Question #1: Fine Arts

10 points

One of this painter's 1930s urban works shows a man in purple going down a staircase [pause] and is titled *Entrance to Subway.* In a possible representation of himself with his second wife Mell, this artist portrayed two very abstract moving creatures on a brown floor with a surreal white background [pause] in *Slow Swirl by the Edge of the Sea.* This artist's later works, such as *Four Darks in Red* and *Black on Maroon*, show blocks of colors that are approximately rectangular. Name this Russian-born American painter known for his "multiform" and "color field" paintings.	Mark **Rothko** [or Markus **Rothkowitz**]

Question #2: Science

10 points

Radiation from this part of the electromagnetic spectrum will be used to map the surface of the Moon when NASA sends landers there in the near future. This radiation is used in thermography [thur-MAH-gruh-fee] to detect tumors by sensing heat. This radiation is detected by missiles, such as the Falcon, which are classified as heat-seekers. Active-illumination night vision works by making this radiation visible. Blood alcohol content and the concentration of carbon dioxide in the atmosphere can be measured using spectroscopy [spek-TRAH-skuh-pee] based on this type of radiation. Name this part of the electromagnetic spectrum that has wavelengths slightly longer than those of visible light.	**infrared** or **IR** [accept near **infrared**]

Question #3: Literature

10 points

These words are a subset of a part of speech, and a further subset of these words has an epistemic [ep-ih-STEM-ik], deontic [dee-"ON"-tik], or dynamic modality. These words are part of a clause and can specify the aspect or voice of the clause. These words can make a clause active or passive, and they can also make a clause perfect or imperfect. The word "will" is this type of word when it indicates the future tense. Conjugations of "to be" and "to have" are also commonly used as these types of verbs. Name these verbs that typically accompany a main verb.	**auxiliary** verbs or **helping** verbs [or **helper** verbs or (verbal) **auxiliaries**]

Question #4: Social Studies

10 points

As a U.S. senator, this person worked with Representative Augustus Hawkins to create the Full Employment and Balanced Growth Act. Before President Kennedy was elected, this person introduced a bill to create the Peace Corps; after Kennedy's death, this person, as Majority Whip, got the Civil Rights Act of 1964 through the Senate. Early in his career, this person led the Fusion Committee that created the Minnesota Democratic-Farmer-Labor Party. Name this person who served as Lyndon Johnson's vice president and was the Democratic presidential nominee in 1968, when he lost to Richard Nixon.	Hubert (Horatio) **Humphrey** (Jr.)

Question #5: Literature

10 points

In one story by this writer, a character says "I'm Arnold Friend and that's my real name and I'm gonna be your friend, honey." In that story, this writer depicted a 15-year-old named Connie who hangs out at a drive-in restaurant. In a novel by this writer, Brock Botsford kills Bernie Malin, who loves Brock's sister, Loretta. That novel is part of this author's Wonderland Quartet, which starts with her novel *A Garden of Earthly Delights.* This author also wrote a novel about Marilyn Monroe titled *Blonde.* Name this author of "Where Are You Going, Where Have You Been?" and *them.*	Joyce Carol **Oates**

Question #6: Science

10 points

Medicines that undergo this type of reaction, such as penicillamine [pen-uh-SILL-uh-meen], which is sold as Cuprimine [KOO-pruh-meen], are given to patients with Wilson's disease. Because that medicine commonly undergoes this type of reaction, it is also useful for treating lead poisoning. This process is the main part of a medical therapy that removes heavy metals from people's bodies. The result of this type of reaction is similar to a coordination complex but has more bonds. One agent commonly used in this process when it combines with calcium and iron is E.D.T.A. Name this process that forms polydentate ligands [pah-lee-DENT-"ate" LIG-undz], which are often called cyclic, with a metal.	**chelation** [or **chelating**]

Question #7: Fine Arts

10 points per part

	This type of Latin hymn focuses on the suffering of Mary.	
1	Name this type of song whose two-word name means "mother stood."	***Stabat Mater***
2	This composer wrote a *Stabat Mater* around 1590 for Pope Gregory XIV [14]. This composer has been credited with saving polyphonic music, though that credit was probably overstated.	Giovanni (Pierluigi da) **Palestrina**
3	This Czech composer wrote another popular *Stabat Mater*; he later traveled to America, an experience that inspired his "From the New World" Symphony.	Antonín (Leopold) **Dvořák**

