



Question #1: Literature – Mythology

10 points

<p>According to Incan myth, the goddess of this entity cried tears of silver and was the mother of the first governor of Cusco [KOOZ-koh], Manco Cápac. According to Norse myth, Hati chases this thing and will consume it during Ragnarök. In Chinese myth, Chang'e is the goddess of this object, the embodiment of yin. By defeating the god of this thing, Thoth won an extra five days on the calendar. In Shinto myth, this thing is represented by Tsukiyomi [soo-kee-yoh-mee]. Name this celestial object represented by Luna in Roman mythology.</p>	<p>the moon [accept Luna before “Luna”]</p>
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Question #2: Science – Physics

10 points

<p>After this person abandoned his pilot wave theory, David Bohm rediscovered and improved it. An independent confirmation of this person's theory led to a Nobel Prize for J. J. Thomson's son George. This person's theory was also confirmed by an experiment in which electrons were scattered by a crystal of nickel, conducted by Clinton Davisson and Lester Germer. This person asserted that for any particle, Planck's constant over momentum equals his namesake wavelength. Name this scientist who described wave properties of matter.</p>	<p>Louis (-Victor-Pierre-Raymond) de Broglie [duh BROY-lee]</p>
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Question #3: Social Studies – U.S. History

10 points

<p>In one speech, this person said “I hate all White people. You are thieves and liars.” Because the white people at the speech did not understand him, they gave him a standing ovation. One of this person’s military victories followed a vision he had of grasshoppers falling from the sky. This person was eventually killed as part of the efforts of Nelson Miles to end the Ghost Dance Movement. This leader’s efforts were often supported by Crazy Horse. Name this leader of the Hunkpapa Lakota whose troops at the Battle of the Little Bighorn killed George Custer.</p>	<p><u>Sitting Bull</u> [or <u>Tatanka Iyotake</u>, prompt on partial answers]</p>
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Question #4: Fine Arts – Composers of the Modern Era

10 points

<p>This composer’s <i>Double Concerto for Violin and Cello and Orchestra</i> was written for Maria Bachmann and Wendy Sutter, the latter of whom he worked with on <i>Songs and Poems for Solo Cello</i>. This composer was a supporter of Tibetan independence, writing the score for the movie <i>Kundun</i>, and he also wrote the scores for <i>The Hours</i> and <i>Koyaanisqatsi</i> [koh-yah-nis-KAHT-see]. This person’s “Portrait Trilogy” is a set of three operas about important men; one of them has acts that refer to Leo Tolstoy, Rabindranath Tagore, and Martin Luther King, Jr. Name this composer of <i>Satyagraha</i>, <i>Akhnaten</i>, and <i>Einstein on the Beach</i>.</p>	<p>Philip (Morris) <u>Glass</u></p>
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Question #5: Science – Health

10 points

<p>People with Bartter syndrome have too little of this mineral. The hormone aldosterone [al-doh-“STAIR-own”] causes this mineral to be released into the urine, and a decrease in magnesium in the body is often followed by a decrease in this mineral. Levels of this mineral and magnesium are checked when people have heart arrhythmias [uh-RITH-mee-uhz]. Too little of this mineral, along with magnesium and calcium, can cause muscle cramping. Channels that regulate this mineral in cells are often activated by calcium and work in tandem with sodium channels. Name this mineral that is too low in people with hypokalemia [“high”-poh-kuh-LEE-mee-uh].</p>	<p>potassium ions [or K⁺ [“K plus”]]</p>
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Question #6: Literature – World Literature

10 points

<p>Much of this poet’s work is found in Anne Carson’s “If Not, Winter”. In a poem by Charles Baudelaire [sharl boh-duh-lair], the speaker says that Venus was jealous of this author, who “departed to find out if the sea is indulgent and kind.” Catullus adapted this writer’s poem “He seems to me equal to the gods”. This author of “Ode to Anactoria” referred to the goddess of love as “subtle of soul and deathless” in her only complete extant poem, “Ode to Aphrodite”. Name this Greek poet from Lesbos.</p>	<p>Sappho (of Lesbos)</p>
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Question #7: Fine Arts – Art History

