



**Question #1: Social Studies – World History**

*10 points*

<p>British forts in what is now this country were targeted by the <b>Fenian [FEE-nee-un]</b> Raids. The transfer of Rupert’s Land to this country sparked the Red River Rebellion, which ended when <b>Louis Riel [loo-ee ree-el]</b> left. During this nation’s October Crisis in 1970, the FLQ attempted to get the French-speaking part of this country to secede. This modern country includes most of the regions explored by <b>Jacques Cartier [zhahk kar-tee-ay]</b> and Samuel de Champlain. Name this country whose past prime ministers include John Macdonald, Pierre Trudeau, and Stephen Harper.</p>	<p><u><b>Canada</b></u></p>
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**Question #2: Mathematics – Math Concepts**

*10 points*

<p>The repeated subtraction of this type of function from the reciprocal function is used to approximate the <b>Euler [OY-ler]</b>-Mascheroni constant. This function was used to develop Kepler’s Third Law and design slide rules. The value of this function’s derivative varies inversely with its input, an example of which is that for one of this type of function, the derivative is 1 over <math>x</math>. This function allows multiplication problems to be converted into addition problems. Name this inverse of exponential functions, whose “common” form is called base 10 and whose “natural” form is base <math>e</math>.</p>	<p>(natural or common) <b>logarithms</b> or <b>log</b>(arithmic) functions [accept answers that additionally include “natural” or “common” or a base]</p>
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**Question #3: Fine Arts – Classical Music & Opera**

10 points

One character in this opera says “It is a mismatch to take a soldier when one could have an officer.” The title character of this opera sings about visiting **Lillas Pastia [LIL-las PAHS-tyah]** and dancing the **Seguedilla [say-gway-DEE-yah]**. This opera begins with Corporal Morales and some soldiers relaxing in a square when they are approached by Micaela, who is looking for **Don José [dohn zhoh-say]**. Soon after that, the women who work in a cigarette factory get off of work. This opera includes the “Toreador Song” and “**Habanera [ah-bah-NAIR-ah]**”. Name this opera about a gypsy woman, composed by **Georges Bizet [jorj bee-zay]**.

**Carmen**

**Question #4: Literature – U.S. Literature**

10 points

This author wrote of visiting **Pio Baroja [PEE-oh bah-ROH-hah]**, whom this writer felt was more deserving of a Nobel Prize than himself. One of his novels, about smuggling Chinese workers into Florida, is *To Have and Have Not*. Robert Cohn’s affair with Lady Brett Ashley served as the backdrop to one of his novels, and an 18-foot marlin secures the reputation of the fisherman Santiago in another of his works. Name this author of *Death in the Afternoon*, *The Sun Also Rises*, and “The Old Man and the Sea.”

Ernest (Miller) **Hemingway**



### Question #5: Science – Chemistry

10 points

<p>Chlorine is added to this compound to create an insecticide called <b>lindane</b> [LIN-dayn]. <b>Pyrene</b> [“PIE”-reen] and <b>anthrocene</b> [“AN-throw-seen”] are larger derivatives of this compound. This compound is the most famous compound that both is planar and satisfies Hückel’s rule, which results in its great stability. Scientists were baffled by the structure of this molecule until August <b>Kekulé’s</b> [KEK-oo-leh’z] dream of a snake eating its own tail led him to propose it having a cyclic structure. Name this most notable aromatic compound, whose formula is <math>C_6H_6</math>.</p>	<p><b>benzene</b> [prompt on <b><math>C_6H_6</math></b> before the end]</p>
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### Question #6: Social Studies – Geography

10 points

<p>Two islands in this lake are named <b>Manitou</b> [MAN-ih-too] after spirits in <b>Algonquian</b> [al-GAHN-kee-un] mythology. Cars are ferried across this body of water by the SS <i>Badger</i>, which travels between the towns of Ludington and <b>Manitowoc</b> [MAN-ih-tuh-wahk]. A town named Holland near this body of water celebrates an annual Tulip Time Festival. The Door Peninsula separates Green Bay from the main part of this lake. The Straits of <b>Mackinac</b> [MAAK-ih-naw] separate it from Lake Huron. Cities on the shore of this lake include Gary and Milwaukee. Name this Great Lake bordered by Wisconsin, Indiana, and Illinois.</p>	<p>Lake <b>Michigan</b></p>
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### Question #7: Mathematics – Statistics

