



### Question #1: Miscellaneous

10 points

<p>Since 1989, this sport has used the “new life” scoring rule, meaning that preliminary scores do not carry over to the final score. Two possible actions in this sport are respectively named after <b>Simona Amanar</b> [see-MOH-nah ah-mih-NAR] and <b>Elena Produnova</b> [el-YAY-nuh proh-doo-NOH-vah]. After <b>Věra Čáslavská</b> [VYAIR-ah CHAH-slahff-skah] was the top woman in this sport in the 1960s, it was dominated by Olga <b>Korbut</b> [KOR-but] and Nadia <b>Comăneci</b> [koh-mah-NEECH] during the 1970s. More recently, <b>Kohei Uchimura</b> [KOH-hay oo-chee-MUR-uh] was the top man, and Simone Biles was the top woman in this sport. Name this sport whose events include pommel horse, vault, floor exercise, and balance beam.</p>	<p>(artistic) <b>gymnastics</b></p>
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### Question #2: Social Studies

10 points

<p>This leader allowed attacks against <b>Acholi</b> [ah-KOH-lee] and <b>Lango</b> [LAHN-goh] ethnic groups, including massacres against army members who belonged to those groups, after an attempted invasion by exiles. This leader attracted international criticism after allowing a French plane to be hijacked and the Jewish passengers to be held hostage. He also expelled all Asians from his country. This person gained power by launching a military coup in 1971 against Milton <b>Obote</b> [oh-BOH-tay]. He eventually fled to Saudi Arabia after his country was invaded by <b>Tanzania</b> [tan-zuh-NEE-uh]. Name this leader of Uganda.</p>	<p>Idi <b>Amin</b> (Dada Oumee) [EE-dee ah-MEEN]</p>
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### Question #3: Science

10 points

A type of iron developed by Keith Millis is named for the fact it is high in this property and is also called nodular cast iron. The fracture energy of metals drops below a pre-determined value at a temperature named both for this property and being brittle. This property is increased when metal goes through the heating and cooling process called **annealing** [uh-NEE-uh-ling]. Substances with this property can be pulled past their elastic limit while staying close to a linear stress-versus-strain relationship, which allows them to be drawn into a wire. Identify this ability of materials to handle tensile stress, in contrast to malleability.

**ductility** [accept being **ductile**]

### Question #4: Literature

10 points

One work by this poet contains a poem within a poem that begins “Go, dumb-born book.” That work is within a poem that this writer began “For three years, out of key with his time, he strove to resuscitate the dead art of poetry.” The 81st part of a long poem by this writer begins “Zeus lies in **Ceres’** [SEER-eez] bosom” and later states “Pull down thy vanity, I say pull down.” In the book *ABC of Reading*, this poet wrote “Literature is news that stays news.” This poet found an audience for T. S. Eliot and helped to edit *The Waste Land*. Name this poet who controversially supported Benito Mussolini and who wrote the poems *Hugh Selwyn Mauberley* and *Cantos*.

Ezra (Weston Loomis)  
**Pound**



**Question #5: Mathematics**

*10 points*

<p>In graph theory, either this common English word or the phrase “induced cycle” can be used to describe a chord-less cycle. The concept of genus in topology is analogous to a concept known by this word. This common English word is also used to describe a removable discontinuity in the graph of a function, which can arise when the simplified version of a rational function has a value at a point, but the un-simplified version equals 0 divided by 0. Give this common word used to describe a point on a graph that is represented by an open circle.</p>	<p><u>hole</u></p>
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**Question #6: Social Studies**

*10 points*

<p>This city contains Benjamin Latrobe’s Basilica of the National Shrine of the Assumption of the Blessed Virgin Mary, which is America’s oldest cathedral. This city is where the Gwynns Falls stream goes past Leakin Park and joins the Patapsco [puh-TAPSS-koh] River. The county surrounding this city includes the census-designated places Catonsville [KAYT-unz-vill] and Towson [TOW-sun]. The Locust Point neighborhood in this city is the site of the fort that inspired Francis Scott Key to write “The Star Spangled Banner”, Fort McHenry. This city is the location of Coppin State University and Johns Hopkins University. Name this most populous city in Maryland.</p>	<p><u>Baltimore</u>, Maryland</p>
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**Question #7: Fine Arts**