10 points per part

In this painting, a naked girl lies on a bed, and a person dressed in black is next to the bed.		
1	Name this 1892 painting set in Tahiti.	<i><u>Spirit of the Dead Watching</u></i> [or <i><u>Manao tupapau</u></i> or <i><u>The Spirit of the Dead Keep Watch</u></i>]
2	<i>Spirit of the Dead Watching</i> is by this artist. He also painted <i>The Yellow Christ</i> .	(Eugène Henri) Paul Gauguin [goh-gan]
3	A lower corner of one Gauguin painting states “Nafea Faa ipoipo”. Based on that inscription, one of the two women in the painting is asking the other when she will take this action.	getting married or marrying or having a wedding [accept variations]

Question #8: Fine Arts – Art History

10 points per part

Jules Hardouin-Mansart [zhool ar-dwan man-sar] was the chief architect for Louis XIV [14].		
1	Much of Mansart’s work was for this palace outside of Paris. He also designed the Grand Trianon and the Orangerie [or-awn-zhur-ee] that this palace overlooks.	Palace of Versailles [vair-“sigh”] [or Château de Versailles]
2	Mansart also designed this room at Versailles which contains Charles Le Brun’s painting <i>The King Governs by Himself</i> .	The Hall of Mirrors [or Grande Galerie or Galerie des Glaces]
3	Mansart helped Libéral Bruant [lee-bair-al broo-awn] with this building that originally was a home for veterans. A chapel with a large dome was added soon after it was built, and it is now the burial place of Napoleon.	Les Invalides [lay zahn-vah-lee] [or Hôtel national des Invalides]



Question #9: Science – Biology

10 points per part

This division includes the <i>Aspergillus</i> [as-pur-JIL-us] genus, which is responsible for many fungal infections.		
1	Identify this division commonly referred to as “sac fungi” due to structures that form in their sexual phase.	Ascomycota [ASS-koh-my-KOH-tuh] or ascomycetes [ASS-koh-MY-seets]
2	Ascomycetes are used to make this drug; it became the first antibiotic when Alexander Fleming discovered it.	penicillin [or Penicillium]
3	This genus of ascomycetes includes baker’s yeast, which is the species <i>cerevisiae</i> [sair-uh-VEE-see-ee].	Saccharomyces [SACK-uh-row-MY-sees]

Question #10: Science – Biology

10 points per part

This organ is just above the prostate in men, and it can be impacted by an enlarged prostate.		
1	Name this hollow elastic organ that collects urine from the kidneys.	(urinary) bladder
2	These tubes take urine from the kidneys to the bladder. They can get blocked by kidney stones, which is very painful.	ureters [yur-EET-urz or YUR-ih-turz]
3	The contraction of this muscle releases urine from the bladder. Problems with this muscle cause an overactive bladder.	detrusor [dih-TROO-zur] (urinae) muscle [prompt on muscularis propria]



Question #11: Literature – U.S. Literature

10 points per part

This former high-school athlete briefly abandons his family to live with Ruth Leonard.		
1	Name this Magipeel [MAJ-uh-“peel”] salesman. In a novel whose title says that this character <i>Is Rich</i> , his wife, Janice, inherits her father’s Toyota dealership.	Harry “Rabbit” Angstrom [accept any]
2	“Rabbit” Angstrom appears in a series of novels by this author.	John (Hoyer) Updike
3	When Rabbit runs away from his pregnant wife and young son, he goes to visit this man, his former high school basketball coach.	Marty Tothero [accept either]

Question #12: Literature – U.S. Literature

10 points per part

This novel’s title character receives a briefcase that he believes holds a scholarship, but instead contains a vulgar message.		
1	Identify this novel whose unnamed title character is subjected to experimentation following an accident at a paint factory. He escapes the wrath of Ras the Destroyer by disguising himself with a hat and glasses.	<i>Invisible Man</i>
2	This author of <i>Invisible Man</i> wrote the essay “An Extravagance of Laughter,” which is in the collection <i>Going to the Territory</i> .	Ralph Waldo Ellison
3	Ellison’s other novel, <i>Juneteenth</i> , is about this racist senator who started out as a preacher named Bliss Hickman.	Adam Sunraider [accept either]



Question #13: Social Studies – World History

10 points per part

This battle took place a month after the Battle of Alma, during the Siege of Sevastopol.		
1	Name this battle that included the Charge of the Light Brigade.	Battle of <u>Balaclava</u>
2	The Battle of Balaclava took place during this war. It occurred on, and is named for, a peninsula that extends into the Black Sea.	<u>Crimean</u> War [accept <u>Crimean</u> Peninsula]
3	The Charge of the Light Brigade was blamed on a miscommunication between Lieutenant General Lucan and this British field marshal.	FitzRoy <u>Somerset</u> , 1st Baron <u>Raglan</u> [accept either underlined name]