10 points per part

This type of diagram shows all the information from the five-number summary of a data set.		
1	Name this kind of diagram that shows the minimum, maximum, and quartiles of a distribution.	<b>boxplot</b> [or <b>box-and-whisker</b> plot or <b>box-and-whisker</b> diagram]
2	A segment drawn inside the box of a boxplot represents this value, also known as the second quartile. This value separates the higher half of a distribution from the lower half.	<b>median</b> [prompt on <b>50th percentile</b> or <b>fifth decile</b> ]
3	Find the interquartile range for a distribution with a minimum of 10, a first quartile of 12, a median of 15, a third quartile of 20, and a maximum value of 23.	<b>8</b>

### Question #8: Mathematics – Statistics

10 points per part

This two-word phrase is sometimes used to claim that differences between values are due to random errors.		
1	Name this type of statement that is tested in statistical experiments. This statement is falsely rejected in a type I [1] error.	<b>null hypothesis</b>
2	This is the name for a subgroup of a population measured in a statistical experiment. One way of calculating the standard deviation is named for this term; the other type is the population standard deviation.	<b>sample</b>
3	If an experiment with a 7% chance of success was tried 500 times, what would be the expected number of successes?	<b>35</b>



**Question #9: Literature – U.S. Literature**

10 points per part

This character used a lasso to defeat <b>Sagamore</b> [SAG-ruh-mor] in a duel to the death.		
<b>1</b>	Name this character who is stabbed by <b>Meliagraunce</b> [MEL-ee-uh-grawnss] and is the target of a spell causing him to sleep for 1,300 years.	<b>Hank Morgan</b> [accept either; prompt on The <b>Boss</b> ; prompt on, but do not otherwise reveal, The Connecticut <b>Yankee</b> ]
<b>2</b>	Hank Morgan travels from 19th-century America to medieval times in this novel.	<i>A <u>Connecticut Yankee in King Arthur's Court</u></i> [or <i>A <u>Yankee in King Arthur's Court</u></i> or <i>A <u>Yankee at the Court of King Arthur</u></i> ]
<b>3</b>	This satirist wrote <i>A Connecticut Yankee in King Arthur's Court</i> . He also wrote <i>The Adventures of Tom Sawyer</i> .	Mark <b>Twain</b> [or Samuel (Langhorne) <b>Clemens</b> ]

**Question #10: Literature – U.S. Literature**

10 points per part

This resident of West Egg was shot after taking the blame for something Daisy Buchanan had done.		
<b>1</b>	Name this graduate of St. Olaf's, whom George Wilson killed for supposedly running over George's wife Myrtle.	<b>Jay Gatsby</b> [accept either; accept <b>Gatz</b> , <b>Jimmy</b> , or The <b>Great Gatsby</b> ]
<b>2</b>	Jay Gatsby appears in <i>The Great Gatsby</i> , which is by this author.	F(rancis) Scott (Key) <b>Fitzgerald</b>
<b>3</b>	Henry Gatz and Owl Eyes were among the few attendees of this event. When Klipspringer was invited to this event, he asked about tennis shoes.	Jay Gatsby's <b>funeral</b> [accept similar answers referencing a <b>funeral</b> or <b>memorial</b> ]



**Question #11: Science – Biology**

*10 points per part*

These diagrams use the <b>alleles</b> [uh-LEELS] of parents to depict the possible <b>genotypes</b> [“gene-oh-types”] of offspring.		
<b>1</b>	Name these “squares”. They show a 3-to-1 <b>phenotype</b> [FEE-noh-“type”] ratio when crossing a pair of <b>heterozygous</b> [HET-uh-roh-ZY-gus] parents.	<b>Punnett</b> squares
<b>2</b>	Punnett squares are used to analyze the types of inheritance patterns named for this man, an Austrian monk who studied pea plants.	Gregor <b>Mendel</b> [accept <b>Mendelian</b> inheritance or <b>Mendelian</b> genetics]
<b>3</b>	Punnett squares are especially used for this method of determining whether an organism is homozygous or heterozygous, in which the organism of unknown genotype is bred with a homozygous recessive partner.	<b>test cross</b> (ing)

