



**Question #1: Social Studies**

10 points

<p>This country experienced the “<b>coup d’état</b> [koo deh-tah] of public opinion” in 1957, replacing President <b>Gustavo Rojas Pinilla</b> [goo-STAH-voh ROH-hahss pee-NEE-yah] with a military <b>junta</b> [HOON-tuh]. <b>Rafael Núñez Moledo</b> [rah-fah-EL NOON-yez moh-LAY-doh] led this country’s <b>La Regeneración</b> [lah ray-hen-air-ah-see-OHN] movement, which established this country as a republic. When presidential candidate <b>Jorge Eliécer Gaitán</b> [HOR-hay el-ee-ESS-er “guy”-TAHN] was killed in 1948, this country experienced a violent ten-year period during which over 100,000 people were killed. In recent decades, this country has experienced violence between the National Liberation Army and FARC. Name this South American country that used to control Panama.</p>	<p>(Republic of) <b><u>Colombia</u></b> or (República de) <b><u>Colombia</u></b></p>
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**Question #2: Literature**

10 points

<p>This person wrote “For fruits are all of them female, in them lies the seed” to open his poetry collection <i>Birds, Beasts and Flowers</i>. A novel by this author begins with two sisters discussing whether marriage is an experience or the end of experience. Those sisters, Gudrun and Ursula Brangwen, were also in this author’s earlier novel <i>The Rainbow</i>. Another novel by this author is about Constance and her love affair with the gamekeeper Oliver Mellors. Name this British author of <i>Women in Love</i> and <i>Lady Chatterley’s Lover</i>.</p>	<p>D(avid) H(erbert) <b><u>Lawrence</u></b></p>
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**Question #3: Fine Arts**

10 points

This composer used a descending **arpeggio** [ar-PEJ-ee-oh] in C-sharp minor leading into an “**Un poco piú vivo**” [oon POH-koh PEE-oh VEE-voh] part to open a piece he wrote based on a theme by Baron von Fricken, which he called *Symphonic Études* [AY-toodz]. The fourth movement of this composer’s third symphony is labelled “Solemn” and was inspired by his visit to Cologne while he lived in **Düsseldorf** [DUR-sul-dorf]. One of this composer’s favorite compositions was based on the E. T. A. Hoffmann character Johannes Kreisler. Name this composer of the Rhenish Symphony who was married to **Clara Wieck** [KLAR-ah veek].

Robert Schumann

**Question #4: Science**

10 points

This particle’s anti\*particle was discovered in an experiment near the Savannah River Plant and was based on collisions with protons to form neutrons and positrons. An observatory in Sudbury, Canada named for these particles verified that their oscillations involving flavor changes were responsible for fewer of them being detected in earlier experiments. Because these particles are not affected by electromagnetism or the strong nuclear force, they go through almost everything. Name these extremely light particles that comprise three of the six types of lepton.

neutrinos



**Question #5: Social Studies**

10 points

<p>This law went into effect in 1967 as an amendment to the Administrative Procedure Act. The Supreme Court ruled that this law does not apply to third-party FBI rap sheets in <i>Department of Justice v. Reporters Committee for Freedom of the Press</i>. This law, which applies only to the Executive Branch at the federal level, was extended by the Privacy Act of 1974 and the Government in the Sunshine Act. Name this law that allows people to request unreleased documents from any federal executive agency.</p>	<p><u>Freedom of Information Act</u> or <b>FOIA</b> [FOY-uh]</p>
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**Question #6: Mathematics**

10 points

<p>This mathematician is the namesake of two different things called “primes”, one of which is an actual prime number congruent to 3, mod 4, and the other of which isn’t really a prime number, but is a complex number whose real and imaginary parts are prime. The class of functions named for this mathematician are transformations of the function “<math>e</math> to the opposite of <math>x</math> squared”. The process of row-reducing a matrix is named for this mathematician, and sometimes the name of <b>Wilhelm Jordan</b> [VIL-helm YOR-dahn] is added too. Identify this mathematician, the namesake of the normal distribution that generates a bell curve.</p>	<p>Carl (Friedrich) <u>Gauss</u></p>
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**Question #7: Fine Arts**