Question #8: Fine Arts

10 points per part

	Mozart wrote 13 pieces that were classified as this type of music, the last of which was "Eine kleine Nachtmusik" ["EYE"-nuh KLY-nuh NAHKT-moo-zeek].	
1	Give this term for classical music that is more casual than a symphony. This term traditionally applied to songs performed by men to impress women, who often listened from their balcony.	**serenade**s
2	This English composer wrote *Serenade for Tenor, Horn and Strings* at the same time that he was working on the opera *Peter Grimes*.	Benjamin **Britten**
3	Mozart's seventh serenade, like his 35th symphony, was written for this family.	**Haffner** family or the **Haffner**s

Question #9: Science

10 points per part

	Spacecraft often go near a planet or moon for a gravity assist.	
1	Mariner 10 and MESSENGER both used gravity assists from this planet on their way to Mercury.	**Venus**
2	The term "apsis" refers to an extreme point in an orbit. What word, formed by adding a prefix to the word "apsis", means the point in an orbit at which a rocket engine is the most efficient?	**peri**apsis [PAIR-ee-AP-siss]
3	Gravity flybys take advantage of the effect named after this scientist who worked in Germany. The effect states that engines are more efficient at high speeds.	Hermann **Oberth** [oh-bert] or **Oberth** effect

Question #10: Science

10 points per part

	This quantity is plotted on the y-axis of the Hertzsprung-Russell diagram.	
1	Name this quantity that is synonymous with absolute brightness and can be used to find absolute magnitude.	**luminosity**
2	The known star with the highest luminosity is in this galaxy near the Milky Way that is connected to a smaller galaxy by a bridge of gas.	**Large Magellanic Cloud** [accept **LMC**]
3	That hypergiant star, R136a1, is this type of star that can be further classified as "WN" or "WC".	**Wolf-Rayet** star

Question #11: Literature

10 points per part

	This novel begins with Monsieur Crevel riding in a carriage wearing his National Guard uniform.	
1	Name this novel in which the title character has Count Steinbock arrested at about the same time she uses Crevel to tear apart the Hulot [oo-loh] family.	*La **Cousine Bette** [lah **koo-zeen bet**] [or **Cousin Bette** or **Cousin Betty**]
2	*Cousin Bette* is part of this French author's *The Human Comedy.*	Honoré de **Balzac**
3	This Balzac novel is often paired with *Cousin Bette.* Its title character is a man who collects art.	*Le **Cousin Pons** [leh **koo-zeen pawnss**]

Question #12: Literature

10 points per part

	This novel instructs the reader: "Relax. Concentrate. Dispel every other thought."	
1	Name this novel in which The Reader and Ludmilla find many interrupted novels.	***If on a winter's night a traveler*** [or ***Se una notte d'inverno un viaggiatore***]
2	*If on a winter's night a traveler* refers to Cimmeria [sim-AIR-ee-uh] and Cimbria [SIM-bree-uh], two fictional examples of these entities.	**country**/ies [accept **nation**s]
3	This author wrote *If on a winter's night a traveler* and *Invisible Cities.*	Italo **Calvino**

Question #13: Social Studies

10 points per part

	This state's panhandle contains the city of Amarillo [am-uh-RIL-oh].	
1	Name this state between New Mexico and Louisiana.	**Texas**
2	This river goes through Waco [WAY-koh] and College Station, Texas before emptying into the Gulf of Mexico just south of Houston.	**Brazos** River [or **Brazos** de Dios]
3	The Brazos River starts near this city just south of the panhandle. Some of the tourist sites in this city honor Buddy Holly, who was born in it.	**Lubbock**, Texas

Question #14: Social Studies

10 points per part

	Some of these islands form an independent country west of the International Date Line, and some are part of an American territory east of the International Date Line.	
1	Name these islands that include the city of Apia [ah-PEE-ah] on the island of Upolu [oo-POH-loo].	**Samoa**n islands
2	This town with a repetitive name is the capital of American Samoa.	**Pago Pago** [PAHN-goh PAHN-goh]
3	This New Zealand territory, formerly known as the Union Islands, is just north of Samoa. Nukunonu [noo-koo-NOH-noo] is its largest atoll.	**Tokelau**

