613 to 1917:		
1	Rulers of Russia during that time period belonged to what ruling house or dynasty?	Romanov(s)
2	Which Empress ruled from 1762 to 1796? Some people believe she had her husband Peter the Third assassinated.	Catherine The Great (accept Catherine the Second, prompt Catherine or Catherine Romanov)
3	What son of that Empress assumed power when she died? He passed namesake laws stating that power passes on to the eldest son of a ruler.	Paul (The First)

Question #26: Social Studies – World History

10 points per part

Name these African countries that used to be colonies:		
1	After gaining independence from the United Kingdom, this country was ruled by Milton Obote (oh-BOH-tay) and Idi Amin.	Uganda
2	This country that used to be the British colony known as Southern Rhodesia has been ruled by Robert Mugabe (moo-GAH-bay) for most of its time since independence.	Zimbabwe
3	This country became independent of France when it was part of the Mali Federation. Its first President was Léopold Senghor.	Senegal

Question #27: Science – Health

10 points per part

Answer these questions about vitamins:		
1	Which vitamin is known as ascorbic acid and often found in citrus?	(Vitamin) C
2	Vitamins often contain what type of amino acid that is not created in humans?	Essential
3	A deficiency in which B vitamin can cause beriberi?	$(B)_1$ (or Thiamine)

Question #28: Science – Health

10 points per part

Answer the following about blood pressure:		
1	What is the name of the higher blood pressure reading? The lower one is diastolic.	Systolic (accept other word forms)
2	What is the name of the chronic condition also known as high blood pressure?	Hypertension (prompt HTN)
3	What condition in some pregnant women causes high blood pressure?	Pre-eclampsia

Question #29: Mathematics – Conceptual Question

15 points

The volume of one of these shapes can be found by first cubing an edge length, then multiplying by the square root of two, and dividing by three, and each of their vertices can be placed in a coordinate system by giving each vertex two coordinates equal to zero and one coordinate equal to plus or minus a constant. Their surface area can be calculated by squaring an edge length and multiplying by two times the square root of three, and the vertices of this shape can be used as the center of the faces of a cube. These shapes are essentially two square-based pyramids with the squares covering each other. Name this Platonic solid which, like the tetrahedron and icosahedron, has triangular faces.	Octahedron(s) (or Octahedra)

Question #30: Literature & Language Arts – World Literature

15 points

One lawyer in this novel works "pro deo"; after the trial, the guilty party's father organizes a wedding between his son and the woman who is pregnant with his child. This novel opens with a letter indicating that someone is sick and needs help. The letter comes from a clergyman who indicates that the sick person is a prostitute. Local leaders in this novel have organized a bus boycott, so the central figures walk around. The clergyman ends up finding his son, who is sentenced to death. The bishop later asks the clergyman to leave the village of Ndotsheni, shortly after returning from his trip to Johannesburg. Name this novel written by Alan Paton.	*Cry, the Beloved Country*

Question #31: Science – Chemistry

15 points

Even though this quantity is not part of the Clausius theorem, when this quantity is constant the Clausius theorem is an equation rather than an inequality. Clausius defined change in this quantity as the change in heat divided by the temperature, and the product of this quantity with temperature is subtracted from enthalpy to calculate Gibbs free energy. This quantity is lowered by Maxwell's demon, a being which cannot exist. This quantity used to be thought of as waste energy, since an increase in this quantity meant a decrease in the amount of useful work a system was capable of. Name this quantity which, according to the 2nd Law of Thermodynamics, always increases.	Entropy

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

15 points

For a short time, this person served as both Secretary of State and Chief Justice of the Supreme Court. He recused himself in two cases regarding Hunter's Lessee about the Judiciary Act, but he wrote the decision in Cohens vs. Virginia, which reaffirmed the right of the Supreme Court to review state court decisions. This Justice also wrote the decision upholding the Yazoo Land Act in Fletcher vs. Peck. This Chief Justice wrote other key decisions such as Marbury vs. Madison and McCulloch vs Maryland. Name this Supreme Court Justice from 1801 to 1835.	(John) Marshall

Replacement Question A: Literature – U.S. Literature

15 points

This person wrote a short story about a medicine-show man with a two-headed quarter, Doc Marlowe. This person wrote, "It is better to ask some of the questions than to know all the answers," at the end of "The Scotty Who Knew Too Much", which appeared in his collection *Fables for Our Times*. This man wrote a story about a man who reaches fifty-five miles per hour on his drive to Waterbury in what is not a Navy hydroplane and who ends up imagining a firing squad. Name this contributor to *The New Yorker* magazine who wrote the story "The Secret Life of Walter Mitty".	(James) Thurber

Replacement Question B: Math – Conceptual Question

15 points

The name of this person is combined with E.H. Moore to denote the pseudoinverse of a matrix, and this person worked with his father Lionel to design a staircase optical illusion that was used in M.C. Escher's *Ascending and Descending*. He is also the namesake of an optical illusion triangle which appears to be a solid object but whose vertices cannot match up. Name this mathematician who combined kites and darts to design a type of non-periodic tiling.	(Roger) Penrose

Replacement Question C: Social Studies – Geography

15 points

Much of this state is in its Southern Rivers region, stretching to the town of Fruitland. Near Lumber City in this state, the Oconee and Ocmulgee Rivers combine to form the Altamaha River. It includes Fort Screven on Tybee Island, which is located near a historic city with many open squares, while the other side of the state includes Fort Benning. Its main state university is located in Athens, and its capital and largest city contains Hartsfield–Jackson Airport. Name this state between Alabama and South Carolina whose capital is Atlanta.	Georgia

Replacement Question D: Science – Astronomy

15 points

It is believed that two of these objects collided to form Mayall's Object, and scientists generally consider the center of Hoag's Object and its ring to form a single one of these. One method of classifying these objects rates their orientation on a scale from one to seven, while another classification system differentiates by stage, family, and variety, and another classifies some of these astronomical objects as lenticular. These are commonly classified as irregular, elliptical, and spiral. Name these objects formerly known as extragalactic nebulae that include our home the Milky Way.	Galaxy (or Galaxies)

Replacement Question E: Science – Biology

10 points per part

Identify these plant hormones:		
1	This was the first type of plant hormone discovered and plays a role in many tropisms.	Auxin(s)
2	This hormone is used to overcome dwarfism in some plants and produce raisins and some varieties of seedless fruit.	Gibberellin(s)
3	This hormone is associated with cell division, and the role of cells is determined by the ratio of this hormone with others.	Cytokinin(s)

Replacement Question F: Science – Biology

10 points per part

Answer these questions about early embryonic development:		
1	What is the name for the single layer of cells that exists immediately before gastrulation?	Blastula
2	The gastrula has three layers. What is the layer between the endoderm and the ectoderm?	Mesoderm
3	What structure in that middle layer develops into the vertebral column, which in humans is the spine?	Notochord

Replacement Question G: Social Studies – Geography

10 points per part

Identify these Ohio cities:		
1	The largest city in southwest Ohio, it is across the Ohio River from Newport, Kentucky.	Cincinnati
2	This town between Cleveland and Canton has long been associated with manufacturing tires.	Akron
3	This city is on Maumee Bay at the western end of Lake Erie.	Toledo

Replacement Question H: Social Studies – Geography

10 points per part

Identify these Caribbean islands:		
1	This island combines with Vieques, Culebra, and Mona to form an unincorporated territory of the United States. It is not one of the Virgin Islands.	Puerto Rico
2	This island contains the Dominican Republic and Haiti.	Hispaniola
3	This British Leeward Island contains Soufrière Hills volcano, which has been active in recent years, causing its capital of Plymouth to be abandoned.	Montserrat

Question #1: Social Studies – Current Events

15 points

The leader of this country used to belong to a group called Anyanya, a name meaning snake venom, and in a former position that leader replaced John Garang. This country has had trouble in its state of Warrap, and its primary ethnic group is the Dinkas, a subset of the Nilotic people. This country is currently headed by Salva Kiir Mayardit, and its capital is at Juba. Name this country between Ethopia and the Central African Republic that became independent in 2011.	South Sudan (do not accept Sudan)

Question #2: Science – Chemistry

15 points

The efficiency of this type of chemical is measured by comparing its amount to the substrate amount, and it is also measured by its turnover number, which is how much it accomplishes before it deactivates, and its turnover frequency. Substances that deactivate these substances are called poisons. Zeolites often take on this role in the creation of gasoline, and platinum used to be commonly used in this role to create sulfuric acid. Often, this substance is consumed and then produced in a reaction; it must still exist when the reaction is over. Name these substances typically used to speed up chemical reactions.	Catalyst(s) (prompt Enzyme)