*10 points per part*

This painter and Paul Signac [sin-yahk] developed pointillism [“POINT-ill”-izm].		
1	Name this painter of <i>A Sunday on La Grande Jatte</i> .	Georges(-Pierre) <u>Seurat</u> [zhorzh soo-rah]
2	The bottom left corner of <i>La Grande Jatte</i> shows a man reclining on his elbow and also performing this act.	<u>smoking</u> a pipe [accept any reasonable answer including <u>smoking</u> or <u>smoke</u> ]
3	In this other Seurat work, a woman stands on a white horse.	<i>The <u>Circus</u></i> [or <i>Le <u>Cirque</u></i> ]

**Question #8: Fine Arts**

*10 points per part*

There is debate over whether the subject of this memorial statue is making his initials with his hands in American Sign Language.		
1	Name this memorial that is across a reflecting pool from the Washington Monument.	<u>Lincoln</u> Memorial
2	Henry Bacon designed the building that houses the statue of Lincoln, and this sculptor created the statue.	Daniel Chester <u>French</u>
3	A Daniel Chester French sculpture of a woman sometimes called “Miss Forward” is on the top of this state’s capitol.	<u>Wisconsin</u>



**Question #9: Mathematics**

*10 points per part*

A function named for this mathematician outputs 1, 0, or $-1$ depending on whether the input has square factors and an even or odd number of prime factors.		
<b>1</b>	Identify this mathematician whose name is also used for a one-sided surface that can be made by connecting the sides of a loop with a half-twist.	August Ferdinand <u>Möbius</u>
<b>2</b>	Möbius strips have this property implying that you cannot use the right-hand rule when analyzing them.	<u>non-orientability</u> or <u>non-orientable</u> surface or equivalent
<b>3</b>	This other non-orientable shape is formed by passing a tube through its own side and then joining the ends, which is not possible for a solid object in three dimensions.	<u>Klein bottle</u>

**Question #10: Mathematics**

*10 points per part*

If a conditional statement is true, then the statement with this relationship to it is also true.		
<b>1</b>	Name this statement formed by swapping the hypothesis and conclusion, and negating both of them.	<u>contrapositive</u> [or <u>contraposition</u> ]
<b>2</b>	This type of statement is made by swapping the hypothesis and conclusion but <i>not</i> negating them.	<u>converse</u> [accept <u>conversion</u> ]
<b>3</b>	Proof by contrapositive, also called “denying the consequent”, is often referred to by this two-word Latin phrase.	<u>modus tollens</u>



### Question #11: Literature

10 points per part

This author described his experiences fighting for England in World War I in <i>Good-Bye to All That</i> .		
1	Name this author of historical novels such as <i>I, Claudius</i> .	Robert <u>Graves</u>
2	Graves is one of 16 World War I poets honored by a slab at Poets' Corner in Westminster Abbey. The slab has a quote from this poet who wrote "Dulce et Decorum est" [DULL-kay et day-KOR-um est].	Wilfred <u>Owen</u>
3	The Robert Graves book <i>The White Goddess</i> was heavily influenced by this anthropologist's book <i>The Golden Bough</i> .	James (George) <u>Frazer</u>

### Question #12: Literature

10 points per part

In this play, Nick Bottom's head is turned into a donkey's head by a mischievous spirit, or puck, named Robin Goodfellow.		
1	Name this Shakespeare play in which Oberon [OH-bur-ahn] and Titania [tih-TAHN-yah] are the King and Queen of the fairies.	A <u>Midsummer Night's Dream</u>
2	In <i>A Midsummer Night's Dream</i> , Theseus [THEE-see-uss] marries this queen of the Amazons.	<u>Hippolyta</u> [hih-PAH-lih-tuh]
3	In the first scene of the play, this man tells his lover "The course of true love never did run smooth" after being rejected by her father.	<u>Lysander</u>