Question #15: Mathematics

10 points

The axiom named for this person is sometimes called "the axiom of continuity" and states that n multiples of any segment are longer than any other segment, for some number n. Just like Euclid [YOOK-lid], there are geometries named for not followinig this person's axiom. That axiom is named for this person because it must be true for the method of exhaustion, which this person used to approximate the area of a circle and the value of pi. The class of solids named for this person do not have identical sides, but they do have identical vertices and regular sides. Name this ancient Greek mathematician and scientist.	**Archimedes** [ark-ih-MEE-deez]

Question #16: Social Studies

10 points

This U.S. cabinet-level department used to support homemakers by overseeing the Bureau of Home Economics. This department became involved with education with the Smith-Lever [LEE-vur] Act of 1914, which eventually led to the establishment of cooperative extension services at land-grant universities. This department's Food and Nutrition Service administers the National School Lunch Program and the Supplemental Nutrition Assistance Program. This department also oversees food safety and rural development. Name this cabinet-level department that administers laws related to farming.	US Department of **Agriculture** or **Agriculture** Department

Question #17: Science

10 points

This process is sometimes carried out with the help of *Bacillus* [buh-SILL-uss] *subtilis moh 3*, which are electro·active bacteria. Australia uses most of the energy gained through the CETO 6 [SEE-toh "six"] program for this process. This process is the most common reason to perform multi-effect distillation or multi-stage flash distillation. This type of water purification is often done by reverse osmosis, though forward osmosis causes less fouling. Some of the biggest plants for this process are in the Middle East. This process is used by civilizations that live near oceans, seas, and some lakes. Name this process of removing minerals—especially salt—from water.	**desalination** [before "minerals", accept any reasonable answer indicating the **removal** or **salt** or **mineral**s; before "water", prompt on water **purification** or **purifying** water; before "reverse", prompt on **reverse osmosis**]

Question #18: Social Studies

10 points

The articles of this military alliance begin with a reference to Pope Paul III's Council at Mantua. This alliance was harmed by a feud between John Frederick, who was a leader in it, and his cousin Duke Maurice. While this alliance was in the process of being dissolved, it defeated Eric II and forced him to swim for his life at the Battle of Drakenburg. The big loss for this alliance was at the Battle of Mühlberg, which was a major victory for Holy Roman Emperor Charles V. This alliance worked with Martin Luther. Name this 16th-century alliance that was located in what is now Germany and was comprised of Protestant princes.	**Schmalkaldic** [shmahl-KAL-dik] **League** [or **Schmalkaldischer Bund**]

Question #19: Miscellaneous

10 points

A song about this game was the biggest hit for Buckner & Garcia. One of the sequels to this game had some intermissions showing Junior and Yum-Yum. The villains in this game are nicknamed Blinky, Pinky, Inky, and Clyde. In the feminine version of this game, the fruits moved around rather than sitting still near the center of the screen. This game's villains could be eaten when they turned blue, which happened when the title character ate a power pellet. Name this video game popular during the 1980s in which the title character goes around a maze eating dots.	**Pac-Man** [accept **Jr. Pac-Man** or **Ms. Pac-Man**]

Question #20: Literature

10 points

In one novel by this author, a woman states "My heart and my hand shall never be separated", causing a man to ask "Am I as hateful to you, as the vile Solmes?". During that novel, this author describes those characters' correspondence with Anne Howe and John Belford, respectively. In another novel by this author, the protagonist says a closet "held the worst heart in the world". When this author has Mrs. Jervis leave the room, the protagonist is attacked by Mr. B. Name this 18th-century English author who wrote the epistolary novels *Clarissa* and *Pamela*.	Samuel **Richardson**

Question #21: Science

10 points per part

	Mixtures involving this type of substance are called alloys.	
1	Name these substances that generally are shiny and are good conductors of heat and electricity.	**metal**s [or **metal**lic substances]
2	Metals generally have this property, the ability to be pulled into a wire. This property is not the same as malleability.	**ductility** or being **ductile**
3	There is some controversy as to whether this element or gold is the most ductile. This metal is in several chemotherapy drugs that are designed to destroy DNA.	**platinum**