Question #3: Fine Arts – Composers of Modern Era

15 points

This composer wrote a ballet about a prince who uses his own hair in a puppet to attract a princess and another ballet about women whose dances attract a wealthy Chinese man. His only opera is about a man taking his bride Judith to his home, which has seven locked doors. In addition to *The Wooden Prince*, *The Miraculous Mandarin*, and *Bluebeard's Castle*, he wrote *Concerto for Orchestra*, *Mikrokosmos*, and *Kossuth*. Name this 20th Century Hungarian composer.	(Bela) Bartok (or Bartok Bela)

Question #4: Mathematics – Conceptual Question

15 points

The generalization of this theorem allowing it to be applied to two functions rather than the usual one is named after Cauchy, and a version of this theorem applied to integration sets an integral equal to the product of its width times a function value and is derived from the extreme value theorem. Most proofs of the common form of this theorem begin by proving Rolle's Theorem, which is a special case of this theorem. Give this theorem applied to continuous and closed intervals stating that a point in the interval has the same slope as a line going through the endpoints of the interval.	Mean Value (Theorem) (accept MVT)

Question #5: Literature & Language Arts – World Literature

15 points

To help out his former employer, this figure helps Valentine fake her death. He gets help from the daughter of Ali Pasha, who was betrayed by one of his enemies. In the resulting trial at the Chamber of Peers, that enemy is found guilty of treason. He goes ashore following the death of Captain Leclere, where he receives a letter addressed to Noirtier. After the death of a friend, he puts himself in the body bag, which is then tossed into the sea. Caderrouse, Danglars, and Fernand Mondego conspire to do in this figure, and afterwards Mondego ends up marrying his love, Mercedes. Name this protagonist who assumes many names in *The Count of Monte Cristo*.	Edmond Dantes [prompt partial answer, accept "The Count of Monte Cristo" until mentioned, accept Abbe Busoni and Lord Wilmere until protagonist]

Question #6: Social Studies – World History

15 points

Near the end of his career, this person arbitrated a conference to work out the Ethiopian border before English and Italian Somaliland declared their independence, while near the beginning he had ordered all ships in his country to leave to escape the Nazis. This person recruited Ralph Bunche to work for him and then gave Bunche a major role in negotiations over Palestine. This person resigned from his most famous role after being accused of hiring disloyal Americans, and he had already gone unrecognized by the Soviet Union due to his actions leading up to the Korean War. Name this Norwegian who served as the first Secretary-General of the United Nations.	(Trygve) Lie

Question #7: Science – Biology

10 points per part

Answer these questions about a process similar to respiration:		
1	By what process similar to anaerobic respiration often performed by yeast do cells convert energy without an electronic transport chain?	Fermentation (accept other word forms)
2	That process is sometimes used to produce which acid also known as milk acid?	Lactic (Acid) (do not accept Lactose)
3	What genus of yeast do baker's yeast and brewer's yeast come from?	Saccharomyces

Question #8: Science – Biology

10 points per part

Answer these questions about the uterus:		
1	What tubes run from the ovaries to the uterus?	Fallopian (tubes)
2	During pregnancy, which organ develops in the uterus along with the fetus, allowing transfers between the mother and the fetus?	Placenta
3	During labor, which hormone is responsible for contractions of the uterus?	Oxytocin (or Pitocin)

Question #9: Literature & Language Arts – Speech

10 points per part

Given a quote from an inaugural address, name the President who said it:		
1	The only thing we have to fear is fear itself.	F(ranklin) Roosevelt (accept FDR, prompt Roosevelt)
2	The torch has been passed to a new generation of Americans.	(John "Jack" Fitzgerald) Kennedy (accept JFK)
3	Our supreme task is the resumption of our onward, normal way.	(Warren) Harding

Question #10: Literature & Language Arts – Speech

10 points per part

Answer the following questions about the Gettysburg Address:		
1	How many years are four score and seven?	87
2	In what state is Gettysburg?	Pennsylvania
3	According to the speech, what proposition is our country dedicated to?	(That) "all men are created equal"

Question #11: Social Studies – Geography

10 points per part

Identify these Hawaiian Islands:		
1	This island is by far the most populous and contains Honolulu.	Oahu
2	This island containing Haleakala is the second largest after the Island of Hawaii and is the third most populous.	Maui
3	This island northwest of the Island of Hawaii contains the town of Hanalei and has been used to film many movies such as Jurassic Park.	Kauai