Question #14: Social Studies – World History

10 points per part

The union of Austria-Hungary lasted from 1867 to 1918, dissolving at the end of World War I.		
1	For almost its entire history, Austria-Hungary was headed by this emperor. He died in 1916.	<u>Franz Joseph I</u> or <u>Francis Joseph I</u> or <u>Ferenc József I</u> [prompt on partial answer]
2	This nephew of Franz Joseph was the heir apparent until he was assassinated in Sarajevo [sar-ah-YAY-voh] in 1914.	<u>Franz Ferdinand</u> (Carl Ludwig Joseph Maria) [prompt on partial answer]
3	Franz Ferdinand became the heir apparent after Franz Joseph's only son, Rudolph, killed his mistress and himself at this hunting lodge.	<u>Mayerling</u>



Question #15: Mathematics – Math Concepts

10 points

In linear algebra, this term refers to a “space” that is the same as the kernel, and is the set of vectors that map to the zero vector under a transformation. Tony Hoare [hor] invented a type of “reference” in programming languages that is described by this term, which he called his “billion-dollar mistake” and which represents the absence of anything. This adjective is also used to describe a hypothesis that is assumed to be true until there is evidence against it; such hypotheses often state that there is no relationship between two variables. Name this synonym of “empty”; “empty set” used to be synonymous with a set described by this term.

null [accept longer answers]

Question #16: Social Studies – U.S. History

10 points

This city’s first mayor was Pieter Schuyler [SKY-ler], and Alexander Hamilton was married at its Schuyler Mansion. This city was at the northern end of the route taken by the *Clermont*, the early steamboat developed by Robert Fulton. An early plan to create a government for all 13 colonies was named for this city and was supported by the “Join, or Die” political cartoon that Benjamin Franklin published. Franklin presented the plan at a Congress in this city in 1754. Name this city on the Hudson River that is the capital of New York.

Albany, New York



Question #17: Miscellaneous – Journalism

10 points

<p>This organization is tasked with producing and delivering the Reference News, as well as the Internal Reference report to high-ranking ministers. This is the only foreign news agency allowed to operate in Laos. This organization drew controversy during its slow response to the 2003 SARS outbreak. CNN drew this agency's ire when it used the images of Nepalese police during coverage of the 2008 Tibetan riots. Name this official press agency of the Chinese government.</p>	<p><u>Xinhua</u> [<u>sheen-hoo-ah</u>] News Agency [accept <u>Xinhuashe</u> or <u>New China</u> News Agency]</p>
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Question #18: Science – Chemistry

10 points

<p>Trouton's rule allows the prediction of a substance's enthalpy of vaporization if this quantity is known. If this value for a mixture is not between this value for its parts, then the mixture is an azeotrope [AY-zee-oh-"trope"]. If the parts of a mixture have very similar values of this property, it should be distilled fractionally instead of simply. The normal type of this quantity is the temperature at which the vapor pressure of a liquid is one atmosphere. Give this term for the temperature at which a liquid changes into a gas.</p>	<p>boiling point</p>
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Question #19: Social Studies – Religion

10 points

A novice in this religious movement is supposed to follow a director “like a corpse in the hand of the washer”. The novice or pupil in this movement is the *murid*, and the director is the *pir*. This movement has played a central role in the development of *ghazal* poetry. A popular part of this movement is the Mevlevi Order, which uses dance in its religious ceremonies. Many members of this movement refer to the wool members used to wear by calling themselves Tasawwuf. The spinning that goes with many of this group’s ceremonies have led to some members being called “whirling dervishes”. Name this mystical movement in Islam.

sufism [or sufist movement; accept Tasawwuf before it is mentioned; prompt on Islam or Muslim religion before the end; prompt on mysticism or prompt on whirling dervishes]

Question #20: Literature – Grammar/Usage

10 points

In describing an action and its reversal, some languages have a “discontinuous” form of this tense. In French, an auxiliary “avoir” [ahv-war] or “etre” [et-ruh] is used for conjugation into this tense. The perfective aspect of this tense is referred to as the preterite [PRET-ur-it], while the imperfect implies ongoing action. The perfect aspect involving this tense is called pluperfect. Interrogative sentences in this tense often start with ‘did’. Name this verb tense that is used for actions that have already happened.