Question #22: Science

10 points per part

	Answer the following about chemical weapons:	
1	This yellow-green diatomic gas was used as a chemical weapon in World War I.	**chlorine** [accept $\underline{Cl_2}$]
2	Mustard gas contains chlorine, carbon, hydrogen and this element. The combination of this element and hydrogen is responsible for the smell of rotting eggs.	**sulfur** [accept **S**]
3	Chlorine is present in almost all of this type of chemical weapons. They are named for the blisters they cause as a result of chemical burns.	**vessicant**s

Question #23: Mathematics

10 points per part

	This theorem and the extreme value theorem can be proven from the least upper-bound property.	
1	Name this theorem stating that if a function is continuous on the interval from a to b, it takes every value between "f of a" and "f of b".	**intermediate value** theorem [accept **IVT**]
2	This corollary of the intermediate value theorem states if a continuous function takes on positive and negative values in an interval, it must have a root in that interval.	**Bolzano**'s theorem
3	Find the value of x predicted by Bolzano's theorem for the function "sine of x" based on the fact that the sine of 9 pi over 4 is positive [pause] and the sine of 23 pi over 6 is negative.	**3 pi** [do not prompt on partial answers]

Question #24: Mathematics

10 points per part

	These diagrams are used to show solutions to differential equations.	
1	Name these diagrams which consist of many short segments plotted on a graph.	**slope field**s [accept **direction field**s]
2	Slope fields are used to visualize this family of methods to approximate solutions to differential equations. Euler's [OY-lur'z] method is a simple example of this type of method.	**Runge-Kutta** [ROON-guh KOO-tuh] methods
3	Give the y-coordinate of the horizontal segments on a slope field showing solutions to the equation "y prime equals the natural log of y".	$y = \underline{\mathbf{1}}$

Question #25: Social Studies

10 points per part

	Name these Nobel Peace Prize laureates:	
1	This person, who was born in what is now North Macedonia, was a nun who did charity work in Kolkata, India.	**Mother Teresa** [or Mary Anjezë **Bojaxhiu**]
2	This person was awarded the prize for her non-violent work but more recently has not controlled violence as the head of Myanmar.	Aung San **Suu Kyi** [awng san **soo chee**] [prompt on **Suu** or **Kyi** but do not accept or prompt on other partial answers]
3	This person received the prize when she was the President of Liberia.	Ellen **Johnson Sirleaf** [accept either underlined name]

Question #26: Social Studies

10 points per part

	After brief terms by Yuri Andropov and Konstantin Chernenko, this person became the leader of the Soviet Union.	
1	Name this final Soviet leader who was in charge when several Eastern European countries became more independent.	Mikhail **Gorbachev**
2	Gorbachev promoted a policy of *perestroika*, which means "restructuring", and this policy, whose Russian name means "openness".	**glasnost**
3	Eduard Shevardnadze [shev-urd-NAHD-zhuh], who was Gorbachev's Minister of Foreign Affairs, became the leader of this country until its Rose Revolution.	**Georgia** [or **Sakartvelo**]

Question #27: Literature

10 points per part

	In this novel, Lestrade and Gregson are falsely given credit for figuring out who murdered Joseph Stangerson.	
1	Name this novel that involves Lucy's wedding ring and the German word for "revenge" written on a wall.	*A **Study in Scarlet***
2	This detective is the person who actually figures out who the murderer is, as he does in many stories and novels by Arthur Conan Doyle.	**Sherlock Holmes** [accept either]
3	In this Sherlock Holmes novel, some characters believe in a supernatural black dog that terrorizes generations of a family.	*The **Hound of the Baskervilles***

Question #28: Literature

10 points per part

	In this novel, Blore is killed when a heavy clock falls on him.	
1	Name this novel that involves ten figurines on a table on a remote island. The figurines break as the visitors to the island are killed one at a time.	***And Then There Were None***
2	*And Then There Were None* was written by this English writer of *The Mousetrap*.	Agatha (Mary Clarissa **Miller**) **Christie** [accept either underlined name]
3	Christie wrote many novels featuring the detective Hercule Poirot [air-kyool pwah-roh], including one named for the murder of this fiancé of Mrs. Ferrars.	**Roger Ackroyd** [accept either]

Question #29: Science

10 points

One example of this type of organelle is targeted by doxycycline ["dock-see"-SYK-lin], which treats malaria. In the past decade, scientists discovered an organelle of this type that produces tannin [TAN-in]. Another organelle in this category is responsible for forming and storing starch. Those examples of these organelles are colorless, but some of these organelles have color—some of these organelles give fruits and flowers their colors. These organelles exist in auto·trophic [awt-oh-TROH-fik] eukaryotes ["you-CARRY-oats"], and the best known examples of them are green. Name this class of organelles that includes chloroplasts [KLOR-oh-plasts].	**plastid**s [prompt on **apicoplast**s or **leucoplast**s or **tannosome**s or **amyloplast**s or **chloroplast**s]

Question #30: Mathematics

10 points

A theorem named for this person was extended by Frederick Soddy to spheres and gives a quadratic equation for the reciprocals of the radii of four mutually tangent circles. This person and Leonhard Euler [OY-lur] stated equivalent theorems about polyhedra [pah-lee-HEE-druh]; this person's version states that the total defect of a polyhedron [pah-lee-HEE-drun] is 4 pi radians. The number of sign changes in a polynomial is used to find the maximum number of positive roots using this person's "rule of signs". Name this French mathematician who developed analytic geometry, which is why the rectangular coordinate system is referred to using an adjectival form of this person's name.	René **Descartes** [ren-ay **day-kart**] [or Renatus **Cartesius**; prompt on **Cartesian**]

Question #31: Social Studies

10 points

A few decades after this law was passed, Congressman Richard Poff expanded it to apply to actions outside the U.S. This law was the main subject of *Gorin v. U.S.*, which determined that this law could be applied to people who did not harm the U.S. Another Supreme Court decision over this law used the phrase "shouting fire in a theater." That 1919 case was *Schenck v. U.S.*. The Supreme Court also ruled that this law was used properly against Eugene Debs. This law was extended by the Sedition Act of 1918. Name this act that prohibited some speech that is disloyal to the United States.	**Espionage** Act of 1917

Question #32: Literature

10 points

This character has a dream in which the king of the sea says "The court summons you. Why do you not go?". That dream, following a huge storm, causes this character to leave the Suma coast. This character, who is the son-in-law of the Minister of the Left, impregnates his stepmother, and their son becomes a national leader. This character had many affairs, including ones with Reikeiden [ray-kay-den] and her sister, the Lady of the Orange Blossoms. This character's first wife was Lady Aoi [ow-ee], and after she died he treated Lady Murasaki as though she were his wife. Name this protagonist of Murasaki Shikibu's novel that was written in the 11th century in Japan.	Prince (**Hikaru**) **Genji** [accept either underlined name; prompt on **Minamoto**]

Extra Question #1: Science

10 points

This is the most common drug that is used to activate adenyl cyclase [AD-uh-nill "SIGH"-klayss] and lower intra·cellular ionic calcium concentrations. Though it is not this drug's most common purpose, this drug can be used with a nebulizer to treat hyperkalemia ["hyper"-kuh-LEE-mee-uh]. Like procaterol [proh-KAT-uh-rawl] and ritodrine [RIT-uh-dreen], this medicine is a short-acting beta-2 adrenergic agonist; this medicine is much more common than the others. Patients taking this medicine are supposed to hold their breath for 10 seconds before exhaling. Name this commonly used broncho·dilator [BRAHN-koh-"dilator"] that is taken—sometimes through an inhaler—to control asthma attacks.	**albuterol** [al-BYOO-tuh-rawl] [or **salbutamol** or **Ventolin** or **Proventil**; prompt on **bronchodilator**]

Extra Question #2: Mathematics

10 points

A method for generating some of these structrures is named for Ralph Strachey [STRAY-chee]. When these structures satisfy extra conditions, they are classified as "diabolical" or "pandiagonal". The sum used in these structures equals one-half n times the quantity "n squared plus 1", where n is the size. When this type of structure has an odd-number size, then the number in the center is the average value of all the numbers in the structure. In the 3-by-3 version of this type of structure, there are eight ways to get a sum of 15. Name this arrangement of numbers in which each row, column, and diagonal has the same sum.	**magic square**s