Question #12: Social Studies – Geography

10 points per part

Identify these New England cities:		
1	This is the capital of Rhode Island and home of Brown University.	Providence
2	This is the most populous city in Connecticut, located between Stamford and New Haven.	Bridgeport
3	This Massachusetts town is considered the birthplace of the industrial revolution in the United States and contains over five miles of canals.	Lowell

Question #13: Mathematics – Trigonometry

10 points per part

Find the following values for the graph of y equals three plus four times the cosine of the quantity 2x minus pi over two end quantity, where x is given in radians:		
1	Maximum y-coordinate	7
2	Least positive value of x that produces the maximum value for y	Pi/4 (or equivalent)
3	Least positive value of x that produces the minimum value for y	3Pi/4 (or equivalent)

Question #14: Mathematics – Trigonometry

10 points per part

Simplify the following expressions:		
1	The quantity one minus two sine squared of x end quantity divided by the cosine of two x	1
2	The sine of x times the tangent of the quantity x over two	1 – cos(ine) x (or equivalent)
3	The tangent squared of x minus the secant squared of x	-1

Question #15: Science – Astronomy

15 points

One of the laws named after this person states that a normal vector to the ecliptic and a normal vector to the orbital path of the moon are both perpendicular to the spin axis of the moon. His other laws state that the equator of the moon makes a constant angle with the ecliptic and that the rotation and revolution periods of the moon are equal. After Huygens discovered Titan, this person discovered the next four moons of Saturn, and he is also the namesake of the gap between the outermost rings of Saturn. Name this namesake of an orbiter now studying Saturn.	(Giovanni Domenico or Jean Dominique) Cassini

Question #16: Social Studies – Psychology

15 points

A famous example of this phenomenon is known as the Aliquis Incident, and this was originally considered a form of Fehleistung formally known as parapraxis. It was described in the book *Psychopathology of Everyday Life*, which is written by the person this concept is named after. Difficult to categorize because actions are overdetermined, this phrase refers to unintentionally revealing errors in speech. Give this phrase named after the founder of psychoanalysis.	Freudian Slip (accept parapraxis before it is mentioned)

Question #17: Literature & Language Arts – Grammar/Usage

15 points

This field of study was started by Charles Sanders Peirce, Charles William Morris, and the linguist Ferdinand de Saussure. It often involves the concept of deconstruction developed by Jacques Derrida. This field classifies anything as a text that can be looked at independently of its sender and receiver, and it examines different ways of looking at a text, including in some cases through Marxist thought. Name this field which studies the construction and maintenance of reality through what it labels as signs.	Semiotics (or Semiotic Studies or Semiology)

Question #18: Fine Arts – Classical Music & Opera

15 points

The last part of this opera, Questo è il fin, was commonly omitted in 19th Century performances. The servant of the title character in this opera opens with Notte e giorno faticar, which means night and day slave away, and he later sings Madamina, il catalogo è questo. That character, Leporello, works for the title character who kills the father of Donna Anna before being tormented by that father's ghost. Name this Mozart opera based on tales of a legendary lover.	(Il dissoluto punito, ossia il) Don Giovanni

Question #19: Mathematics – Conceptual Question

15 points

This synonym of homothecy is classified as central when this type of transformation does more than translation. This transformation can be represented by a matrix with off diagonal values equal to zero and a constant greater than one along the diagonal. It is associated with a move away from its center, which is equivalent to a vanishing point in perspective. Identify this type of transformation whose impact is to enlarge its object.	Dilation

Question #20: Science – Earth Science

15 points

These events rarely occur in very cold regions, but one of these is very similar to an ivu. One of the best-studied occurrences of this phenomenon occurred in 2003 near Rat Islands, Alaska. Scientists debate whether this occurrence in 1929 near the Saint Lawrence River was caused by a landslide. Some of the worst of these were caused by the 1883 Krakatoa eruption and the 1755 Lisbon earthquake, and the deadliest ones probably occurred in 2004 in the Indian Ocean. Give this term which is Japanese for Harbor Wave.	Tsunami(s)

Question #21: Mathematics – Algebra

10 points per part

Solve the following equations for x. For the first two equations, the left side is a power divided by another power:		
1	9 raised to the 2x power divided by 3 to the x power equals 9	2/3 (accept .6 repeating)
2	2 raised to the 2x-3 power divided by 2 raised to the x+1 power equals 2	5
3	2 raised to the x power equals one-half	-1