past tense



Question #21: Mathematics – Algebra

10 points per part

The lowercase form of this Greek letter is used to represent standard deviation.		
1	Name this Greek letter whose capital form denotes repeated addition.	<u>sigma</u>
2	Evaluate the sum, as k goes from 5 to 6, of the expression $3k$.	<u>33</u>
3	Find the sum of the first 19 positive integers.	<u>190</u>

Question #22: Mathematics – Algebra

10 points per part

This property is named for the fact that functions like x^2 [<i>“x squared”</i>] and x^{10} [<i>“x to the tenth power”</i>] have it, though other functions — like the cosine of x — have it too.		
1	Give this term for a function that, graphically, means the function’s graph is symmetric when flipped over the y -axis.	<u>even</u> function or <u>evenness</u> or <u>even</u> symmetry
2	Suppose $f(3) = 6$ [<i>“f of 3 equals 6”</i>] and $g(-3) = 7$. If f and g are both even functions, find the value of f plus g of -3 .	<u>13</u> [do not accept “-13”]
3	If h is both even and odd, and it is defined everywhere, find the value of $h(9)$ [<i>“h of 9”</i>].	<u>0</u>



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

10 points per part

Congress uses a committee system to edit bills and determine which ones will get worked on by the entire House or Senate.		
1	Name the committee in the House of Representatives where all tax bills begin.	Committee on <u>Ways and Means</u> or [or <u>Ways and Means</u> Committee]
2	Both chambers of Congress use a committee with this name for discretionary-spending legislation. These committees are separate from the Budget Committees.	Committee on <u>Appropriations</u> [or <u>Appropriations</u> Committee]
3	In each chamber, the committee with this name is the only committee with an equal number of Democrats and Republicans. The others have more members from the majority party.	Committee on <u>Ethics</u> [or <u>Ethics</u> Committee]

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

10 points per part

Give these legal terms in Latin.		
1	This phrase, meaning “you have the body”, refers to a writ demanded by a person questioning whether they are being imprisoned legally.	writ of <u>habeas corpus</u>
2	This phrase, meaning “of its own will”, describes actions by a court that are not requested by either party.	<u>sua sponte</u> [or <u>suo motu</u> or <u>nostra sponte</u>]
3	This phrase means “friend of the court”. It is used to describe briefs written by people not directly involved in a case.	<u>amicus curiae</u> [or <u>amici curiae</u>]



Question #25: Science – Physics

10 points per part

This phenomenon was first noticed by looking at pollen grains in water under a microscope.		
1	Name this random movement of particles suspended in a fluid. Albert Einstein explained it.	<u>Brownian</u> motion [or <u>pedesis</u> ; accept <u>Brownian</u> movement]
2	The study of Brownian motion was one of several ways that Jean-Baptiste Perrin [zhahn bap-teest pair-an] approximated this large physical constant.	<u>Avogadro</u> constant or <u>Avogadro</u> 's number
3	Einstein used this coefficient in his derivation. In Brownian motion, this coefficient equals the root-mean-square average of displacement divided by twice the time.	<u>diffusion</u> coefficient or coefficient of <u>diffusion</u>

Question #26: Science – Physics

10 points per part

John Bardeen shared two Nobel Physics Prizes.		
1	Bardeen shared the 1956 prize with William Shockley and Walter Brattain for inventing these semiconductor devices. They are used to switch or amplify signals.	<u>transistors</u>
2	Bardeen shared the 1972 prize with Leon Cooper and John Schrieffer for a theory of these materials that do not have any electric resistance.	<u>superconductors</u>
3	Bardeen spent over 25 years as a professor of electrical engineering at this university. This school's National Center for Supercomputing Applications invented the first major web browser, Mosaic.	University of <u>Illinois</u> at Urbana-Champaign [or <u>UIUC</u> or <u>U of I</u>]



Question #27: Literature – Mythology

10 points per part

The doors of this god's temple were closed in times of peace, and open in times of war.		
1	Name this two-faced father of Tiberinus, the god of doorways.	Janus [JAY-nuss]
2	Janus made a hot spring erupt from underground to put off the invasion of Rome that had been prompted by the kidnapping of these people.	Sabine women [prompt on Sabines ; accept Sabine virgins]
3	Janus' wife, Juturna, is the sister of this Rutulian and jilted fiance of Lavinia.	Turnus