*10 points per part*

Name these violinists:		
<b>1</b>	This person, nicknamed the “Red Priest”, was a highly regarded violinist in the early 18th century. He also wrote the <i>Four Seasons</i> .	Antonio (Lucio) <b>Vivaldi</b>
<b>2</b>	This person, born in what is now Israel, suffered through polio as a child. He was the soloist on the <i>Schindler’s List</i> soundtrack and has performed many times with <b>Pinchas [PEEN-kuss]</b> Zukerman.	Itzhak <b>Perlman</b>
<b>3</b>	This person famously broke two E-strings when she was 14-years-old and being conducted by Leonard Bernstein in 1986.	<b>Midori Goto</b> [accept either]

**Question #8: Fine Arts**

*10 points per part*

Male leads in operas are often in this voice range, such as Florestan in Beethoven’s <i>Fidelio</i> .		
<b>1</b>	Name this male voice range higher than baritone.	<b>tenor</b>
<b>2</b>	In this opera by <b>Giacomo Puccini [JAH-koh-moh poot-CHEE-nee]</b> , the Prince—who is a tenor—sings “ <b>Nessun [NEH-soon]</b> dorma”.	<b><i>Turandot</i></b> <b>[TOO-rahn-doht or too-rahn-doh]</b>
<b>3</b>	This composer wrote the tenor arias “Ah! <b>mes amis [mess ah-mee]</b> ” for <i>La fille du régiment</i> [lah feel doo reh-zhee-mawn], and “Una furtiva <b>lagrima [fur-TEE-vah lah-GREE-mah]</b> ” for <i>L’Elisir D’Amore</i> [lay-lee-ZEER dah-MOR-ay].	(Domenico) Gaetano (Maria) <b>Donizetti</b> [“guy”]-TAH-noh <b>doh-nee-ZET-tee</b>



### Question #9: Science

*10 points per part*

Identify these molecules whose structures were determined by Dorothy Crowfoot Hodgkin:		
<b>1</b>	Hodgkin determined the structure of this hormone that is often injected by people to control diabetes.	<b><u>insulin</u></b>
<b>2</b>	Hodgkin won a Nobel Prize for discovering the structure of this vitamin that is also called <b>cobalamin</b> [koh-BAL-uh-min].	vitamin <b><u>B<sub>12</sub></u></b> [prompt on vitamin <b><u>B</u></b> ]
<b>3</b>	Hodgkins' first major discovery was the structure of this <b>protease</b> [PROH-tee-"ace"] that works alongside <b>chymo-trypsin</b> [ky-moh-TRIP-sin] and trypsin.	<b><u>pepsin</u></b>

### Question #10: Science

*10 points per part*

The coco de mer—which is both a nut and one of these objects—weighs 40 pounds, which is a lot heavier than most of these objects.		
<b>1</b>	Name these small hard objects from plants that contain the next-generation embryonic plant.	<b><u>seeds</u></b>
<b>2</b>	This part of an embryonic plant is the first part to emerge from the seed and grows into the root.	<b><u>radicle</u></b> [ <b><u>radical</u></b> ]
<b>3</b>	A seed often has this mark that shows where it was attached to the plant. This mark is away from the <b>micropyle</b> [ <b><u>micro-pile</u></b> ] opening.	<b><u>hilum</u></b> [ <b><u>HI</u></b> ]-lum]



### Question #11: Literature

10 points per part

The narrator of this novel often asks “What’s it going to be then, eh?”		
1	Name this novel that begins with Alex, Pete, Georgie, and Dim drinking what he calls both “milk with knives in it” and “ <b>moloko</b> [muh-loh-KOH] with knives in it”.	<i>A <u>Clockwork Orange</u></i>
2	This author wrote <i>A Clockwork Orange</i> and four novels about Mr. Enderby.	(John) Anthony <u>Burgess</u> ( <u>Wilson</u> ) [accept either underlined name]
3	Anthony Burgess’s studies of this other author led Burgess to create <i>A Shorter Finnegans Wake</i> and an operetta titled <i>Blooms of Dublin</i> .	James (Augustine Aloysius) <u>Joyce</u>