Question #22: Mathematics – Algebra

10 points per part

Express the following numbers using addition, subtraction, or multiplication:		
1	Express 38 as the sum of two distinct primes.	31+7 (or 7+31)
2	Express 15 as the difference of two primes.	17-2
3	Express 91 as the product of two primes.	13x7 (or 7x13)

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

10 points per part

Answer these questions about slave rebellions:		
1	In what town did John Brown capture an armory in 1859?	Harpers Ferry, ((West) Virginia)
2	Which slave led a rebellion in Virginia in 1831 that left over one hundred people dead?	(Nat) Turner
3	A slave named Jemmy started a rebellion in 1739 in South Carolina near what river?	Stono

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

10 points per part

Identify these candidates who narrowly lost Presidential elections:		
1	After several Electoral College ties, this person lost to Thomas Jefferson in 1800 in a vote in the House of Representatives. That election led to the 12th Amendment.	(Aaron) Burr
2	After a long recount and a Supreme Court case that decided how to handle Florida, this person lost the Election of 2000.	(Al) Gore(, Jr.)
3	This Major General who served under Meade at Gettysburg would have been elected if he had received eleven thousand more votes from New York.	(Winfield Scott) Hancock

Question #25: Literature & Language Arts – U.S. Literature

10 points per part

Name these works by Jack London.		
1	This book is about a dog named Buck who gets sent to Alaska.	(*The*) *Call of the Wild*
2	In this novel, Humphrey van Weyden works on a ship run by a man with the last name Larsen.	(*The*) *Sea-Wolf*
3	This dystopian novel is told by Anthony Meredith in the distant future after he finds a manuscript written by Avis Everhard.	(*The*) *Iron Heel*

Question #26: Literature & Language Arts – U.S. Literature

10 points per part

Name these Jewish American novelists.		
1	This man wrote *Portnoy's Complaint* and several books about Nathan Zuckerman.	(Philip) Roth
2	This man wrote about baseball prodigy Roy Hobbs in *The Natural*.	(Bernard) Malamud
3	This writer born with the last name Abraham won the first National Book Award for *The Man with the Golden Arm*.	(Nelson) Algren

Question #27: Science – Environmental Science

10 points per part

Answer the following questions about the Environmental Protection Agency:		
1	Which President created the EPA in 1970?	(Richard) Nixon
2	The EPA now enforces which legislation originally passed in 1963 that controls acid rain, carbon monoxide, and particulate matter pollution?	Clean Air (Act)
3	What is the common name for the Comprehensive Environmental Response, Compensation, and Liability Act which allowed the EPA to force polluters to clean up sites they contaminated?	Superfund

Question #28: Science – Environmental Science

10 points per part

Answer these questions about controversies involving coal mining:		
1	Many environmentalists oppose the use of coal because it generally creates large amounts of which greenhouse gas?	Carbon Dioxide (or CO_2)
2	What is the common name for coalworker's pneumoconiosis, a disease that impacts people exposed to large amounts of coal dust?	Black Lung (Disease)
3	What coal mining process often used in the Appalachians changes the landscape of the area being mined?	Mountaintop (Removal Mining)

Question #29: Literature & Language Arts – World Literature

15 points

In this novel, the Russian schooner *Demeter* runs ashore at Whitby. At Hampstead Heath, children wander away from home after following the Bloofer Lady. A minor character in this novel tries to consume higher forms of life in order to gain immortality. Ultimately, Renfield's death leads to the searing of the flesh of Mina Murray. One character in this novel dies of a heart attack after seeing her daughter attacked by a wolf. Van Helsing oversees the destruction of Lucy Westenra in this work, which opens with Jonathan Harker traveling to Transylvania. Name this novel by Bram Stoker about a vampire.	*Dracula*

Question #30: Social Studies – U.S. Government

15 points

This House of Representatives Committee was assigned the review of NAFTA, since it is in charge of passing all trade agreements. Currently overseen by Dave Camp of Wisconsin, it has been led in the past by James Polk, Millard Fillmore, and William McKinley. Its members are not allowed to serve on other committees, and it has no counterpart in the Senate due to the Origination Clause in the Constitution. Name this House Committee whose primary purpose is overseeing tax laws.	(House) Ways and Means (Committee)

Question #31: Science – Physics

15 points

Along with James Hartle, this physicist is the namesake of the wave equation of the universe. Additionally, his name is sometimes attached to a paradox involving the loss of quantum mechanical property information, which is not allowed by quantum theory. This paradox may have been solved by taking into account the radiation field of a black hole. This scientist is also the namesake of a possible process that lowers the energy of black holes. Name this physicist who theorized that black holes emit radiation.	(Stephen) Hawking

