



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
1st Section  
Toss-up Questions

**Question #1: Literature – British Literature**

10 points

One character in this novel justifies the title act as revenge for Daisy and other potential kidnapping victims. At this novel's conclusion, it is agreed that the Yugoslavian police will be told about a man who wore a Wagon Lit uniform to perform the title action. A character in this novel justifies not taking a case by saying, "I do not like your face, Mr. Ratchett." The sequence of events in which twelve different passengers had a hand in killing a man was revealed by **Hercule Poirot** [air-kyool pwah-roh]. Name this mystery, written by Agatha Christie, that takes place on a train.

**Murder on the Orient Express** [accept **Murder on the Calais Coach**]

**Question #2: Science – Physics**

10 points

Solutions to a quantum mechanical system of this type contain the **Hermite** [air-meet] polynomials. That system contains energy levels with equal spacing. Einstein's model of heat capacity treats atoms in a lattice as this kind of system. A dashpot can be used to "damp" this kind of system, and under the small-angle approximation, a pendulum can be treated as this type of system. The equations of motion for these systems consist of a linear combination of sine and cosine functions. Name this type of system exemplified by a mass on a spring.

simple **harmonic oscillator(s)** [or simple **harmonic oscillation**; accept answers referring to simple **harmonic motion**; prompt on **spring(s)**; prompt on **oscillation** or **oscillator**]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
1st Section  
Toss-up Questions

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

10 points

The public wing of the first version of this organization was known as the Young Men's Democratic Clubs. Following the murder of Mary **Phagan [FAY-gun]**, William Simmons led the revival of this group at Stone Mountain. Its members plotted the bombing of the 16th Street Baptist Church in Birmingham. Politician David Duke used to be a Grand Wizard of this organization. Name this organization glorified in the film *The Birth of a Nation*, whose members often wear pointed hoods and white robes.

(Knights of) the Ku Klux  
**Klan** or **KKK**

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

10 points

If the capacity type of this quantity for an object does not equal the covering type, then the object is classified as a fractal. For a vector space, this quantity equals the number of vectors in the basis. When this value is  $n$ , a simplex has  $n$  plus one **vertices [VER-tih-seez]**. Tesseract exists in a space where this quantity is four, while this value is zero for a single point. Name this quantity equal to the number of coordinates required to specify a point in a space, which is two for a plane.

**dimension**(ality)



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
1st Section  
Toss-up Questions

**Question #5: Literature – World Literature**

10 points

In this play, one character uses a scarf and parasol to hide himself from Zeus. Iris has to remind this drama's protagonist of her immortality. During a negotiation in this play, one protagonist calls **Heracles** ["HAIR"-uh-kleez] a bastard and gets Zeus's negotiators to agree to terms that involve a transfer of power. This play opens with a search for a **Hoopoe** [HOO-poh] by **Euelpides** [yoo-EL-pih-deez] and **Pisthetaerus** [piss-thuh-TAY-rus]. Name this **Aristophanes** [air-iss-TAH-fuh-nee] play in which avian creatures build Cloudcuckooland.

*The **Birds** [or **Ornithes**]*

**Question #6: Fine Arts – Art History**

10 points

This architect designed a museum featuring the yellow prisms of **Olafur Eliasson's** [OH-luh-fur uh-LEE-uh-sun's] *Inside the Horizon*, the **Louis Vuitton** [LOO-ee vwee-TAWN] Foundation. This architect also designed the Weisman Art Museum at the University of Minnesota. Another one of this architect's projects features the Sky Church and was based on a model he made out of sliced guitars. That building in Seattle is the Experience Music Project. Name this architect whose stainless steel designs include the Walt Disney Concert Hall in Los Angeles, and Chicago's BP Pedestrian Bridge and Jay Pritzker Pavilion.