Extra Question #3: Social Studies

10 points

Years before the Nuremberg trials, some German soldiers were tried in this city for mistreating prisoners during World War I. This city's St. Nicholas Church was the initial site of the Monday demonstrations against the East German government that started in 1989. This city is just outside of Breitenfeld, which was the site of two victories for Sweden during the Thirty Years' War. This city was also the site of a massive battle, featuring 600,000 soldiers, that forced Napoleon to return to France shortly before he was exiled to Elba. Name this German city that in 1813 was the site of the Battle of the Nations.	**Leipzig**, Saxony, (East) Germany

Extra Question #4: Literature

10 points

After the protagonist of this novel "slept through the day and night in his grandfather's house", he walked through town and all the dogs barked. After the protagonist of this novel remembers seeing an eagle flying with a snake, this novel gives a brief history of the Eagle Watchers Society. Part of this novel is set in Los Angeles six years after the murder of Juan Reyes, an albino nicknamed "the white man". Francisco, who is the grandfather of the protagonist, dies at the end of this novel. Name this novel about a World War II veteran returning to New Mexico to live on a reservation, written by N. Scott Momaday.	***House Made of Dawn***

Extra Question #5: Fine Arts

10 points

In Linz ["lints"] in the 1860s, this composer wrote masses numbered 1 through 3, though he wrote some simpler masses in the 1840s such as the *Windhaager Messe* [VINT-hah-gur mess-uh]. This composer received many rounds of applause at the 1884 premier of his seventh symphony, which supposedly has a cymbal clash to symbolize the death of Richard Wagner [REEK-hart VAHG-nur]. There are several versions of this composer's second symphony, which is nicknamed "Symphony of Pauses", because he often revised his own symphonies. Name this Austrian composer whose fourth symphony is nicknamed *Romantic* and whose two early symphonies are referred to as *Unknown* and "Number Zero".	(Josef) Anton **Bruckner**

Extra Question #6: Science

10 points per part

	This act was done via somatic [soh-MAT-ik]-cell nuclear transfer to create Dolly the sheep in 1996.	
1	Name this process that creates an organism that is genetically identical to a single parent.	reproductive **cloning** [or making a **clone**]
2	Cloning proved that somatic cells could regain this trait of cells that are capable of giving rise to several different cell types.	**pluripotency** [plur-ih-"potency"] or **pluripotent** cells
3	In 2018, two primates of this type were cloned in China.	(crab-eating) **macaque**s [muh-"COCK"] [or ***Macaca*** *fascicularis* or long-tailed **macaque**s; prompt on Old World **monkey**s]

Extra Question #7: Science

10 points per part

	This display is often made for genetic testing and uses a Giemsa [GIM-suh] stain.	
1	Name this display of an organism's chromosomes.	**karyotype**(s) [accept **karyotyping**]
2	Karyotyping is usually done on cells in this phase of mitosis, before ana·phase.	**meta·phase**
3	This genetic test, which uses fluorescence to find chromosomal abnormalities, was developed during the 1980s and can be used in spectral karyotyping.	**FISH** [or **fluorescence in situ hybridization**]

Extra Question #8: Social Studies

10 points per part

	There have been several attempts to add a balanced budget amendment to the Constitution.	
1	This author of the Declaration of Independence and third U.S. president said that if he could have one amendment, it would be for a balanced budget.	Thomas **Jefferson**
2	This senator wrote a Balanced Budget Amendment that passed the Senate in 1982 but failed in the House. This person ran for president in 1948 as the States' Rights Democratic Party candidate.	(James) Strom **Thurmond** (Sr.)
3	A balanced budget amendment was promised in this document written by Newt Gingrich and Dick Armey to promote Republicans during the 1994 Congressional elections.	**Contract with America**

Extra Question #9: Social Studies

10 points per part

	This president increased the size of the United States by agreeing to the Gadsden Purchase, which was named after his ambassador to Mexico.	
1	Name this president who became unpopular after signing the Kansas-Nebraska Act. The Democrats nominated James Buchanan in 1856 instead of re-nominating this President.	Franklin **Pierce**
2	This person, who served as Pierce's secretary of war, later became the president of the Confederate States.	Jefferson (Finis) **Davis**
3	The Pierce administration was weakened by the publication of this document that said the U.S. should buy Cuba or take it over by force.	**Ostend Manifesto** [or **Ostend Circular**]