Question #32: Literature – U.S. Literature

15 points

This novelist wrote a play which takes place after White almost throws himself in front of a train. The protagonist in one novel by this writer joins Toadvine to go scalphunting and meets a hairless man known as Judge Holden. Another novel by this author concerns a horse and pistol stolen from Jimmy Blevins and the relationship between John Grady and Alejandra. Those works are *The Sunset Limited*, *Blood Meridian*, and *All the Pretty Horses*. Name this author who wrote about hitman Anton Chigurh in *No Country for Old Men*.	(Charles Cormac) McCarthy

Replacement Question A: Science – Biology

15 points

Defects in the creation of this protein can cause a combination of kidney failure and hearing loss known as Alport syndrome or in Ehlers-Danlos syndrome. Its structure was proprosed by Ramachandran and Kartha, known as the Madras group, as a triple helix. It is broken down by cortisol, and a lack of this protein leads to scurvy. It is the most abundant protein in the body, especially in connective tissue, and it is often used in cosmetic surgery. Name this protein used to create gelatin.	Collagen

Replacement Question B: Literature – Mythology

15 points

One weapon used by this figure was used to create the island of Corfu. That weapon was made from adamantine, and given to him by his mother. He caused the wound that led to the creation of the tree nymphs and Furies. This figure ruled during the Golden Age, but feared being overthrown. He utilized a sickle in one notable deed, which also led to the birth of Aphrodite from sea foam. Name this Titan who took over as supreme deity after overthrowing Uranus.	Cronos [accept Saturn]

Replacement Question C: Social Studies – U.S. History

15 points

This person convinced Syria to release Robert Goodman and soon after that he convinced Cuba to release twenty-two American prisoners. This person served as shadow Senator for the District of Columbia during the 1990s, and he started Operation PUSH and the Rainbow Coalition. After the assassination of Martin Luther King, this person caused controversy by wearing a bloody shirt. Name this civil rights leader who ran in the Democratic Presidential primaries in 1984 and 1988.	(Jesse) Jackson

Replacement Question D: Math – Conceptual Question

15 points

A common proof of this rule involves subtracting f of x times g of x and adding the same quantity in between two terms. That step allows g of x to be factored from the first two terms and the opposite of f of x to be factored from the last two terms, and the differences those terms are multiplied by can then be divided by h to follow the general form for simple derivatives. The entire quantity gets divided by g of x times g of the quantity x+h, which approaches g squared of x. Another method to prove this rule uses the chain rule and the product rule. Name this rule for finding a derivative when one function is divided by another function.	Quotient (Rule)

Replacement Question E: Social Studies – World History

10 points per part

Name these conferences that took place during World War Two:		
1	This conference between Roosevelt and Churchill in Newfoundland in 1941 produced a namesake charter.	Atlantic (Conference)
2	This conference, sometimes called the Crimean Conference, involved Roosevelt, Churchill, and Stalin deciding how to re-organize Europe.	Yalta (Conference)
3	This conference headed by Edward Stettinius was officially called Washington Conversations on International Peace and Security Organization. It made plans for the United Nations.	Dumbarton Oaks (Conference)

Replacement Question F: Social Studies – World History

10 points per part

Identify these countries that have found different ways of honoring Simón Bolívar:		
1	This country had a Bolivarian Revolution since electing Hugo Chavez in 1998.	Venezuela
2	Like Bolivia, this country considers Bolívar to be its first President. The heart of its capital is Plaza de Bolívar.	Colombia
3	Bolívar convinced San Martín to leave this country in 1823 and then finished the job of liberating it. One of the provinces in its La Libertad Region is named Bolívar.	Peru

Replacement Question G: Mathematics – Geometry

10 points per part

Find the following for a circle of radius ten. Ignore units:		
1	the circumference	20 Pi
2	the arclength for a central angle of seventy-two degrees	4 Pi
3	the area of inscribed square	200

Replacement Question H: Mathematics – Geometry

10 points per part

Answer the following about a parallelogram that has side lengths of four and six and has an interior angle of forty-five degrees. Ignore units:		
1	What is the perimeter?	20
2	There are two possible heights depending on which side is used as the base. What is the larger possible value of the height?	$3\sqrt{2}$
3	What is the area?	$12\sqrt{2}$