**Question #12: Science – Biology**

*10 points per part*

Cells in this kind of tissue contain an organelle called the <b>sarcoplasmic reticulum</b> [sar-koh-PLAS-mik reh-TIK-yoo-lum].		
<b>1</b>	Name this type of tissue that contracts to allow humans to move. It comes in skeletal, smooth, and cardiac varieties.	<b>muscle</b> tissue or <b>muscles</b>
<b>2</b>	This is the functional unit of a muscle. It is composed of actin and <b>myosin</b> [MY-oh-sin].	<b>sarcomere</b>
<b>3</b>	Sarcomeres do not contract until they encounter ions of this element, which stop <b>troponin</b> [TROH-poh-nin] from blocking the binding of actin and myosin. This element is found in the sarcoplasmic reticulum.	<b>calcium</b> [or <b>Ca</b> ; accept <b>Ca<sup>2+</sup></b> ]



**Question #13: Social Studies – Religion**

*10 points per part*

In this person’s namesake book in the Old Testament, Satan is told that he can touch everything this man has but cannot take this man’s life.		
<b>1</b>	Name this man who blesses God even when his possessions and his family are destroyed.	<b>Job</b> [rhymes with “lobe”] [or <b>Iyov</b> ]
<b>2</b>	In the <b>Septuagint</b> [sep-TOO-uh-jint], this elder brother of Jacob was named as Job’s grandfather. This person gave up his birthright to Jacob in exchange for a bowl of stew.	<b>Esau</b> [or <b>Aysav</b> ]
<b>3</b>	In Chapter 14 verse 14 of his namesake book, this prophet indicated that Noah, Daniel, and Job could only save themselves when Jerusalem is judged.	<b>Ezekiel</b> [or <b>Yechezkayl</b> ]

**Question #14: Social Studies – Religion**

*10 points per part*

This saint was arrested following his denunciation of the relationship between Herod <b>Antipas</b> [AN-tuh-pus] and <b>Herodias</b> [hur-AH-dee-us].		
<b>1</b>	Name this son of <b>Zechariah</b> [zek-uh-RY-uh] and Elizabeth who described Jesus as the “Lamb of God.” He performed a ritual on Jesus Christ in the River Jordan.	<b>John the Baptist</b> [prompt on <b>John</b> ]
<b>2</b>	This angel appeared to Zechariah in the temple to foretell the birth of John the Baptist. In Islam, this angel narrated the Koran to Muhammad.	<b>Gabriel</b> [accept <b>Jibril</b> ]
<b>3</b>	With her mother’s encouragement, this daughter of Herod Antipas demanded the head of John the Baptist.	<b>Salome</b>



**Question #15: Miscellaneous – Consumer Education**

*10 points*

This company ended its relationship with Redington Gulf following an SEC inquiry into illegal business deals with Iran. Following the cancellation of a collaboration with Napster on a personal media player, this tech company made a deal with Apple allowing it to sell a line of iPods with its own logo on the back. It was founded during the Great Depression in a one-car garage in Palo Alto, and since its 2002 acquisition of Compaq it focused on the personal computing market. This company sells Stream, ENVY, and Pavilion laptops, and it split in 2015. Name this tech giant that in 1999 hired Carly Fiorina as CEO.

**Hewlett Packard** [or **HP Inc.**; accept **Hewlett Packard Enterprise**]

**Question #16: Literature – British Literature**

*10 points*

This poet invited readers to join him in singing the sweet chorus of “Ha ha he” in “Laughing Song”. This poet wrote of an animal with “such a tender voice, making all the vales rejoice” in a poem in which God is told to bless that animal and the animal is asked “who made” it. That poem, “The Lamb”, is in this writer’s *Songs of Innocence*. In another of this writer’s poems, the speaker asks, “What immortal hand or eye, could frame thy fearful symmetry?”. Name this poet who wrote of an animal “burning bright in the forests of the night” in “The Tyger”.