### Question #12: Literature

10 points per part

In this novel, Miss Gostrey says “What you’ve come out for then is simply to render him an immense service.”		
1	Name this novel in which Miss Gostrey is talking about Lewis Lambert Strether’s attempts to bring Chad Newsome back to America.	<i>The <u>Ambassadors</u></i>
2	This author wrote <i>The Ambassadors</i> , <i>The Portrait of a Lady</i> , and <i>Daisy Miller</i> .	Henry <u>James</u>
3	Henry James also wrote this novella about the siblings Miles and Flora and the ghosts of Miss Jessel and Peter Quint.	<i>The <u>Turn of the Screw</u></i>



### Question #13: Social Studies

10 points per part

This psychologist's small-world experiment led other people to use the phrase "six degrees of separation".		
<b>1</b>	Name this psychologist who also led an experiment at Yale University in which participants believed they were giving electric shocks to a learner.	Stanley <b><u>Milgram</u></b>
<b>2</b>	Milgram's experiment was inspired by the trial of this Nazi in Israel, which led to this person being hanged.	Adolf <b><u>Eichmann</u></b>
<b>3</b>	Milgram used this word to title a documentary about his experiment. Milgram's 1974 article was titled "Perils of" <i>this word</i> .	<b><u>Obedience</u></b>

### Question #14: Social Studies

10 points per part

The five-factor model breaks this entity into openness, conscientiousness, extra-version, agreeableness, and neuroticism.		
<b>1</b>	Name this combination of the thinking, feeling, and behaving characteristics of an individual.	<b><u>personality</u></b>
<b>2</b>	This psychiatrist developed a personality test that is often scored by the Exner System based on perceptions of inkblots.	Hermann <b><u>Rorschach</u></b> <b><u>["ROAR-shock"]</u></b>
<b>3</b>	This American psychologist wrote the book <i>Personality: A Psychological Interpretation</i> . He also developed the Scale of Prejudice and Discrimination.	Gordon (Willard) <b><u>Allport</u></b>



**Question #15: Science**

10 points

A choke is the same thing as one of these circuit elements but with a very low  $Q$  factor. The impedance of these objects varies directly with the frequency of their circuits. These objects cause current to lag electromotive force in an alternating-current circuit. A resonant circuit must have a capacitor and one of these circuit elements, and it sometimes has a resistor. These circuit elements work by creating a magnetic force that opposes changes in current. Name these circuit elements that can be made by looping wire around a magnetic core, and whose strength is measured in henries.

inductors

**Question #16: Literature**

10 points

This play contains the line “I will not lend thee a penny”, which leads to the response “Why then the world’s mine oyster, which I with sword will open.” That response is spoken by Pistol, who along with Bardolph and Nym are lower-class characters in this play. This play features a French doctor named Caius, whose ability to speak English is sometimes mocked by the Host of the Garter Inn. In this play, a man writes nearly identical love letters to two different married women, who join forces to play tricks on him. Name this play by William Shakespeare featuring Mistress Ford, Mistress Page, and Falstaff.

*(Sir John Falstaff and) the*  
**Merry Wives of**  
**Windsor**





**Question #17: Fine Arts**

10 points

<p>One portrait by this artist depicts a well-known Scottish historian seated and facing to the left of the painting, though his bearded face is turned slightly towards the viewer. In addition to painting Thomas Carlyle, this artist worked on a project that includes <i>The Princess from the Land of Porcelain</i>. That project, which this artist originally made in London, is now at the Freer Gallery of Art in Washington, D.C. This artist also made a portrait of a seated woman facing to the left with her feet slightly elevated. Name this American artist of <i>The Peacock Room</i> whose <i>Arrangement in Grey and Black, Number 1</i> portrays his mother.</p>	<p>James Abbott McNeill <u>Whistler</u></p>
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**Question #18: Social Studies**

10 points

<p>This person wrote “To be a poor man is hard, but to be a poor race in a land of dollars is the very bottom of hardships.” Those words are in a chapter this person wrote called “Of Our Spiritual Strivings”. This person said in both a speech and in a book, “The problem of the 20th century is the problem of the color line.” In an essay, this person wrote “The problem of education, then, among Negroes must first of all deal with the Talented Tenth”. Name this person who opposed the Atlanta Compromise pushed by Booker T. Washington and who wrote <i>The Souls of Black Folk</i>.</p>	<p>W(illiam) E(dward) B(urghardt) <u>Du Bois</u> <u>[doo boyss]</u></p>
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### Question #19: Science