Question #28: Literature – Mythology

10 points per part

Answer the following about the Churning of the Ocean.		
1	It followed a great flood in the story of this religion. According to this religion, the soul — called <i>atman</i> — is influenced by illusions called <i>maya</i> .	Hinduism
2	To facilitate the Churning, Vishnu took the form of Kurma, one of these animals. In Greek myth, Hermes used parts of one of these amphibians to make the first lyre.	turtles [accept tortoises]
3	The churning of the ocean explains the origin of <i>amrita</i> , a substance that grants this quality to the gods.	immortality [or eternality ; accept any answer indicating living forever]



Question #29: Mathematics – Math Concepts

10 points

If you start with a segment AB [“A B”], then the locus of points P such that angle PBA is twice the measure of angle PAB forms one of these shapes, a fact was used by Pappus [PAP-uss] of Alexandria to trisect angles. Some “rectangular” types of this shape are formed by setting the product of the x and y coordinates equal to a constant, in which case the conjugate and transverse axes both make 45-degree angles with the axes, and the eccentricity is $\sqrt{2}$ [“the square root of 2”]. Name this type of conic section with two branches and two asymptotes [“ASS-imp-totes”].

hyperbola(s)

Question #30: Literature – U.S. Literature

10 points

David Shulman wrote a sonnet about this person in which each line is an anagram of the title. In *I Know Why the Caged Bird Sings*, the protagonist attends a high school named for this man. The last published work of Washington Irving was a five-volume biography of this man. Shortly after this person died, he was the subject of a biography by Parson Weems that started several legends about him. One poem dedicated to this person called for “a crown, a mansion, and a throne that shined” to be given to this man. Name this subject of the poem “To His Excellency” by Phillis Wheatley.

George Washington



Question #31: Science – Biology

10 points

In the intermembrane space that surrounds these structures, there is no **oxidative phosphorylation** ["OX"-ih-day-tiv fahss-for-ih-LAY-shun]. The genus *Chlamydomonas* [kluh-MID-oh-MOH-nuss] is unusual for having exactly one of these structures and having it shaped like a bowl enclosing the nucleus. The name of *Spirogyra* [spy-roh-JY-ruh] comes from the shape of this structure in it. These structures have their own DNA, which is encoded to create **RuBisCO** [roo-BISS-koh]. These structures are very similar to **cyanobacteria** ["sigh"-AN-oh-"bacteria"] but are part of more complex organisms. Name these organelles that conduct photosynthesis in plants.

chloroplasts
[KLOR-oh-plasts]

Question #32: Social Studies – World History

10 points

A recent president of this country is the daughter of a man who came to power in the May 16 coup in 1961 and was killed by its central intelligence director in 1979. The 2000 Nobel Peace Prize went to the president of this country for implementing a Sunshine Policy that increased communication with its rival. This country's first president, who resigned following protests over the 1960 elections, was the strong anti-communist Syngman Rhee. This country's corporations include POSCO, Hyundai, and Samsung. Name this capitalist country that borders the Demilitarized Zone.

South Korea [or
Republic of Korea or
ROK; prompt on **Korea**]



Extra Question #1: Fine Arts – Classical Music & Opera

10 points

This composer's "O let me weep" is often called "The Plaint", and appears in his *The Fairy-Queen*, which is based on Shakespeare's *A Midsummer Night's Dream*. This composer's semi-opera *King Arthur* is based on a libretto by John Dryden. Benjamin Britten adapted a theme by this composer into *The Young Person's Guide to the Orchestra*; that theme came from this composer's *Abdelazer* suite. This composer wrote the music for the funeral of Mary II of England. Name this English Baroque composer whose only complete opera, based on a work by Virgil, is *Dido and Aeneas*.

Henry **Purcell**

Extra Question #2: Mathematics – Math Concepts

10 points

One of this person's theorems stated but did not prove that every positive integer can be written as the sum of three or fewer triangular numbers, four or fewer square numbers, and so on, a statement now called his polygonal number theorem. The prime numbers named for this person have a definition kind of similar to that of Mersenne primes, and can be written in the form "1, plus 2 to the 2 to the k ", though most such numbers are not prime. The statement that modulo any prime number p , any number a is congruent to a to the p , is called this mathematician's "little theorem". Name this French mathematician whose "last theorem" was proved by Andrew Wiles.

Pierre de **Fermat**
[fair-mah]



Extra Question #3: Literature – British Literature

10 points

<p>This phenomenon is asked to “make me thy lyre” and to “be the comrade of thy wanderings over heaven”. This phenomenon is called a “Destroyer and Preserver” after it is addressed as a “Wild Spirit”. “The sapless foliage of the ocean” knows the voice of this phenomenon, which is called “the trumpet of a prophecy”. This phenomenon is addressed as “breath of Autumn’s being”, and the poem named for it ends with the line “if winter comes, can spring be far behind?”. Name this natural subject of an ode by Percy Shelley.</p>	<p>the <u>West Wind</u> [prompt on <u>wind(s)</u>]</p>
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Extra Question #4: Science – Chemistry

10 points

<p>NASA’s Phoenix lander and Mars Reconnaissance Orbiter found salts with this anion [AN-“ion”], which may explain why water was able to flow at very low temperatures. This anion blocks thyroid function, which may cause issues for long-term living on Mars. Nitrate and this ion are often combined with ammonium [uh-MOH-nee-um] to make propellants for rockets and missiles. This ion is the least reactive oxidizer of the chlorate [KLOR-“ate”] ions, and it has more oxygen atoms than the other chlorates. Name this ion with a –1 charge, which consists of four oxygen atoms surrounding a chlorine atom.</p>	<p><u>perchlorate</u> [before “four”, accept ClO_4^{1-} or ClO_4^{-1} or ClO_4^-]</p>
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Extra Question #5: Social Studies – World History

10 points

Several people involved in the largest of these events in New Zealand history were killed by the blizzard and flood of 1863 in Central Otago. Another of these events was tied to the genocide of the Selk'nam people, was started by Ramón Serrano Montaner, and led Julius Popper to attract many former Europeans to **Tierra del Fuego** [tee-AIR-ah del FWAY-goh]. The Chilkoot and White Pass Trails were used in the 1890s to reach one of these events that attracted people to Dawson City, many of whom later moved to Nome, and which took place in the Yukon's Klondike region. Name these events that attract many prospectors.

gold rushes



Extra Question #6: Literature – World Literature

10 points per part

One person with this occupation believes that everyone has a troll living inside him or her.		
1	Name this job held by Halvard Solness and Howard Roark. Solness fell to his death from atop one of his creations.	<u>architect</u> (s)
2	Halvard Solness is the protagonist of <i>The Master Builder</i> , one of this Norwegian’s “portrait plays”.	Henrik (Johan) <u>Ibsen</u>
3	In a novel by Heinrich Boll, the architect Robert Faehmel partakes in this activity every weekday at 9:30.	<u>billiards</u>

Extra Question #7: Literature – World Literature

10 points per part

The title group of this play partakes in a dance “pure and holy, which embraces all the charms of all the Graces”.		
1	Name these title characters who only appear while Dionysus [“die”-oh-NY-suss] and Xanthias [ZAN-thee-uss] cross the river Styx [“sticks”] into the underworld.	the <u>frogs</u> [accept <u>batracho</u> i]
2	The frogs croak “brekekekex, ko-ax, ko-ax” in a play by this Greek satirist.	<u>Aristophanes</u> [air-iss-TAH-fuh-neeZ]
3	In <i>The Frogs</i> , Dionysus chooses this playwright to return to the realm of the living, which was not the god’s intent when the journey began.	<u>Aeschylus</u> [ESS-kuh-luss]



Extra Question #8: Science – Chemistry

10 points per part

A double bond between two carbon atoms is made up of a sigma bond and one of these bonds.		
1	Name this kind of bond in which two lobes of one orbital overlap two lobes of another orbital.	<u>pi</u> bond(s)
2	This type of orbital, often denoted with an asterisk, has a higher energy level than would exist if the molecule were broken up. Benzene has three regular pi orbitals and three of these pi orbitals.	<u>anti-bonding</u> molecular orbitals
3	This type of molecular orbital has the same energy as would exist if the molecule was broken up. Cyclooctatetraene [“PSYCH”-loh-AHK-tayt-TRAY-eeen] has three bonding pi orbitals, three antibonding pi orbitals, and two of these orbitals.	<u>non-bonding</u> molecular orbitals

Extra Question #9: Science – Chemistry

10 points per part

This ion reacts with water to form oxygen and hydroxide.		
1	Name this dioxide consisting of two oxygen atoms with a combined charge of -1 .	<u>superoxide</u> [“super-oxide”] or <u>hyperoxide</u>
2	Superoxide dismutase [diss-“MUTE-ace”] converts it into oxygen or into this compound whose formula is H_2O_2 .	<u>hydrogen peroxide</u>
3	This enzyme, found throughout the body and concentrated in the liver, converts hydrogen peroxide into water and oxygen.	<u>catalase</u> [“CAT-uh-lace”]