William **Blake**





### Question #17: Science – Earth Science

10 points

<p>A member of the rose family called <i>Polylepis</i> [<i>“poly”-LEP-iss</i>] grows on these formations. These formations are typically the home of <i>edelweiss</i> [<i>AY-dul-“vise”</i>], which has a species name making the relationship explicit. These landforms are also the most common homes of <i>vicuñas</i> [<i>vee-KOO-nyas</i>] and chinchillas. The fault-block types of these objects can be found in <i>Harz</i> [<i>“hearts”</i>], Germany and, like the fold type, are formed by continental drift. These objects often form volcanoes. Name these very large objects that often collect in ranges such as the Great Dividing Range, the Andes, and the Himalayas.</p>	<p><b>mountains</b> [or <b>alpine</b>; accept mountain <b>range</b> before it is mentioned]</p>
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### Question #18: Social Studies – U.S. History

10 points

<p>During this president’s term in office, John <i>Fries</i> [<i>frees</i>] led a rebellion against a property tax. Also during his presidency, Congress ended treaties with France and authorized attacks on French ships in what became known as the Quasi-War. Those events occurred after this president announced that French diplomats sought bribes in the XYZ Affair, and they led to him backing the Alien and Sedition Acts. Name this drafter of the Massachusetts State Constitution, who was the first vice president and second president.</p>	<p><b>John Adams</b> [prompt on “Adams”]</p>
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**Question #19: Literature – World Literature**

*10 points*

On his way to **Küsnacht** [KOOS-nahkt], this character steered a boat to shore before putting his captors back out to sea. This person's murder of a tyrant, which happened after his victim showed Armgart no pity, led to the signal **Ulrich** [OOL-rik] of Rubenz was looking for to start a revolution. This person was captured after he did not salute the governor's cap, and he later killed that governor, **Albrecht** [AHL-brekt] Gessler. Name this Swiss archer who was given a chance to save his own life by shooting an apple off the head of his son.

**William Tell** [accept either; accept **Wilhelm** Tell or **Guillaume** Tell]

**Question #20: Science – Biology**

*10 points*

In these cells, the release of calcium ions causes the cortical reaction. These cells are surrounded by a layer called the **zona pellucida** [ZOH-nuh peh-LOO-sih-duh]. The formation of these cells also results in the creation of three polar bodies. When these cells develop, the corpus **luteum** [LOO-tee-um] is formed. These cells, which are large enough to be seen with the naked eye, are stored in follicles until they are released into the **Fallopian** [fuh-LOH-pee-un] tubes. One of these cells is shed with the **endometrium** [EN-doh-MEE-tree-um] during menstruation. Name these female sex gametes that are fertilized by sperm cells.

**egg cells** [or **ova** or **ovum** or **oocytes**]



**Question #21: Mathematics – Geometry**

*10 points per part*

This term refers to any line that intersects two other lines at distinct points.		
<b>1</b>	Name this line that creates congruent alternate interior angles when the two lines it intersects are parallel.	<b>transversal</b> line [accept <b>transverse</b> line]
<b>2</b>	If a transversal intersects two parallel lines, and one of the interior angles formed is 37 degrees, then what is the degree measure of the interior angle adjacent to that one? Consecutive interior angles are not congruent in this case.	<b>143</b> degrees
<b>3</b>	Suppose transversal lines $ABC$ and $XYZ$ intersect three parallel lines named $AX$ , $BY$ , and $CZ$ . If segment $AB$ measures 4 units, $BC$ measures 6 units, and $XY$ measures 6 units, then what is the length of $YZ$ ?	<b>9</b> units

**Question #22: Mathematics – Geometry**

*10 points per part*

This term can refer to a plane that touches a sphere at one point.		
<b>1</b>	Name this term for two mathematical objects, such as a line and a curve, that touch at only one point.	<b>tangent</b> line [accept line of <b>tangency</b> ]
<b>2</b>	If two circles, one with a radius of 3 units and the other with a radius of 4 units, are 3 units apart, then how far apart are their centers?	<b>10</b> units
<b>3</b>	In the situation above, find the length of a segment from a point of tangency on the circle of radius 3 units to the center of the circle of radius 4 units.	<b>root 91</b> units [or the <b>square root of 91</b> units or <b>radical 91</b> units or equivalents, do not accept “91”]



**Question #23: Fine Arts – Art History**

*10 points per part*

His birth name was <b>Doménikos Theotokópoulos</b> [doh-MEN-ee-kohss thay-oh-toh-KOH-puh-lohss].		
<b>1</b>	Give the common nickname for this painter of <i>The Nobleman with his Hand on his Chest</i> and <i>The Burial of the Count of Orgaz</i> .	El <b>Greco</b>
<b>2</b>	Most of El Greco’s famous paintings such as <i>View of Toledo</i> [toh-LAY-doh] were made in this country. Salvador Dalí lived in Catalonia, which is currently part of this country.	(Kingdom of) <b>Spain</b> [or Reino de <b>España</b> ]
<b>3</b>	Catalonia was also home to this artist of <i>The Harlequin’s Carnival</i> and the sculpture <i>The Caress of a Bird</i> .	<b>Joan Miró</b> [zhoh-AHN mee-ROH]