10 points

Stars named for these phenomena are also dwarf and variable stars, including UV Ceti [“SEE-tie”]. That star, also known as Luyten 726-8 [“LIE-ten seven twenty-six dash eight”], goes through extreme changes in brightness, like other stars named for these phenomena. A small number of these actual phenomena, as opposed to the stars named for them, are classified as spotless and exhibit less energy than the others. These phenomena usually occur with sunspot activity. Major examples of these phenomena occur along with coronal [kuh-ROH-null] mass ejection and can be detected in the Earth’s magnetosphere [mag-NEE-toh-“sphere”]. Name these brief eruptions from the Sun’s surface.

(solar) flares

### Question #20: Literature

10 points

One story by this writer is about a wizard’s attempt to dream a man into reality, but when the wizard is not burned by a flame, he realizes that he is another person’s dream. This author of “The Circular Ruins” wrote a story that ends “My solitude is gladdened by this elegant hope.” That story is about a place this author describes as “illuminated, solitary, infinite, perfectly motionless, equipped with precious volumes, useless, incorruptible, secret” and as having adjacent hexagonal rooms. Name this author whose story “The Library of Babel” is in his collections *The Garden of Forking Paths* and *Ficciones* [feek-see-“OWN-ace”].

Jorge (Francisco Isidoro)  
Luis Borges  
[BOR-hayss] (Acevedo)



### Question #21: Mathematics

10 points per part

This principle is sometimes called <b>Dirichlet's</b> [dir-ik-let's] box principle.		
<b>1</b>	Name this principle stating that if there are items in boxes, and there are more items than boxes, then at least one box must have more than one item.	<b>pigeonhole</b> principle
<b>2</b>	How many times must you roll a standard single die to make sure that you get at least 11 rolls with the same number?	<b>61</b> times
<b>3</b>	The pigeonhole principle is contrasted with this mathematician's paradox of the Grand Hotel, in which a hotel with infinitely many rooms can accommodate additional guests even if it is full.	David <b>Hilbert</b>

### Question #22: Mathematics

10 points per part

Of the seven Millennium Prize problems, this is the one most closely related to computer science.		
<b>1</b>	Name this problem comparing the time it takes to solve a problem to the time it takes to verify the solution to a problem.	<b><math>P</math></b> vs. <b><math>NP</math></b> or whether <b><math>P</math></b> equals <b><math>NP</math></b>
<b>2</b>	The $P$ versus $NP$ problem can be formalized using a theoretical "machine" named for this person who helped the British break codes during World War II.	Alan (Mathison) <b>Turing</b>
<b>3</b>	Turing machines use a tape with ordered squares that each contain one character. If there are four squares, and each square contains a blank space or one of two characters, then how many possible tapes are there?	<b>81</b>



**Question #23: Social Studies**

*10 points per part*

The first U.S. law with this term in the title was named for John Sherman and passed in 1890.		
<b>1</b>	Give this term for laws that block anti-competitive agreements and monopolies.	<b><u>anti-trust</u></b> laws or <b><u>anti-trust</u></b> acts
<b>2</b>	In 1914, the Sherman Antitrust Act was clarified by the Federal Trade Commission Act and an act named for this Alabama Congressman.	Henry (De Lamar) <b><u>Clayton</u></b> (Jr.)
<b>3</b>	In 1904, the U.S. Supreme Court upheld the Sherman Antitrust Act after Teddy Roosevelt ordered the breakup of this railroad trust.	<b><u>Northern Securities</u></b> Company

**Question #24: Social Studies**

*10 points per part*

Another nickname for this region and period is “the Dirty Thirties”, and one of the days in 1935 became known as Black Sunday.		
<b>1</b>	Give this two-word phrase for areas affected by drought and storms in the 1930s that hurt agricultural output. Oklahoma and Kansas were particularly hard-hit.	<b><u>Dust Bowl</u></b>
<b>2</b>	This photographer was hired by the Farm Security Administration to document the damage. One resulting work is <i>Migrant Mother</i> .	Dorothea <b><u>Lange</u></b> [or Dorothea Margareta <b><u>Nutzhorn</u></b> ]
<b>3</b>	In reaction to the Dust Bowl, President Roosevelt created this project that used the U.S. Forest Service and New Deal agencies, including the Works Progress Administration and Civilian Conservation Corps, to plant trees from North Dakota to Texas.	Great Plains <b><u>Shelterbelt</u></b> Project



**Question #25: Literature**

*10 points per part*

The characters in this play are thrown for a loop when they learn that Theodore “Hickey” Hickman no longer drinks.		
<b>1</b>	Name this play set in Harry Hope’s saloon in New York City.	<i>The <u>Iceman Cometh</u></i>
<b>2</b>	<i>The Iceman Cometh</i> was written by this author who also wrote <i>Long Day’s Journey into Night</i> .	Eugene (Gladstone) <u>O’Neill</u>
<b>3</b>	Hickey is accused of re-starting this war when <b>Piet Wetjoen [peet weh-“TONE”]</b> yells at Cecil Lewis.	(Second) <u>Boer</u> War

**Question #26: Literature**

*10 points per part*

This novel includes a description of the 1928 <b>Okeechobee [oh-kee-CHOH-bee]</b> hurricane, during which Tea Cake is bitten by a dog.		
<b>1</b>	Name this novel about Janie Crawford, who kills her third husband in self-defense before returning to Eatonville, Florida.	<i><u>Their Eyes Were Watching God</u></i>
<b>2</b>	<i>Their Eyes Were Watching God</i> was the second novel by this author whose first novel was <i>Jonah’s Gourd Vine</i> .	Zora Neale <u>Hurston</u>
<b>3</b>	In the novel, Nanny compares African-American women to these animals. Matt Bonner has a yellow one of these animals, and Janie meets her second husband while her first husband is buying one of these animals.	<u>mules</u>



**Question #27: Science**

*10 points per part*

Name these medical tests:		
<b>1</b>	This test produces images of bones using radiation that has wavelengths between that of ultraviolet light and gamma rays, similar to a C.T. scan.	<u><b>X-rays</b></u>
<b>2</b>	In this test, tissue or fluid is removed from the body and sent to pathology. The tissue is often taken from a tumor or cyst.	<u><b>biopsy</b></u> (ing)
<b>3</b>	This result from a blood test gives the percentage by volume of red blood cells. It can indicate anemia or leukemia.	<u><b>hematocrit</b></u> [prompt on <u><b>packed-cell volume</b></u> or <u><b>PCV</b></u> ]

**Question #28: Science**

*10 points per part*

Identify these sexually transmitted diseases:		
<b>1</b>	The human immunodeficiency virus, HIV, causes this disease when the patient's T-cell count falls below 200 cells per micro-liter.	<u><b>AIDS</b></u> or <u><b>acquired immune deficiency syndrome</b></u>
<b>2</b>	This virus is the most common sexually-transmitted infection in the U.S. The <b>Gardasil</b> [GAHR-duh-sil] vaccine decreases the chance of it causing cancer.	<u><b>HPV</b></u> or <u><b>human papillomavirus</b></u>
<b>3</b>	This disease is the most common disease caused by protozoans. Most men have no symptoms, but it can cause pain and shortened pregnancies in women.	<u><b>trichomoniasis</b></u> [TRIK-uh-muh-NY-uh-siss]



**Question #29: Literature**

10 points

<p>A short story by this writer ends with Turu becoming the new Rainmaker. That story is part of “Three Lives”, which were placed at the end of this author’s futuristic novel set in <b>Castalia</b> [kah-STAHLL-yuh] and were supposedly written by one of his characters. In another novel by this writer, the protagonist successfully guesses that a girl he meets is named <b>Hermine</b> [hair-MEE-nay]. That protagonist created by this author is intrigued by a sign that says, “Magic Theatre—Entrance Not for Everybody.” Name this German author who wrote about Joseph <b>Knecht</b> [“connect”] and Magister Ludi in <i>The Glass Bead Game</i> [pause] and about Harry Haller in <i>Steppenwolf</i> [SHTEP-en-vulf].</p>	<p>Hermann (Karl) <b>Hesse</b></p>
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**Question #30: Mathematics**

10 points

<p>This action is performed by a Householder transformation. A matrix that performs this action has one <b>eigenvalue</b> [“EYE-gun-value”] equal to <math>-1</math> and other eigenvalues equal to positive 1. Like translations and rotations, this type of transformation is an <b>isometry</b> [“eye”-SAH-meh-tree]. This transformation can be done to the graph of a function by placing a negative sign in front of the function or the variable, depending on whether you want to take this action with respect to the <math>x</math>-axis or <math>y</math>-axis. Name this type of transformation in which each point of an object is moved perpendicular to an axis so that it ends up the same distance away from the line but on the other side.</p>	<p><b>reflection</b> [or <b>reflecting</b> or <b>reflected</b>]</p>
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### Question #31: Social Studies

10 points

This leader banned the practice of buying and selling provincial governorships, which was known as **suffragia** [suf-ruh-JEE-uh]. To win support when he opposed the Three Chapters, this leader kidnapped Pope **Vigilius** [vee-JEE-lee-us]. The Codex Constitutionum was part of the collection of Roman laws and legal decisions named as this person's code. Much of the history of this leader was recorded by **Procopius** [proh-KOH-pee-us], who traveled with his general **Belisarius** [beh-lee-SAR-ee-us]. Belisarius helped this leader gain territory that had belonged to the Western Roman Empire. Name this 6th-century Byzantine emperor who, along with his wife Theodora, ordered the construction of the Hagia Sophia.

**Justinian I** or **Justinian the Great** [or Flavius **Justinianus** or Petrus **Sabbatius**; prompt on **Justinian**]

### Question #32: Science

10 points

These chemicals are activated by the proteins Sleepy 1 and Snezy, and they undo the effects of Della proteins. These chemicals are named for the genus of a fungus whose species is **fujikuroi** [foo-jee-kur-oy]. These chemicals are used on Thompson seedless grapes to increase size, and they are also used to make dwarf corn grow into normal corn. Some research indicates that these chemicals are most impactful if they are applied before **indole-3-acetic** [IN-dohl "three" uh-SEE-tik] acid. These chemicals were discovered based on observations of foolish seedling disease in rice. Name these plant hormones that, like auxins, stimulate plant growth.

**gibberellins** or **gibberellic acid** [prompt on plant **hormones**]





### Extra Question #1: Fine Arts

10 points

This composer's friendship with the performer Jules-Bernard **Laserre** [lah-ser] led to a few of his pieces being written for cello, including a four-minute piece that is often performed for encores, the *Allegro appassionato*. In another piece by this composer, the violinist sometimes tunes the E string to E-flat to make it easier to play a **tritone** ["TRY-tone"]. This composer started that piece with the harp playing the same note 12 times, and he made heavy use of xylophones to portray skeletons. Name this French composer who used Halloween as the setting for his *Danse macabre*.

(Charles-)Camille  
**Saint-Saëns** [san sawn]

### Extra Question #2: Social Studies

10 points

This person's home is now a museum managed by the Masonic Bent Lodge. Stephen Kearny sent this person, Edward Beale, and **Chemuctah** [chuh-MUK-tah] to ask Robert Stockton for reinforcements during the Battle of San Pasqual. This person won the Battle of Canyon de Chelly by getting several Native American tribes to help defeat the Navajos, who were then forced to take the Long Walk. Though this person was illiterate, he took reports to Washington, D.C. to let Secretary of War William Learned Marcy know how the Bear Flag Revolt was progressing. Name this frontiersman who guided John Frémont to California.

(Christopher Houston)  
"Kit" **Carson**



### Extra Question #3: Science

10 points

Because this ion is made of both of the elements used to harden iron or steel, it is used for case-hardening. Though carbon monoxide is typically the biggest problem when inhaling smoke fumes, this ion is a major problem if the smoke is from burning nylon or wool. This ion inhibits **cytochrome c oxidase** [“SIGH-toe-chrome C OX-id-ace”], which means that this ion prevents the production of ATP. The simplest acid with this ion is made by the **Andrussow** [AN-droo-soh] process, which uses methane, ammonia, and oxygen. This ion has the same chemical formula as the **nitrile** [NY-“trial”] group. Name this poisonous ion that contains one atom each of carbon and nitrogen.

**cyanide** [accept **cyano**; before “carbon”, accept **CN<sup>-</sup>** [“C N minus”] or **CN<sup>1-</sup>** [“C N one minus”] or **CN<sup>-1</sup>** [“C N minus one”]; prompt on **CN**]

### Extra Question #4: Literature

10 points

Either this adjective or the adjective “indefinite” is used to describe verb aspects in which the verb is used to express a fact, in contrast to the progressive and perfect aspects. This adjective is also used to indicate the type of past tense formed by only adding the suffix “-ed” to a verb. Though the future tense described by this adjective uses the word “will”, the past and present tenses described by this adjective do not have auxiliary verbs. This adjective also describes the subject of a sentence if all adjectives are removed. Name this synonym of “plain” and “basic” that is used to describe sentences that have only one clause.

**simple**



**Extra Question #5: Mathematics**

*10 points*

A function named after this person has trivial zeros at all negative even numbers. The other zeros of the function named after this person are used to justify a law about the number of primes less than a given number, and many efforts have been made to prove that those other zeros all have a real part equal to  $\frac{1}{2}$ . Another concept named after this person is simpler than the Newton-Cotes formulas and Simpson's rule but achieves the same goal. Name this mathematician whose "sums" use rectangle areas to approximate the value of an integral.

(Georg Friedrich)  
Bernhard **Riemann**  
**[REE-mahn]**



### Extra Question #6: Science

*10 points per part*

The equation “ $E$ equals $m c$ squared” was explained in Albert Einstein’s paper “On the Electrodynamics of Moving Bodies”.		
<b>1</b>	The equation was developed as part of this first form of relativity theory that applies when there are inertial frames of reference.	<b><u>special</u></b> theory of relativity
<b>2</b>	If the square root of the quantity “1 minus beta squared” is in the denominator, then the mass in the equation represents this type of mass of a stationary object.	<b><u>rest</u></b> mass
<b>3</b>	If units are chosen so that the speed of light equals 1, then the square of this quantity equals energy squared minus rest mass squared. Give a one-word answer.	<b><u>momentum</u></b>

### Extra Question #7: Science

*10 points per part*

This type of image is made by backward extensions of diverging rays.		
<b>1</b>	Name this type of image that is contrasted with a real image.	<b><u>virtual</u></b> image
<b>2</b>	Virtual images are formed by this type of lens that can also be called a concave lens or negative lens.	<b><u>diverging</u></b> lens(es) [or <b><u>divergent</u></b> lens(es) or <b><u>dispersive</u></b> lens(es)]
<b>3</b>	If you have a concave mirror, which is a converging mirror, where should you place an object if you want the image to be the same size as the object? Your answer should not have any numbers in it.	at the <b><u>center of curvature</u></b> [prompt on <b><u>center</u></b> ]



**Extra Question #8: Social Studies**

*10 points per part*

This peace is the combined result of the Treaty of Münster, the Treaty of <b>Osnabrück</b> [ <b>ohss-nuh-BROOK</b> ], and other treaties.		
<b>1</b>	Name this peace that followed the Thirty Years' War.	Peace of <b>Westphalia</b>
<b>2</b>	In the Peace of Westphalia, Alsace was given to this country. Alsace is still a part of this kingdom's modern successor.	(Kingdom of) <b>France</b> [or Royaume de <b>France</b> ; accept <b>French Republic</b> or <b>République française</b> ]
<b>3</b>	The Peace of Westphalia divided this region, with the western part going to Sweden and the eastern part going to Brandenburg-Prussia.	<b>Pomerania</b>

**Extra Question #9: Social Studies**

*10 points per part*

Charles V was the Holy Roman Emperor from 1519 to 1556.		
<b>1</b>	What royal house did Charles V belong to? It ruled Austria and many other places in Europe.	House of <b>Habsburg</b> or <b>Hapsburg</b> dynasty or the <b>Hapsburgs</b> [or <b>Hapsburg</b> ]
<b>2</b>	Charles V was known by this name in Spain, where he at first ruled jointly with his mother Joanna the Mad.	<b>Charles I</b> or <b>Carlos I</b> [prompt on <b>Carlos</b> ]
<b>3</b>	Charles issued a 1521 edict named for this city that said "We forbid anyone from this time forward to dare, either by words or by deeds, to receive, defend, sustain, or favor the said Martin Luther."	<b>Worms</b> [ <b>vurmz</b> ]