**Question #13: Science**

*10 points per part*

Rennin is a protein of this type used in cheese production.		
<b>1</b>	Give this term for a protein-based catalyst.	<b><u>enzymes</u></b>
<b>2</b>	John Howard Northrop first isolated this enzyme that breaks down proteins in the stomach. This enzyme works with <b>chymotrypsin [ky-moh-TRIP-sin]</b> and <b>trypsin [TRIP-sin]</b> .	<b><u>pepsin</u></b>
<b>3</b>	This enzyme breaks down <b>peptidoglycans [PEP-tih-doh-GLY-kanz]</b> . It exists in tears and saliva, and it protects from infections by killing bacteria.	<b><u>lysozyme</u></b> ["LICE"-oh-zyme]

**Question #14: Science**

*10 points per part*

This sense is part of the somatosensory system.		
<b>1</b>	Name this sense based on receptors throughout the skin.	<b><u>touch</u></b> (ing) [accept <b><u>tactile</u></b> sense]
<b>2</b>	These <b>mechanoreceptors [meh-KAN-oh-"receptors"]</b> are especially sensitive to high-frequency vibrations.	<b><u>Lamellar corpuscles</u></b> or <b><u>Pacinian corpuscles</u></b>
<b>3</b>	These spaces exist where an axon leaves a Pacinian corpuscle. In any neuron, these spaces are myelin sheath gaps.	<b><u>nodes of Ranvier</u></b> [ran-vee-ay] [prompt on partial answers]



**Question #15: Social Studies**

10 points

A few months after this event, a mayor said “This city will be chocolate at the end of the day.” That mayor, who accepted bribes from Frank Fradella after this event, was Ray Nagin [NAYG-in]. The U.S. president at the time of this event was criticized for saying “Brownie, you’re doing a heck of a job” to the director of FEMA [FEE-muh] during this event, Michael Brown. Many Republicans stated that Mississippi governor Haley Barbour handled this event better than Louisiana governor Kathleen Blanco. Name this natural disaster that struck during the George W. Bush presidency in 2005.

Hurricane Katrina [accept any reasonable answer containing Katrina; prompt on a hurricane]

**Question #16: Miscellaneous**

10 points

This group was formed by its namesake singer and its drummer Mark Pontius. A 2017 video by this group delves into the deep dreams that computers have and features a song that was on its extended play *III* [“three”]. That video is for “Doing It for the Money”, which was the first single from this group’s album *Sacred Hearts Club*. In another video, this band is killed during a rehearsal but is still able to perform their song “Houdini”. Name this indie pop band that recorded the albums *Torches* and *Supermodel* and the song “Pumped Up Kicks”.

Foster the People





**Question #17: Literature**

10 points

Two characters in this play are arrested for stealing wood from Jim Miller, and the same incident results in Crawley getting shot to death. This play's antagonist's father died in a boxcar fire after stealing the central object, which had a carving depicting his family. That fire produced the Ghosts of the Yellow Dog, who were credited with drowning Sutter in his well. The antagonist of this play stays with his Uncle Doaker while he and Lymon sell watermelons and try to sell the title object over the objections of his sister Berniece. Name this play that August Wilson wrote about Boy Willie, who wants to sell the title instrument.

*The Piano Lesson*

**Question #18: Science**

10 points

Organisms in this genus are able to create **paramylon** ["PAIR-uh-MY"-lahn], which is similar to starch. These organisms have two flagella of very different lengths and structures, only one of which is visible. Organisms in this genus also have a **paraflagellar** ["PAIR-uh"-fluh-JEL-ur] body connecting their red eyespot apparatus to the long flagellum. These excavates were among the first organisms classified as protists. The model species **gracilis** ["grass-ILL-us"] is in this genus. Like **Percolozoa** [PUR-koh-loh-ZOH-uh], these organisms have both **mitochondria** ["mite-oh-CON"-dree-uh] and **cristae** [KRIS-tee]. Name these protists that have chloroplasts, and can move and ingest nutrients like animals.

**Euglena** [yoo-GLEE-nuh]



**Question #19: Literature**

*10 points*

After being given away as a hostage, one gold-loving member of this group was thrown into fire three times but survived. Another member of this group owned a ship that could be folded up and fit into a pocket. Upon learning of the trickery involving being sent to Honir, this group decapitated Mimir, whom they had received in a hostage exchange involving Kvasir. Kvasir was the wisest member of this group. These residents of **Vanaheim [VAH-nuh-hym]** were led by **Njord [nee-YORD]**. Name this group of Norse deities that fought a war with the **Aesir [AY-seer]**.

**Vanir** [prompt on **Norse deities** or **Norse gods** before “Norse”; do not accept or prompt on “Aesir”]

**Question #20: Science**

*10 points*

This star was the first, other than the Sun, to have its apparent size measured by telescope in 1920. Measurements made in the 21st century indicated that this variable star was born in the Orion **OB1 [“O B one”]** association but is a runaway star. This star’s observed mass has shrunk significantly in recent decades, and in a few thousand years astronomers will see it hit a wall of interstellar dust. This star and **Antares [“ant-AIR-ease”]** are the only first-magnitude red supergiants known to science. Its name derives from Arabic for its location in Orion’s armpit. Name this star that rivals **Rigel [RY-jul]** for the brightest star in the constellation Orion, though it has been named Alpha **Orionis [aw-RY-uh-niss]**.

**Betelgeuse [“beetle-juice”]**[accept **Alpha Orionis** before “Alpha”]



**Question #21: Mathematics**

*10 points per part*

A committee is supposed to be formed from a group of people that contains three girls and three boys.		
<b>1</b>	How many possible committees can be formed that contain a total of three people?	<b><u>20</u></b>
<b>2</b>	How many possible committees can be formed that contain two girls and one boy?	<b><u>9</u></b>
<b>3</b>	If a committee of three people is selected randomly, what is the probability that all three people selected are boys?	<b><u>1/20</u></b> or <b><u>0.05</u></b>

**Question #22: Mathematics**

*10 points per part*

Consider the graph of <b>[read slowly]</b> $y$ equals $x$ cubed minus $7x$ squared plus $14x$ minus $8$ .		
<b>1</b>	Find the $y$ -intercept.	$y = \underline{-8}$ or $(\underline{0}, \underline{-8})$
<b>2</b>	The graph has $x$ -intercepts at $x$ equals $1$ and $x$ equals $4$ . Find the other $x$ -intercept.	$x = \underline{2}$ or $(\underline{2}, \underline{0})$
<b>3</b>	Give the derivative of $y$ with respect to $x$ . Put the highest-degree term first, the next-highest-degree term second, and so on.	$y' = \underline{3x^2 - 14x + 14}$ [or $y' = \underline{3x^2 + -14x + 14}$ ]



**Question #23: Literature**

10 points per part

In one story in this collection, Isabella buries her lover's head in a pot of basil.		
1	Name this collection of 100 stories told over 10 days by 10 travelers waiting out the plague. This collection was written by <b>Giovanni Boccaccio</b> [joh-VAHN-nee bohk-KAHT-choh].	<i>The <b>Decameron</b></i>
2	This character in <i>The Decameron</i> generally tells the last tale each day. His stories about putting the Devil back in hell and turning <b>Gemmata</b> [jem-MAH-tah] into a mare were omitted from early translations for being too sexual.	<b>Dioneo</b> [dee-oh-NAY-oh]
3	In the third story, Filomena tells a parable about a father bequeathing one of these objects to his sons. Gottfried Lessing retold that story as "Nathan the Wise".	<b>rings</b>

**Question #24: Literature**

10 points per part

This novel is considered a thinly-veiled critique of the dictator Manuel Cabrera.		
1	Identify this novel in which Angel Face is tasked with framing a general for the murder of Colonel <b>Sonriente</b> [sohn-ree-EN-tay].	<i><b>El Señor Presidente</b></i> [el sen-YOR preh-see-DEN-tay]
2	<i>El Señor Presidente</i> is a novel by this Guatemalan Nobel winner. He also wrote <i>The Banana Trilogy</i> .	Miguel (Ángel) <b>Asturias</b> (Rosales)
3	This Colombian author wrote about the Venezuelan dictator Marcos Jiménez in <i>The Autumn of the Patriarch</i> and about the Buendía family in <i>One Hundred Years of Solitude</i> .	Gabriel (José de la Concordia) <b>García Márquez</b> [prompt on partial last name]



**Question #25: Social Studies**

*10 points per part*

This person was a federal cashier at the Baltimore branch of the Second National Bank.		
<b>1</b>	Name this person who became the plaintiff in an 1819 Supreme Court case when he refused to pay a tax from the bank to Maryland.	James <u>McCulloch</u>
<b>2</b>	<i>McCulloch v. Maryland</i> was a unanimous decision written by this longest-serving Chief Justice of the United States.	John <u>Marshall</u>
<b>3</b>	In 1819, Ohio passed a law taxing the Bank of the United States, eventually leading to this Ohio State Auditor losing a Supreme Court case against the bank.	Ralph <u>Osborn</u>

**Question #26: Social Studies**

*10 points per part*

This person became president after serving as Secretary of State and Secretary of War under James Madison.		
<b>1</b>	Name this president who presided over the Era of Good Feelings, though it was an economically difficult time due to the Panic of 1819.	James <u>Monroe</u>
<b>2</b>	During Monroe's presidency, the U.S. signed the Adams-Onís ["oh-NIECE"] Treaty with this nation, clearly defining our border and giving us Florida.	(Kingdom of) <u>Spain</u> [or (Reino de) <u>España</u> ]
<b>3</b>	When Monroe was governor of Virginia, this slave planned a rebellion in Richmond that failed, leading to him and 25 of his followers being hanged.	<u>Gabriel Prosser</u> [accept either]



### Question #27: Science

10 points per part

Calcium chloride, which is used to melt ice, is an example of this class of compounds.		
1	Give this general term for an ionic compound that can be formed by a neutralization reaction.	<u>salt</u> (s)
2	What salt results from the neutralization of calcium hydroxide [“hide-ROCK-side”] and sulfuric acid?	<u>calcium sulfate</u> [prompt on <u>CaSO<sub>4</sub></u> ]
3	This mineral composed of calcium sulfate di*hydrate [“die-HIDE-rate”] defines 2 on the Mohs [mohz] scale of hardness.	<u>gypsum</u>

### Question #28: Science

10 points per part

Ethyne molecules are often described as having this effect between <i>s</i> and <i>p</i> orbitals.		
1	Name this phenomenon in which orbitals mix as molecules form.	orbital <u>hybridization</u> [or <u>hybridizing</u> orbitals; accept any reasonable answer containing <u>hybrid</u> ]
2	Molecules with $sp^3d^2$ [“S P three D two”] hybridization have this molecule geometry.	<u>octahedral</u> geometry [accept <u>octahedron</u> ]
3	The nitrogen atom in these organic functional groups is $sp^2$ [“S P two”]-hybridized, which is explained by pi delocalization [dee-“local”-ih-ZAY-shun]. Amines [AY-meenz] and carboxylic [“car-box-ILL”-ik] acid are combined to form this group in the nylon polymer [pah-lih-mur].	(acid) <u>amide</u> [AY-mynd] group [or <u>amide</u> s]



**Question #29: Literature**

10 points

This character loses her father when a child waving a palm frond causes his horse to throw him. This woman chooses her career based on her childhood fascination with Prince Rupert's drops. This ward of Chas Ahearn plays poker on the ship *Leviathan* [leh-"VIE"-uh-thun] with a minister immediately after confessing her gambling habit. Her flame Dennis Hasset is reassigned to Boat Harbour, where her new lover ventures to deliver a gift from Sydney to Bellinger to win her inheritance. This woman bets on the transport of a glass cathedral. Name this character who makes that bet against Oscar in a novel by Peter Carey.

**Lucinda Leplastrier**  
[accept either]

**Question #30: Social Studies**

10 points

Part of this country's capital was taken over at the end of World War I by revolutionaries who wore aster flowers and killed its former Prime Minister **István Tisza** [EESHT-vahn TEE-za]. Operation Margarethe was the Nazi takeover of this country, whose Jews were deported by Adolf Eichmann despite **Miklós Horthy's** [MEEK-lohsh HOR-tee'z] attempts to protect them. **János Kádár** [YAH-nohsh KAH-dar] used Soviet help to run this country after the Soviets turned against **Imre Nagy** [IM-reh nahzh] in 1956. This country is now run by the **Fidesz** [FID-ess] Party led by **Viktor Orbán** [VEEK-tor OR-bahn]. Name this country whose form of government was once called "Goulash Communism".

(Republic of) **Hungary**  
[or **Magyarország** or  
**Magyar Köstársaság**]



**Question #31: Science**

*10 points*

This compound is a byproduct of the most common method to produce silver **iodate** [“**EYE-oh-date**”]. Heating a combination of this compound and ammonium sulfate yields nitrous oxide and other compounds. One of the inspirations for the development of the Haber process was that the Allies had made it difficult for the Germans to make ammonia by cutting off their supply of this compound from Chile. This compound is called “Chile saltpeter” to differentiate it from regular saltpeter, since this compound does not contain potassium. Name this compound that contains sodium and the  $\text{NO}_3$  ion.

**sodium nitrate** [accept **soda niter** or **nitrate of soda**; accept  $\text{NaNO}_3$  before “ $\text{NO}_3$ ”; prompt on **Chile saltpeter** before it is mentioned; do not prompt on “saltpeter”]

**Question #32: Mathematics**

*10 points*

A generalization of this theorem uses factorials and divided differences. An extended version of this theorem uses two functions and is named for Augustin-Louis Cauchy. This theorem is often used to prove the fundamental theorem of calculus. A special case of this theorem for horizontal tangent lines is called Rolle’s theorem. This theorem states that a given secant line has the same slope as some tangent line. Name this theorem that can be proven using the extreme value theorem and intermediate value theorem.

**mean value** theorem  
[accept **MVT**]





### Extra Question #1: Literature

10 points

One holiday in this novel celebrates the Hundred Martyrs to Democracy. The narrator of this novel calls the poet Sherman Krebs a “wrang-wrang”. One character in this novel works at General Forge and Foundry, is inspired by a Marine general who wants a solution for mud, and uses a metaphor about the different ways to stack cannonballs to explain one of his inventions. The narrator of this novel meets members of his “karass” and stays at the Casa Mona hotel in the Republic of San Lorenzo, which has outlawed **Bokononism** [**BOH-koh-nahn-izm**]. Name this novel by Kurt Vonnegut in which the world’s oceans are destroyed by ice-nine.

Cat’s Cradle

### Extra Question #2: Fine Arts

10 points

One painting by this artist shows a man on one knee having his eyes anointed by Jesus. This painter of *Christ Healing the Blind* depicted Jesus wearing red between a man in armor and a man in green with a rope in *The Disrobing of Christ*. Another painting by this artist is based on a legend of Saints Stephen and Augustine burying a person who gave a lot of money to a church. Name this painter of *The Burial of the Count of Orgaz* who lived in Italy and **Toledo** [**toh-LAY-doh**], Spain after leaving his birthplace, Crete.

El **Greco** [el GREH-koh]  
[or Doménikos  
**Theotokópoulos**]



### Extra Question #3: Mathematics

10 points

Like a type of **paraboloid** [par-AB-uh-loyd], one of these surfaces can be generated two ways by moving a straight line, so it is doubly ruled. These surfaces can be generated by setting a constant equal to an expression with three terms in which variables are squared as long as one or two terms are added and the others are subtracted. These surfaces are asymptotic to a double cone. One type of these surfaces is made of one sheet, while the other one has two sheets. Name these surfaces made by rotating a two-branched conic section.

**hyperboloids** (of one or two sheets)

### Extra Question #4: Science

10 points

The natural form of this material comes from *Hevea brasiliensis* [heh-veh-ah brah-seel-YEN-siss] trees, and it is a polymer of **isoprene** ["EYE-so-preen"]. One of the common synthetic forms of this substance is made from the **polymerization** [puh-LIM-ur-ih-ZAY-shun] of **styrene** [STY-reen] and **butadiene** [byoo-tuh-"DIE"-een]. This substance can be extracted from latex, and like latex, it can be used to make gloves. A process patented in 1845 adds sulfur to this material in order to make it more durable. That process, developed by Charles Goodyear, is vulcanization. Name this elastic material used to make hoses and tires.

**rubber** [prompt on **latex** before it is mentioned]



**Extra Question #5: Social Studies**

*10 points*

This event was blamed for the death of Roger Toothaker, who died in prison. Samuel Sewall believed that his relatives' deaths were God's retribution for his role in this event, and he offered a public apology. This event took place 30 years after a similar but smaller event involving the death of Elizabeth Kelly in Hartford, Connecticut. This event began when the daughter and niece of a reverend started having unexplained fits. Name this event in the late 1600s during which women were accused of using special powers in Massachusetts.

Salem witch trials  
[prompt on partial answers;  
accept any reasonable  
answer containing both  
underlined portions]



**Extra Question #6: Mathematics**

*10 points per part*

This property of a graph changes at inflection points.		
<b>1</b>	Name this property that is called “up” when the second derivative of a function is positive and the first derivative is increasing.	<b><u>concavity</u></b> or <b><u>concave</u></b> [accept <b><u>concave up</u></b> or <b><u>convexity</u></b> ]
<b>2</b>	Find the $x$ -coordinate of the point of inflection for the graph of <b>[read slowly]</b> $y$ equals $x$ cubed plus $3x$ squared plus $5x$ minus $2$ .	$x = \underline{-1}$ [accept, but do not otherwise reveal, <b><u>(-1, -5)</u></b> ]
<b>3</b>	Find the $y$ -coordinate of that point of inflection, which, again, is at $x = -1$ for the graph of $y$ equals $x$ cubed plus $3x$ squared plus $5x$ minus $2$ .	$y = \underline{-5}$ or <b><u>(-1, -5)</u></b>

**Extra Question #7: Mathematics**

*10 points per part*

This method of integration finds volumes using the formula $2\pi$ times the integral of the quantity $x$ times $f$ of $x$ .		
<b>1</b>	Name this method that is often contrasted with the disk method.	(integration by/with) cylindrical <b><u>shells</u></b>
<b>2</b>	Find the volume when the region between the $x$ -axis and the line $y$ equals $5$ <b>[pause]</b> from $x$ equals $0$ to $x$ equals $3$ <b>[pause]</b> is rotated around the $y$ -axis.	<b><u>45 pi</u></b> cubic units
<b>3</b>	Find the volume when the region between the $x$ -axis and the line $x$ plus $y$ equals $3$ <b>[pause]</b> from $x$ equals $0$ to $x$ equals $3$ <b>[pause]</b> is rotated around the $y$ -axis.	<b><u>9 pi</u></b> cubic units



**Extra Question #8: Social Studies**

*10 points per part*

Answer the following about the Iditarod dogsled race:		
<b>1</b>	The opening ceremony is held in this most populous city in Alaska.	<u>Anchorage</u>
<b>2</b>	The last five checkpoints of the race are along the southern coast of this peninsula in the Bering Sea. This peninsula, bordered to the south by Norton Sound, was part of the Bering land bridge.	<u>Seward</u> Peninsula
<b>3</b>	The Iditarod ends at this town on Alaska’s western coast. The race commemorates a medicine run to this city during a 1925 <b>diphtheria</b> [dif-THEER-ee-uh] epidemic.	<u>Nome</u>

**Extra Question #9: Social Studies**

*10 points per part*

The Antrim Plateau in this place was formed by volcanic activity.		
<b>1</b>	Name this area—variously described as a county, province, or country—where the River Bann rises in the Mourne Mountain range. Its northern coast has a formation of hexagonal rock columns called the Giant’s Causeway.	<u>Northern Ireland</u> [do not accept or prompt on “Ireland”]
<b>2</b>	There are similar rock columns in Fingal’s Cave on Staffa, an island in this chain off the western coast of Scotland. This chain includes the Isle of Skye.	<u>Hebrides</u> [HEB-rih-deez] Islands
<b>3</b>	Similar rock formations form a pavement called the Church Floor on the south side of this island nation between Scotland and Greenland.	(Republic of) <u>Iceland</u> [or Lydveldid <u>Ísland</u> ]