**Question #24: Fine Arts – Art History**

*10 points per part*

This artist painted <i>The Old Guitarist</i> during his Blue Period.		
<b>1</b>	Name this painter of <i>Guernica</i> [gair-NEE-kah].	Pablo (Ruiz y) <b>Picasso</b>
<b>2</b>	Picasso played a leading role in the analytic, synthetic, and crystal phases of this art movement, in which objects were simultaneously shown from different viewpoints.	<b>cubism</b> [or <b>cubist</b> movement]
<b>3</b>	This painter used cubism in his portrait of Picasso, as well as in his pieces <i>Violin and Checkerboard</i> and <i>Harlequin with Guitar</i> .	<b>Juan Gris</b> [wahn “grease”] [or José Victoriano Carmelo Carlos <b>González-Pérez</b> ]



**Question #25: Social Studies – U.S. History**

*10 points per part*

This battle began with a surprise attack on Pittsburg Landing, led by Albert Sidney Johnston and Pierre Beauregard.		
<b>1</b>	Name this battle won by Union forces after they regrouped at the Hornet’s Nest. Reinforcements led by Don Carlos <b>Buell</b> [BYOO-ul] helped turn the tide on the second day.	Battle of <b>Shiloh</b> [prompt on <b>Pittsburg Landing</b> ]
<b>2</b>	The Battle of Shiloh and the Battle of Stones River near Murfreesboro were fought in this state.	<b>Tennessee</b>
<b>3</b>	Following the Battle of Shiloh, calls for the removal of this general were countered by President Lincoln’s assertion that “I can’t spare this man; he fights”. This person later became commanding general of the Union and the U.S. President.	(Hiram) Ulysses S. <b>Grant</b>

**Question #26: Social Studies – U.S. History**

*10 points per part*

Norman Butler and Thomas Johnson refused to admit to their role in this man’s assassination, while Talmadge Hayer confessed at trial.		
<b>1</b>	Name this person who founded Muslim Mosque, Incorporated after leaving the Nation of Islam. His departure followed a 90-day silence that was ordered by the Nation of Islam’s leader.	<b>Malcolm X</b> [or El-Hajj Malik El- <b>Shabazz</b> ; accept Malcolm <b>Little</b> ; prompt on partial answer]
<b>2</b>	The 90-day silence was a response to Malcolm X’s comment about “chickens coming home to roost so soon”, which is how he described the assassination of this president in 1963.	John F(itzgerald) <b>Kennedy</b> [accept <b>JFK</b> ]
<b>3</b>	<i>The Autobiography of Malcolm X</i> was actually written by this journalist, also the author of <i>Roots</i> .	Alex(ander Murray Palmer) <b>Haley</b>



### Question #27: Science – Chemistry

10 points per part

A common introduction-to-chemistry experiment involves using this technique to separate the pigments in ink.		
1	Name this technique that separates a compound based on a mobile phase's affinity for a stationary phase.	<b>chromatography</b> [kroh-muh-TAH-gruh-fee] [accept <b>chromatogram</b> ]
2	Simple chromatography often uses this paper-based material, which is also commonly used when funneling.	<b>filter</b> paper [or <b>filtration</b> paper]
3	Ion-exchange chromatography can be used to separate proteins because each protein has a different value for this number, the <b>pH [P-H]</b> at which it is neutral.	<b>isoelectric</b> point

### Question #28: Science – Chemistry

10 points per part

A form of this technique named for Karl Fischer can be used to find the amount of water in a sample.		
1	Name this technique in which a substance of known concentration is used to find the concentration of another substance. It is commonly done with acids and bases.	<b>titration</b> [“tie-TRAY”-shun] [or <b>titrating</b> ]
2	In an acid-base titration, one of these substances is typically added to determine visually when a pH threshold is crossed. Probably the most common one is <b>phenolphthalein</b> [fee-nawlf-THAY-leen].	pH <b>indicator</b>
3	A titration is performed until this point, where the unknown and known substances have reacted in the <b>stoichiometrically</b> [STOY-kee-oh-“METRIC”-lee] same amount.	<b>equivalence</b> point



**Question #29: Literature – U.S. Literature**

*10 points*

<p>This town was home to Major Andre’s tree and Wiley’s Swamp, and its schoolhouse was designed by Yost van Houton [“HOW”-tun]. It is about two miles from Tarry Town, and its plowboys occasionally hear a former resident chanting melancholy psalm tunes. One of the students who attends school in this town is Katrina Van Tassel. Its dominant spirit was said to be the ghost of a Hessian trooper. Name this location, once the home of Ichabod [IK-uh-bahd] Crane and the setting for a Washington Irving story about the Headless Horseman.</p>	<p><u>Sleepy Hollow</u>, New York</p>
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**Question #30: Mathematics – Math Concepts**

*10 points*

<p>Two of these entities can be proven equal to each other using the axiom of extensionality. A group consists of an operation and one of these entities. Russell’s paradox concerns one of these mathematical things that cannot exist. Taking the “power” of one of these results in one of them with more elements. The universal example of these entities contains everything, including itself. Two of these things can be combined using either union or intersection. Name these mathematical lists of elements, which are often written using curly brackets.</p>	<p><u>sets</u></p>
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### Question #31: Social Studies – World History

10 points

<p>When <b>Caecilian</b> [sih-SIL-yen] was appointed as the bishop in this city, <b>Majorinus</b> [MAY-jor-EE-nus] attempted to replace him during a conflict that led to the creation of the <b>Donatist</b> [DAH-uh-tist] sect. This city's forces won the Battle of Lake <b>Trasimene</b> [TRAZ-ih-meen] but lost the Battle of Zama to forces led by <b>Masinissa</b> [MASS-uh-NIS-uh] and <b>Scipio Africanus</b> [SIP-ee-oh af-rih-KAN-us]. According to legend, the land for this city's citadel was claimed using oxhide strips. Name this city that lost the <b>Punic</b> [PYOO-nik] Wars against Rome and was led by Hannibal.</p>	<p><u>Carthage</u> [prompt on <b>Tunis</b>]</p>
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### Question #32: Science – Physics

10 points

<p><b>Wien's</b> [veen'z] displacement constant divided by temperature gives a value for this quantity. The cross section for <b>Rayleigh</b> [RA-lay] scattering is inversely proportional to the fourth power of this quantity. Planck's constant divided by momentum gives a version of this quantity that can describe any matter and is named for <b>Louis de Broglie</b> [loo-ee duh broy]. This value times frequency gives the phase speed of a wave. For visible light, it is between about 400 and 700 nanometers. Name this quantity, the distance between successive crests of a wave.</p>	<p><u>wavelength</u> [prompt on <b>length</b> or <b>distance</b>]</p>
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### Extra Question #1: Literature – British Literature

10 points

This character settled down with the daughter of Abdul Gafur, who had tried to frame this man for the theft of Gisborne's money. Called "Frog" by one set of adoptive parents, this character was aided by **Hathi [HAH-thee]** in getting revenge on **Buldeo [bul-DAY-oh]**, who had ordered the imprisonment of **Messua [meh-SOO-uh]**. At a Council Rock meeting led by **Akela [uh-KEE-luh]**, this character was vouched for by the panther **Bagheera [buh-GEER-uh]** and the bear Baloo. After being hunted by the tiger Shere Khan, this boy is raised by wolves. Name this human protagonist of Rudyard Kipling's *Jungle Book*.

Mowgli

### Extra Question #2: Science – Astronomy

10 points

Harlow Shapley argued that this location was the entire universe when he opposed Heber Curtis during the Great Debate in 1920. The center of this object, which put out large flares detected in recent years by the Chandra X-ray Observatory, is the supermassive black hole Sagittarius A-star. This location's name is based on the appearance of a band of stars in the sky that belong to it. This location is between the Triangulum and Andromeda galaxies in size, making it the second-largest galaxy in the Local Group. Name this galaxy we live in.

Milky Way Galaxy [prompt on **galaxy**]



### Extra Question #3: Social Studies – U.S. History

10 points

David du Bose Gaillard [“GUY”-lard] designed the part of this project known as the Culebra [koo-LAY-brah] Cut. Philippe-Jean Bunau-Varilla [fih-leep zhahn boo-“NOW” vuh-RIL-lah] negotiated to allow for its construction to begin after a failed attempt to help Ferdinand de Lesseps. After Tomás Herran rejected a treaty regarding this project, ships were sent to gain independence from Colombia for its namesake nation. Name this waterway that connects the Atlantic and Pacific Oceans, and runs through a Central American country.

Panama Canal

### Extra Question #4: Mathematics – Math Concepts

10 points

This shape can be parametrized as  $x$  equals  $r$  times cosine theta,  $y$  equals  $r$  times sine theta, and  $z$  equals  $r$ . This solid’s surface area can be calculated using a hypotenuse from a right triangle formed from its two basic dimensions. Cutting off either a pyramid or this kind of shape produces a frustrum. A class of shapes including ellipses and parabolas is defined based on the intersection of a plane and this shape. This is one kind of shape whose volume equals one-third times the area of its base times its height. Name this solid that has a circular base.

(right circular) cone



**Extra Question #5: Fine Arts – Art History**

*10 points*

A recent artist from this country, who traveled the world with his *Trash People*, is H.A. Schult. A member of the New Objectivity school from this country painted *Portrait of the Journalist Sylvia von Harden*. Another painter from this country often created landscapes with people facing into the painting, such as *Wanderer above the Sea of Fog*. A 16th-century engraver from this country made *Knight, Death, and the Devil*. Name this home of the Bauhaus, whose artists include Caspar David Friedrich and Albrecht Dürer.

**Germany** [or Federal Republic of **Germany** or Bundesrepublik **Deutschland**]



**Extra Question #6: Mathematics – Algebra**

*10 points per part*

Although it is known that there are infinitely many of these numbers, it is an open question whether there are infinitely many pairs of them that differ by two, which are called twins.		
<b>1</b>	Name these counting numbers greater than one that are only divisible by one and themselves.	<b>prime</b> numbers or <b>primes</b>
<b>2</b>	This French woman is the namesake of prime numbers that satisfy the rule “twice the prime number plus one is also prime”.	Sophie <b>Germain</b> [zhair-men]
<b>3</b>	This is the smallest prime number that is <i>not</i> a Germain prime, since twice this number plus one can be factored into three times five.	<u>7</u>

**Extra Question #7: Mathematics – Algebra**

*10 points per part*

This kind of relation can be identified from its graph by whether it passes the vertical line test.		
<b>1</b>	Name these relations, in which each element of the domain corresponds to exactly one element in the range.	<b>functions</b>
<b>2</b>	The graph of a function may have this kind of point, where the derivative is zero. They are often, but not always, local extrema.	<b>stationary</b> points [accept <b>critical</b> points]
<b>3</b>	Find the $x$ -coordinate of the stationary point of the function $f$ of $x$ equals $x$ squared minus eight $x$ plus three.	$x=4$ [accept (4, -13)]



### Extra Question #8: Literature – British Literature

10 points per part

The narrator of this poem “saw pale kings, and princes too”.		
1	Name this poem that describes a meeting in a dream between a knight-at-arms and a lady in the meads. Its narrator wakes up on a cold hillside.	“La <u>Belle Dame Sans Merci</u> ”
2	This author of “La Belle Dame Sans Merci” wrote “beauty is truth, truth beauty” in “Ode on a Grecian Urn.”	John <u>Keats</u>
3	In the knight’s dream, he gave the lady four of these before falling asleep. In “Sir Gawain and the Green Knight,” the carcasses of three hunted animals are exchanged for three of these.	<u>kisses</u>

### Extra Question #9: Literature – British Literature

10 points per part

Nicknamed “Handel” by Herbert Pocket, this character took a job in Cairo before eventually returning to <b>Satis [SAT-iss]</b> House.		
1	Name this brother-in-law of Joe Gargery who aided the escaped convict Abel Magwitch. Magwitch later became this character’s benefactor.	<u>Philip Pirrip</u> or <u>Pip</u> [accept any underlined name]
2	Pip is the protagonist of this Charles Dickens novel.	<u>Great Expectations</u>
3	After Pip’s sister, Mrs. Joe, was attacked by Orlick, she wrote the letter ‘T’ to represent this object that Orlick used.	a <u>hammer</u>