Frank (Owen) **Gehry** [or Frank Owen **Goldberg**]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
2nd Section  
Teamwork Questions

**Question #7: Science – Biology**

*10 points per part*

This technique typically uses an <b>agarose</b> [AH-guh-rose] matrix.		
<b>1</b>	Name this technique used to separate DNA according to size, by applying an electric field.	gel <b>electrophoresis</b>
<b>2</b>	The DNA in the gel can be visualized by staining it with this <b>intercalating</b> [in-TER-kuh-“late”-ing] agent, which fluoresces with an orange color.	<b>ethidium bromide</b> [accept <b>EtBr</b> ]
<b>3</b>	Ethidium bromide is typically fluoresced using this kind of light. Overexposure to it may cause skin cancer.	<b>ultraviolet</b> light [or <b>UV</b> light; accept other answers containing <b>ultraviolet</b> or <b>UV</b> ]

**Question #8: Science – Biology**

*10 points per part*

This set of reactions requires <b>NADPH</b> [N-A-D-P-H] and converts carbon dioxide to <b>G3P</b> [G “three” P].		
<b>1</b>	Name this set of reactions referred to as the “light-independent” reactions of photosynthesis.	<b>Calvin</b> (-Benson-Bassham) cycle [accept <b>reductive pentose phosphate</b> cycle; prompt on <b>dark reactions</b> or <b>C3</b> or <b>CBB</b> ]
<b>2</b>	The Calvin cycle uses this enzyme to <b>carboxylate</b> <b>RuBP</b> [kar-“BOX”-ih-“late” R-U-B-P]. It is the most abundant enzyme on Earth.	<b>RuBisCO</b> [accept <b>ribulose-1,5-bisphosphate carboxylase/oxygenase</b> ]
<b>3</b>	This alternative form of carbon fixation is found in bundle sheath-containing plants like corn. It is named for the number of carbons in <b>oxaloacetate</b> [“OX”-uh-loh-“ASS”-ih-tayt].	<b>C4</b> [accept longer answers that contain <b>C4</b> ]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
2nd Section  
Teamwork Questions

**Question #9: Literature – British Literature**

10 points per part

This character is the elder daughter of Baptista, and her marriage is a precondition for the marriage of Bianca.		
1	Name this protagonist who ends up being challenged by her husband, <b>Petruchio</b> [peh-TROO-kee-oh].	<b>Katherina</b> Minola [prompt on <b>Kate</b> or <b>Minola</b> or <b>shrew</b> ]
2	Petruchio traveled from this town to Padua to find a wife. In another Shakespearean play, Proteus and Valentine were <i>Two Gentlemen</i> from this city.	<b>Verona</b>
3	When trying to woo Bianca, both <b>Lucretio</b> [loo-KREE-shee-oh] and Hortensio pretended to disguise themselves in this role in order to be in her company.	<b>tutor</b> [accept <b>teacher</b> ]

**Question #10: Literature – British Literature**

10 points per part

This device became fully operational in the same lab that the <b>ILLIAC</b> [ILL-ee-ak] computers were manufactured in Urbana, Illinois.		
1	Name this device that was Initially able to easily defeat Frank Poole in chess. It is eventually reduced to singing “Daisy Bell” as its modules are removed.	<b>HAL 9000</b> [accept <b>Heuristically programmed ALgorithmic computer 9000</b> ; prompt partial answers]
2	HAL 9000 is the primary antagonist of this novel, in which it attempts to kill the crew aboard the <i>Discovery One</i> .	<b>2001: A Space Odyssey</b>
3	<i>2001: A Space Odyssey</i> is by this author.	(Sir) Arthur C(harles) <b>Clarke</b>



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

**Round 8**  
**2nd Section**  
**Teamwork Questions**

**Question #11: Mathematics – Geometry**

*10 points per part*

Euclid's [YOO-klid's] fourth postulate states that all of these geometric figures are congruent to each other.		
<b>1</b>	Name these angles that measure 90 degrees.	<b><u>right</u></b> angles
<b>2</b>	Find the length of the hypotenuse of a right triangle if one of the legs measures the square root of 6 units, and the other leg measures 3 units.	<b><u>root 15</u></b> [or the <b><u>square root of 15</u></b> or <b><u>radical 15</u></b> or equivalents]
<b>3</b>	If one of the acute angles in a right triangle measures 12 degrees, 23 minutes, and 10 seconds, what is the measure of the other acute angle?	<b><u>77 degrees</u></b> and <b><u>36 minutes</u></b> and <b><u>50 seconds</u></b>

**Question #12: Mathematics – Geometry**

*10 points per part*

This term refers to a section of a curve.		
<b>1</b>	Name this term, often used for part of the circumference of a circle.	<b><u>arc</u></b>
<b>2</b>	If a circle has a radius of 12 units, what is the length of an arc that subtends a 60-degree angle around the circle?	<b><u>4 pi</u></b> units [do not accept "4" or "pi"]
<b>3</b>	Find the area of the smaller circular sector in the same situation: a circle with a radius of 12 units, and a sector that includes a 60-degree central angle.	<b><u>24</u></b> (times) <b><u>pi</u></b> square units [do not prompt on partial answer]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
2nd Section  
Teamwork Questions

**Question #13: Fine Arts – Classical Music & Opera**

10 points per part

This composer only wrote one opera: <i>Fidelio</i> .		
1	Name this composer whose nine symphonies include “Eroica”.	Ludwig van <b>Beethoven</b>
2	This is the nickname of Beethoven’s sonata “Quasi una fantasia”. This nickname is based on Ludwig Rellstab’s comparison of this piece to a view of Lake Lucerne at night.	<b>Moonlight</b> Sonata
3	This is the nickname of Beethoven’s ninth violin sonata. It is named for a violinist who did not play it; a Leo Tolstoy novella is named for it.	<b>Kreutzer</b> [KROYT-sur] sonata

**Question #14: Fine Arts – Classical Music & Opera**

10 points per part

He wrote the operas <i>Così fan tutte</i> [KOH-zee fahn TOOT-tay] and <i>Don Giovanni</i> [dohn joh-VAH-nee].		
1	Name this composer from <b>Salzburg</b> [“SALTS”-burg] who started performing when he was six years old.	Wolfgang Amadeus <b>Mozart</b> [or Johannes Chrysostomus Wolfgangus Theophilus <b>Mozart</b> ]
2	This is the nickname of Mozart’s 41st symphony, the last and the longest one that he wrote.	<b>Jupiter</b> symphony
3	Mozart wrote two pieces, a quintet and a concerto, for Anton Stadler to play on this instrument.	<b>clarinet</b>



**Question #15: Miscellaneous – Popular Culture**

10 points

This man portrayed the history teacher Chuck Noblet on *Strangers with Candy*, and he allegedly broke an arm stopping a civil union. This author of *I Am America, And So Can You* spearheaded the “March to Keep Fear Alive.” He hosted “This Week in God” when he was a Daily Show correspondent, and went on to portray a “high-status idiot” as a parody of conservative talk show hosts on his own show. Name this former Comedy Central host whose *Report* [reh-POR] used to follow *The Daily Show*, and who succeeded David Letterman as the host of *The Late Show*.

Stephen Colbert

**Question #16: Science – Biology**

10 points

The amount of this substance in solution can be quantified by using an extinction coefficient of 40 and observing UV-Vis absorption at 260 nanometers. This substance contains a major and minor groove, and it is typically found in the right-handed B conformation. *Topoisomerases* [TOH-poh-“EYE”-SAH-mur-“aces”] can increase or decrease the supercoiling of this molecule, which is synthesized during the S phase of mitosis. Unlike a similar molecule, this molecule typically exists in paired strands. Name this double-*helical* [HEE-luh-kul] molecule that contains human genetic information.

DNA [or deoxyribonucleic acid]





Illinois Masonic Academic Bowl  
2016 Sectional Tournament

**Round 8**  
**3rd Section**  
**Toss-up Questions**

**Question #17: Social Studies – World History**

*10 points*

At this meeting, it was agreed that control of **Lauenberg** [**LAO-en-bairg**] would be offered as compensation for the loss of Norway. Four of this meeting's attendees agreed to remain united per the Treaty of **Chaumont** [**shao-mawn**]; rifts within that group provided an opening for Charles-Maurice de Talleyrand. Organized by Klemens von Metternich, it was an attempt to strike a balance among the European powers following the fall of Napoleon. Name this 1814 gathering in the capital of Austria.

Congress of Vienna

**Question #18: Literature – U.S. Literature**

*10 points*

In one work, this author wrote of “the currents of the Universal Being circulating through me” and being “part or particle of God”. In one essay, he wrote of an object that takes everything in as opposed to reflecting: the “transparent eyeball”. In another essay, he advised the reader to “trust thyself” and that “a foolish consistency is the hobgoblin of little minds.” This person used the line “the shot heard 'round the world” in his “Concord Hymn.” Name this Transcendentalist who wrote “Nature” and “Self-Reliance”.

Ralph Waldo Emerson



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
3rd Section  
Toss-up Questions

**Question #19: Science – Astronomy**

10 points

Following the Miller-Urey experiment, this person and Bishun Khare used long-wavelength ultraviolet radiation to produce **amino** [uh-MEE-noh] acids. This person became the namesake of the Mars Pathfinder lander that released *Sojourner*. This person speculated about the origins of human intelligence in *The Dragons of Eden*. He worked with his wife Ann Druyan on projects explaining Earth's place in the universe, such as *Pale Blue Dot*. Name this popular scientist whose last book was *Billions and Billions* and who, before Neil deGrasse Tyson, made the original show *Cosmos*.

Carl Sagan

**Question #20: Social Studies – U.S. History**

10 points

This person was the ambassador to China and then the director of the CIA under President Ford. This founder of the Points of Light Foundation was the first to publicly describe supply-side economics as “voodoo.” This person uttered the slogan “Read my lips: no new taxes” during his defeat of Michael Dukakis; not being able to uphold that promise helped prevent his re-election against Bill Clinton in 1992. Name this leader, the 41st president of the United States and the father of the 43rd president.

George H(erbert) W(alker) **Bush** [accept **Bush 41** or **Bush the Elder** or equivalents; prompt on **Bush** or **George Bush**; do not accept or prompt on “George W(alker) Bush”]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
4th Section  
Teamwork Questions

**Question #21: Literature – U.S. Literature**

10 points per part

Bill Driscoll and the narrator, two “desperate men”, attempt the title action in this story to raise money for a town-lot scheme in western Illinois.		
1	Name this story in which the son of Ebenezer Dorset is kidnapped, but annoys the kidnappers so much they cannot keep him.	“The <u>Ransom of Red Chief</u> ”
2	This author of “The Gift of the Magi” wrote “The Ransom of Red Chief.”	<u>O. Henry</u> [or William Sydney <u>Porter</u> ]
3	Instead of paying \$1,500 as the kidnappers demanded, they paid Ebenezer this amount to take back the child.	<u>\$250</u>

**Question #22: Literature – U.S. Literature**

10 points per part

One bartender in this novel supplies vagrants with alcohol left in glasses by patrons of Ida’s Bar.		
1	Name this novel featuring Dora Flood, a restaurant owner who also runs a brothel. The plot revolves around attempts to throw a party for the marine biologist Doc.	<u>Cannery Row</u>
2	<i>Cannery Row</i> and its sequel, <i>Sweet Thursday</i> , were written by this author. He wrote about the gentle giant Lennie in <i>Of Mice and Men</i> .	John (Ernst) <u>Steinbeck</u> (, Jr.)
3	<i>Cannery Row</i> , like most of Steinbeck’s novels, is set in this state.	<u>California</u>



**Question #23: Mathematics – