

Illinois Masonic Academic Bowl
2023 State Tournament

> Round 1 > 1st Section Toss-up Questions

## Question \#1: Science

10 points
Back when radium paint was used to make luminous watches, the sulfide of this element was typically used with the paint. An ion of this element is central to both carbonic anhydrase ["an-HIDE-race"] and alcohol dehydrogenase [dee-"hi"-DRAH-juhn-"ace"]. This metal is in the calamine [KAL-uh-"mine"] mineral, which contains both its carbonate and its silicate [SILL-ih-"Kate"]. The pyrithione [pir-ih-THY-ohn] of this element is used to treat skin conditions, including dandruff. To prevent the rusting of steel or iron, a coating of this element is applied, which is called galvanization. This element usually makes up about one-third of brass, with most of the rest being copper. Name this metal whose atomic symbol is " Zn ".
zinc [accept $\underline{\mathbf{Z n}}$ before the end]

## Question \#2: Social Studies

10 points

| When this person was 27 years old, he asked the | John (Forbes) Kerry |
| :--- | :--- |
| Senate Foreign Relations Committee "How do you |  |
| ask a man to be the last man to die in Vietnam? |  |
| How do you ask a man to be the last man to die for |  |
| a mistake?". Many years later, this person's service |  |
| in Vietnam was criticized by the group Swift Boat |  |
| Veterans for Truth, who mocked his three Purple |  |
| Hearts. As secretary of state, this person helped |  |
| negotiate the Joint Comprehensive Plan of Action, |  |
| which is commonly known as the Iran nuclear deal. |  |
| Name this politician from Massachusetts who was |  |
| the 2004 Democratic nominee for president and lost |  |
| to George W. Bush. |  |



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## Question \#3: Miscellaneous

10 points
A so-called "speech" in a book by this writer says
"There was no point in fighting on our side or theirs.
We had all the momentum; we were riding the crest
of a high and beautiful wave." That speech is in a
book this person wrote after being assigned by
Sports Illustrated to write captions for the Mint 400
motorcycle race. This person received attention
early in his career by writing the book Hell's Angels
and the article "The Kentucky Derby Is Decadent
and Depraved". Several works by this journalist
include the words "fear and loathing" in their titles.
Name this writer who developed the concept of
gonzo journalism.

Hunter S(tockton)
Thompson

## Question \#4: Literature

10 points
In this play, Francisco says "I saw him beat the The Tempest surges under him, and ride upon their backs", but Alonso replies "No, no, he's gone." Alonso is the King of Naples in this play, and those lines refer to his son Ferdinand. In this play, Alonso's daughter Claribel had recently gotten married in Africa. Ferdinand is actually alive, and in this play, he falls in love with the daughter of the man who was the Duke of Milan before that title was taken away. In this play, the former duke's daughter, Miranda, falls in love with help from the spirit Ariel after witnessing a shipwreck. Name this play by William Shakespeare that is set on an island and features the sorcerer Prospero.

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## Question \#5: Science

10 points
In 1799, one of these events was seen because Aimé Bonpland [eh-may "bone"-plahn] got a concussion while traveling with Alexander von Humboldt. These events are measured by their zenithal [ZEE-nuh-thul] hourly rate. The point that these events seem to come from is called the radiant, and with an altered suffix, these events are named for the constellation the radiant is located in. These events occur when Earth passes through the path of a comet. The Swift-Tuttle comet is responsible for one of these events that takes place in August, called the Perseids. Name these events during which a lot of so-called "shooting stars" can be seen.
meteor showers [accept meteoroid showers]

## Question \#6: Social Studies

10 points

| John H. Flavell [fluh-VEL] helped popularize this | Jean (William Fritz) |
| :--- | :--- |
| scientist's work in the United States by developing | Piaget [zhahn <br> tests about the ability to distinguish between <br> appearance and reality. This scientist classified his |
| pee-ah-zhay] |  |
| ideas as genetic epistemology |  |
| [eh-PISS-teh-MAH-luh-jee], and he built on |  |
| Immanuel Kant's schema [SKEE-muh] theory. This |  |
| scientist showed that children have trouble |  |
| understanding the conservation of volume of a |  |
| liquid, and he demonstrated that infants treat |  |
| hidden objects as though they no longer exist. |  |
| Name this Swiss psychologist whose theory of |  |
| cognitive development included the formal |  |
| operational and sensorimotor ["sensory-motor"] |  |
| stages. |  |

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## Question \#7: Mathematics

10 points per part

| In the decimal system, 10 has this role. |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Give this term for the number of distinct digits <br> in a number notation system. Its powers are <br> used to determine place values. | base or radix |  |
| $\mathbf{2}$ | What is the name of the base 16 system? | hexadecimal system <br> [prompt on $\underline{\text { hex }]}$ |  |
| $\mathbf{3}$ | Convert the number "one zero three" from <br> hexadecimal to decimal. | $\mathbf{2 5 9}$ |  |

## Question \#8: Mathematics

10 points per part

|  | term describes shapes that are congruent t for scaling. |  |
| :---: | :---: | :---: |
| 1 | Name this relationship between shapes in which lengths are proportional and angles are congruent. | similarity [or being similar; accept similarness |
| 2 | This name is given to shapes that exhibit self-similarity and have a fine structure so that these shapes have the same level of complexity at all scales. | fractals |
| 3 | What is the fractal dimension of the Koch ["coke"] snowflake fractal? | logarithm base 3 of 4 [accept $\log 4$ over $\log 3$ or $\ln 4 / \ln 3$ or equivalents thereof, consulting with math experts if necessary] |

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## Question \#9: Literature

10 points per part

| The protagonist of this novel gets advice from <br> Prince Korasoff on how to attract women. |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Name this French novel in which the <br> protagonist uses the advice to get Mathilde <br> [mah-tild] de la Mole to love him. | The Red and the Black: <br> A Chronicle of the 19th <br> Century) [or Le Rouge et <br> le Noir(: : Chronique de <br> XIX. Siécle); accept Red <br> and Black or Scarlet <br> and Black] |  |
| $\mathbf{2}$ | This author wrote The Red and the Black and <br> The Charterhouse of Parma. | Stendhal [or Marie-Henri <br> Beyle] |  |
| $\mathbf{3}$ | The Charterhouse of Parma begins in this city. <br> Stendhal claims that residents of this city used <br> to be brave but are now more interested in <br> printing "sonnets on pink silk handkerchiefs." | Milan, Italy [accept |  |
| Milano, Italia] |  |  |  |

## Question \#10: Literature

10 points per part

| In this novel, Rosa the Beautiful is mistakenly <br> poisoned. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name this novel about Rosa's sister Clara del <br> Valle ["VIE"-ay]. | The House of the <br> Spirits [or La casa de <br> los espiritus] |
| $\mathbf{2}$ | This author wrote The House of the Spirits and <br> lity of the Beasts. | Isabel (Angélica) Allende <br> ["eye"-EN-day] (Llona) |
| $\mathbf{3}$ | Clara's daughter loves Pedro Tercero but <br> marries a man from this country when she <br> thinks Pedro is dead. | France [or French <br> Republic or République <br> francaise] |

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## Round 1 <br> 2nd Section Teamwork Questions

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## Question \#11: Science

10 points per part

| Natural killer cells and various T cells are part of <br> this body system. |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Name this system that protects from diseases. | immune system [accept <br> immunity system] |  |
| $\mathbf{2}$ | These white blood cells, which develop in bone <br> marrow, produce antibodies. | $\underline{\text { B }}$ cells [accept B <br> lymphocytes] |  |
| $\mathbf{3}$ | These proteins inhibit virus replication. The <br> gamma type of these proteins is released by <br> natural killer cells and natural killer T cells. | interferons <br> [in-tur-FEER-ahnz] <br> [accept IFNs] |  |

## Question \#12: Science

10 points per part

| $\begin{array}{l}\text { One of these } 20 \text { compounds was first isolated from } \\ \text { asparagus, so it is called asparagine } \\ \text { ["uh-SPARE-uh-jean"]. }\end{array}$ |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | $\begin{array}{l}\text { Name these molecules that combine to form } \\ \text { proteins. }\end{array}$ | amino acids |
| $\mathbf{2}$ | $\begin{array}{l}\text { This type of covalent bond links amino acids in } \\ \text { a protein. }\end{array}$ | $\begin{array}{l}\text { peptide bond(s) [prompt } \\ \text { on amide bond(s)] }\end{array}$ |
| $\mathbf{3}$ | $\begin{array}{l}\text { The simplest amino acid, glycine [GLY-seen], is } \\ \text { a precursor to this class of compounds with four } \\ \text { pyrrole [PEER-ohl] rings. Heme [heem] is one } \\ \text { of these compounds. }\end{array}$ | porphyrins |
| [POR-fur-inz] |  |  |$]$

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## Question \#13: Social Studies

10 points per part

| Answer the following about laws designed to help <br> women: |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | This numbered title within the Education <br> Amendments of 1972 forbids discrimination in <br> institutions that receive government aid. This <br> title is often applied to funding for athletics. | Title $\mathbf{9}$ |  |
| $\mathbf{2}$ | This law, passed in 1994, includes a rape shield <br> law and help for people forced out of their <br> homes due to stalking. | Violence Against <br> Women Act or VAWA |  |
| $\mathbf{3}$ | This person is the namesake of a 2009 Fair Pay <br> Act that extends the statute of limitations for <br> equal-pay lawsuits. | Lilly (McDaniel) <br> Ledbetter [accept either <br> underlined name] |  |

## Question \#14: Social Studies

10 points per part

| This Consitutional amendment states "The Congress shall assemble at least once in every year." |  |  |
| :---: | :---: | :---: |
| 1 | Give the number of this so-called "lame duck amendment" that shortened the time period between elections and inaugurations. | 20th Amendment [accept Amendment $2 \mathbf{0}$ ] |
| 2 | The 20th Amendment established this date for presidential inaugurations. | January 20th [or 20 January] |
| 3 | The 20th Amendment also established this date for beginning Congressional terms. | January 3rd [or $\mathbf{3}$ January] |

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## Question \#15: Literature

10 points

> This creature lived in a bottomless body of water called the Alcyonian [al-see-OH-nee-un] Lake. While this creature was alive, humans had to cover their mouth and nose with cloth when approaching that lake because of the fumes. The blood of this creature was used to kill Nessus, which is why the Shirt of Nessus was poisonous. This creature was killed with the help of Iolaus ["eye"-oh-LAY-uss], who used fire to cauterize this creature's necks. This creature was killed as the second labor of Hercules. Name this creature that grew two new heads every time that one of its heads was chopped off.

Lernaean Hydra [or Hydra of Lerna]

## Question \#16: Mathematics

10 points
If this point is taken as a pedal point, then the pedal equation can be expressed as " $p$ squared equals a constant times $r^{\prime \prime}$. This point is the midpoint of the latus [LAT-uss] rectum. This point is at the pole in the equation " $r$ equals $e$ times $d$ divided by the quantity 1 plus $e$ cosine theta". The distance from this point for any point on a shape is the numerator in a formula used to calculate eccentricity. An ellipse has two of these points, but the two points are in the same place in the special case of a circle. Name this point that is inside a parabola and is the same distance from the parabola vertex as the directrix is.


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## Question \#17: Social Studies

10 points

| A siege of a city on this island started in 1648, | Crete [or Kriti] |
| :--- | :--- |
| lasted 21 years, and gained control of the city of |  |
| Candia. This island was the site of the ancient city |  |
| of Lato [LAH-toh], which was inhabited by the |  |
| Dorians. A very early civilization on this island was |  |
| devastated by a volcanic eruption to its north on |  |
| the island of Thira [THEE-ruh], which is also |  |
| known as Santorini. This island is the main site |  |
| where the scripts Linear A and Linear B have been |  |
| found. This island's palace of Knossos [NAH-sus] |  |
| was unearthed by Arthur Evans, and it was built by |  |
| the Minoan [mih-NOH-un] civilization. Name this |  |
| island that is now the largest and most populous of |  |
| the Greek islands. |  |

## Question \#18: Fine Arts

10 points
In one song by this composer, death behaves like a field marshal. That song comes after a song in Modest (Petrovich) Mussorgsky which death convinces a peasant to perform a trepak [truh-PAHK] dance in this composer's Songs and Dances of Death. Another piece by this composer begins with high-pitched strings and woodwinds followed by slow brass notes representing demons. That piece was one of the works by this composer that Nikolay Rimsky-Korsakov claimed to have corrected. Maurice Ravel [rah-vell] re-orchestrated this composer's piano suite inspired by paintings by Viktor Hartmann. Name this Russian composer of Pictures at an Exhibition and Night on Bald Mountain.

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## Question \#19: Science

10 points
One material that takes advantage of this phenomenon is polyvinyl alcohol plastic that has been doped with iodine. Because cordierite [KOR-dee-uh-"rite"] enhances this phenomenon, it can be used to locate the Sun when the Sun is hidden. An angle used for this phenomenon equals the arctangent of the ratio of indices of refraction. This phenomenon exists when a transverse wave lacks rotational symmetry. Intensity is multiplied by the squared cosine of an angle to quantify this phenomenon in Malus's law. Name this phenomenon caused by reflection at Brewster's angle, in which a transverse wave vibrates in a single direction.
(linear) polarization
[accept polarized or polarizing]

## Question \#20: Literature

10 points
The subject of one poem by this writer is "He who,
William Cullen Bryant from zone to zone, guides through the boundless sky thy certain flight, in the long way that I must tread alone, will lead my steps aright." In that poem, this writer said "There is a Power" which relates to both the writer and the bird he is addressing. A longer poem by this writer ends, "By an unfaltering trust, approach thy grave, like one who wraps the drapery of his couch about him, and lies down to pleasant dreams." That poem is this American poet's consideration of death. Name this 19th-century poet who wrote "To a Waterfowl" and "Thanatopsis".

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Round 1<br>4th Section<br>Teamwork Questions

## Question \#21: Social Studies

10 points per part

| This rebellion was considered put down with the <br> 1956 <br> kee-MAH-The of Dedan Kimathi [DEH-dun <br> though its goals were mostly achieved a few years <br> later. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name this response to British colonial rule over <br> Kenya. | Mau Mau rebellion [or <br> Mau Mau uprising or <br> Mau Mau revolt] |
| $\mathbf{2}$ | This person became the first prime minister <br> and then the first president of Kenya once it <br> gained independence. His son Uhuru became <br> president in 2013. | Jomo Kenyatta |
| $\mathbf{3}$ | This person was the president of Kenya from <br> 1978 to 2002. He banned opposition parties for <br> several years before being pressured to allow <br> multi-party elections. | Daniel (Toroitich) arap <br> Moi [MOH-ee] |

## Question \#22: Social Studies

10 points per part

| This period of Russian history lasted from 1598 to <br> 1613. |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Name this violent time when several False <br> Dmitries claimed to be the tsar. | Time of Troubles [or <br> Smutnoe vremya or <br> Smuta $]$ |  |
| $\mathbf{2}$ | Feodor [FYOH-dur] I, who died childless in <br> 1598, was the last tsar of this dynasty that <br> controlled at least parts of Russia for 700 years. | Rurikid dynasty |  |
| $\mathbf{3}$ | This brother-in-law of Feodor I ruled Russia <br> from 1598 to 1605. His son Feodor II was killed <br> two months after he died. | Boris (Fyodorovich) <br> Godunov |  |
| $\left[\begin{array}{l}\text { GAH-duh-nawff] } \\ \text { [prompt on Boris] }\end{array}\right.$ |  |  |  |

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Round 1<br>4th Section<br>Teamwork Questions

## Question \#23: Science

10 points per part

| Glucose, fructose, and galactose [guh-LAK-tohss] are these types of sugars. |  |  |
| :---: | :---: | :---: |
| 1 | Give the one-word name for simple sugars. | monosaccharides [mah-noh-"SACK-uh-rides" |
| 2 | Glucose, fructose, and galactose all have the same chemical formula. How many carbon atoms are in one molecule of each of them? | six carbon atoms |
| 3 | This type of monosaccharide has an end carbon double-bonded to an oxygen atom, as opposed to the double bond being to a different carbon atom in a ketose [KEE-tohss]. | aldose |

## Question \#24: Science

10 points per part

| This process is often used after the Haber <br> [HAH-bur] process. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name this process that converts ammonia to <br> nitric [NY-trik] acid. | Ostwald process |
| $\mathbf{2}$ | This valuable metal is often used as a catalyst <br> in the Ostwald process. This metal is also used <br> in catalytic converters in cars. | platinum [accept Pt] |
| $\mathbf{3}$ | This adjective is used to describe concentrated <br> nitric acid that contains dissolved nitrogen <br> dioxide. The substance can be used as a rocket <br> propellant. | (red) fuming nitric acid <br> [prompt on red] |

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## Question \#25: Literature

10 points per part

| In this poem, a creature named Errour is <br> described as "A monster vile, whom God and man <br> does hate." |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Name this poem in which Arthur kills Orgoglio <br> [or-GOH-lee-oh] to help Una. | The Faerie Queene |  |
| $\mathbf{2}$ | This poet wrote The Faerie Queene. | Edmund Spenser |  |
| $\mathbf{3}$ | The Redcrosse Knight is captured by Orgoglio <br> because he is tricked by this woman, who is <br> described as "a false sorceress". | Duessa |  |

## Question \#26: Literature

10 points per part

| One of William Shakespeare's best known sonnets <br> is Sonnet 18, which begins, "Shall I compare thee <br> to a summer's day?" |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Like all sonnets, how many lines does it have? | $\mathbf{1 4}$ |
| $\mathbf{2}$ | Give the adjective that finishes the second line. <br> It begins "Thou art more lovely and more..." | temperate |
| $\mathbf{3}$ | Sonnet 102 refers to this mythological character <br> singing during summer. This character, who is <br> turned into a nightingale, is also referenced in <br> Shakespeare's Titus Andronicus. | Philomel <br> [ILL-uh-mell] [accept <br> Philomela] |

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## Question \#27: Fine Arts

10 points per part

| Some of the famous silkscreens of this actress were <br> made shortly after her 1962 death and used a <br> publicity photo from the movie Niagara. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name this famous actress who is shown 50 <br> times in the diptych [DIP-tik] named for her. <br> The famous silkscreens of her from the 1960s <br> are in a wide variety of colors. | Marilyn Monroe [or <br> Norma Jeane Mortenson; <br> prompt on Marilyn] |
| $\mathbf{2}$ | This artist created those silkscreens of Monroe. <br> He also worked with a photographic assistant to <br> create Self-Portrait in Drag. | Andy Warhol [or Andrew <br> Warhola Jr.] |
| $\mathbf{3}$ | Warhol also made several images of this food, <br> including the image on the cover of the album <br> The Velvet Underground $\mathcal{E}$ Nico. | bananas [prompt on <br> fruits] |

## Question \#28: Fine Arts

10 points per part

| James Warren invented a common design for this <br> type of architectural structure, made of equilateral <br> triangles that alternate their orientation. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name these structures consisting of multiple <br> members, such as beams, that act together to <br> support weight. They are often used in bridges <br> and roofs. | trusses [prompt on struts] |
| $\mathbf{2}$ | This type of dome, consisting of triangular <br> elements, was popularized by R. Buckminster <br> Fuller. | geodesic dome |
| $\mathbf{3}$ | This surrealist artist is buried in a crypt below <br> a stage floor that is under a glass geodesic <br> dome cupola [KYOO-puh-luh]. That <br> arrangement is in a museum dedicated to this <br> artist in his hometown in Catalonia. | Salvador (Domingo Felipe <br> Jacinto) Dalí (i <br> Domènech) |

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## Round 1 <br> 5th Section Toss-up Questions

## Question \#29: Science

10 points
The uncinate [UN-sin-"ate"] process is a part of this organ that hooks around the superior mesenteric [meh-zen-TAIR-ik] artery. Some of the cells from this organ are called acinar [ASS-in-ur] cells because they look like grapes. This organ's so-called "juice" contains trypsinogen [trip-SIN-oh-jen] and several enzymes. The duct of Wirsung [VEER-zoong], which is sometimes named for this organ, connects it to the bile duct and through the major duodenal papilla [doo-oh-DEE-nul puh-PILL-uh] to the small intestine. Like the stomach and intestines, this organ has delta cells that secrete somatostatin [soh-MAT-oh-STAT-in]. Name this organ that secretes glucagon and insulin from its islets ["EYE"-lets] of Langerhans.
pancreas


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## Question \#31: Literature

10 points
One play by this writer begins with the title character inside her house crying and saying "I

Euripides
[yoo-RIP-uh-deez] can't stand this pain, this misery." At the same time, a nurse and tutor are talking outside the house with the title character's children. Another play by this writer begins with Athena and Poseidon talking about Ajax the Lesser. In that play, Andromache [an-DRAH-muh-kee] tells Hecuba [HEK-yoo-buh] about the death of Polyxena [pah-lee-ZEE-nuh]. Those plays are sometimes performed before and after this writer's play about Clytemnestra's [kly-tem-NESS-truh'z] daughter, Electra. Name this ancient Greek playwright who wrote The Trojan Women and Medea [meh-DEE-uh].

## Question \#32: Social Studies

10 points
The decision in Katzenbach v. Morgan quoted this case's opinion about government actions, saying "Let the end be legitimate." The unanimous decision in this case stated that the words "necessary and proper" should "be considered as synonymous". This case gave implied powers to the federal government. Referring to state actions, this case's decision stated "An unlimited power to tax involves, necessarily, a power to destroy." This case's named plaintiff was a cashier. Name this 1819 case involving the operation of the Second Bank of the United States in Baltimore.

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## Extra Question \#1: Science

10 points

One explanation of this phenomenon on the protein level is the transcription-translation feedback loop discovered by Jeffrey Hall, Michael Young, and Michael Rosbash in Drosophila melanogaster [druh-SAH-fih-luh meh-LAH-noh-GASS-tur]. The suprachiasmatic [SOO-pruh-ky-az-MAT-ik] nucleus allows entrainment to control this phenomenon in humans after receiving input from photo-sensitive ganglion ["GANG"-lee-un] cells. This phenomenon is regulated by melatonin [meh-luh-TOH-nin], which is why melatonin is sometimes used to treat insomnia. This phenomenon is the synchronization of organisms with the light-dark cycle. Name this phenomenon for biological cycles that repeat about every 24 hours.

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circadian rhythms [accept circadian cycle or circadian clock; prompt on diurnal rhythms or answers mentioning sleep or day or night or cycles or rhythms]

## Extra Question \#2: Fine Arts

When Paolo Veronese [vair-oh-NAY-zay] died in 1588, this painter was given the job of creating an enormous fresco for the Doge's [DOH-juh'z] Palace in Venice, which this artist completed with his son Domenico. That work is Il Paradiso. This artist depicted Saint Mark descending to perform one of the posthumous miracles attributed to him in The Miracle of the Slave. Another painting by this artist takes a famous painting scene but gives much more attention to the servants and shows the scene at an angle rather than straight-on. Name this artist who, 100 years after Leonardo da Vinci, painted The Last Supper.

10 points
Tintoretto [or Jacopo
Robusti or Jacopo Comin]

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## Extra Question \#3: Literature

10 points

| Andrew Carnie wrote a book titled for being $A$ | syntax |
| :--- | :--- |
| Generative Introduction to this subject, and Noam |  |
| Chomsky wrote a book about Aspects of the Theory |  |
| of this subject. This subject is sometimes |  |
| contrasted with semantics, which is focused on |  |
| meaning, while this subject is more focused on |  |
| structure. Sometimes typos can confuse computer |  |
| language compilers into thinking that there is a |  |
| type of error named for this subject. While |  |
| grammar consists of a wide set of structural rules, |  |
| this subject concerns the order of words in a |  |
| sentence. Name this set of rules for the way that |  |
| linguistic elements are combined to form a subject. |  |

## Extra Question \#4: Mathematics

10 points
The first example of these numbers is the only one
that does not end in a 1 when written in base 9,
and it is also the only one of these numbers not
ambers
divisible by a perfect square. The Euclid-Euler


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## Round 1 <br> <br> Extra Section <br> <br> Toss-up Questions

}

## Extra Question \#5: Social Studies

10 points

| This dynasty established the Canghai | Han dynasty |
| :--- | :--- |
| [CHAHNG-"hi"] commandery when it controlled |  |
| part of the Korean peninsula after the reigns of |  |
| Wen and Jing. This dynasty sent Zhang Qian |  |
| [CHEE-en] on diplomatic missions that can be |  |
| considered the opening of the Silk Road. It is |  |
| common for Chinese people to name the characters |  |
| in their alphabet after this dynasty. An |  |
| interregnum from this dynasty was eventually |  |
| ended when Liu Xiu [lyoo shyoo] gained control |  |
| from a leader supported by the Red Eyebrows in |  |
| 25 CE. Name this dynasty that ruled between the |  |
| Qin [chin] dynasty and the Three Kingdoms. |  |



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Round 1<br>Extra Section Teamwork Questions

## Extra Question \#6: Mathematics

10 points per part

| Two integration methods are named for this technique, one of which uses trigonometric functions and the other of which often uses the letter $u$ as a variable. |  |  |
| :---: | :---: | :---: |
| 1 | Name this technique. It can be used to solve systems of equations by solving one equation for one variable and using that result to replace the variable in the other equation. | substitution [accept <br> substituting or <br> substitute; accept <br> trigonometric <br> substitution or <br> $u$-substitution] |
| 2 | Solve for $x$ in the system " $y$ equals $2 x$ plus 5 [pause] and $2 x$ plus $y$ equals $29 "$. You only need to solve for $x$. | $x=\underline{\mathbf{6}}$ (and $y$ equals 17) |
| 3 | Evaluate the integral of $2 x$ times the cosine of the quantity $x$ squared [pause] as $x$ goes from 0 to the square root of pi. | $\underline{0}$ |

## Extra Question \#7: Mathematics

10 points per part

| These points can be stationary points without <br> being extrema. |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | Name these points on the graph of a function at <br> which the concavity changes from positive to <br> negative or vice versa. | inflection points [or <br> points of $\underline{\text { inflection; }}$ <br> prompt on $\underline{\text { flex }}(\mathrm{es})]$ |
| $\mathbf{2}$ | Find the $x$-coordinate of the inflection point of <br> the graph of " $y$ equals $x$ cubed minus <br> $x$ squared". You only need to find the <br> $x$-coordinate. | $x=\mathbf{1 / \mathbf { 3 }}$ |
| $\mathbf{3}$ | Find the $x$-coordinate of the inflection point of <br> the graph of " $y$ equals the cotangent of $x "$, <br> where $x$ is between zero and pi radians. | $x=\mathbf{p i}$ over $\mathbf{2}$ radians or $x$ <br> $=\mathbf{1} / \mathbf{p} \mathbf{p}$ radians |



Illinois Masonic Academic Bowl 2023 State Tournament

Round 1<br>Extra Section Teamwork Questions

## Extra Question \#8: Social Studies

10 points per part

| Answer the following about anti-draft protests in <br> the U.S.: |  |  |
| :---: | :--- | :--- |
| $\mathbf{1}$ | This city was the site of a massive riot in 1863 <br> that turned into a race riot, including the <br> looting of the Colored Orphan Asylum on Fifth <br> Avenue near 42nd Street. | New York City, New <br> York [accept NYC] |
| $\mathbf{2}$ | This woman and Alexander Berkman were <br> sentenced to prison in 1917 for organizing the <br> No Conscription League. She was later <br> deported to her home country, Russia. | Emma Goldman |
| $\mathbf{3}$ | In 1966, this person burned his draft card. <br> Despite the First Amendment, the Supreme <br> Court upheld this person's conviction in 1968. | David Paul O'Brien |

## Extra Question \#9: Social Studies

10 points per part

| The first version of this group started in Pulaski, <br> Tennessee, on December 24, 1865. |  |  |  |
| :---: | :--- | :--- | :---: |
| $\mathbf{1}$ | Name this organization that violently opposed <br> Reconstruction and supported white supremacy. | Ku Klux Klan [accept <br> KKK] |  |
| $\mathbf{2}$ | This Confederate general was the first Grand <br> Wizard of the Ku Klux Klan. In 2021, his bust <br> was removed from the Tennessee state capitol. | Nathan Bedford Forrest |  |
| $\mathbf{3}$ | Forrest was criticized for a massacre of <br> African-American soldiers just after this 1864 <br> battle in Tennessee. | Battle of Fort Pillow |  |

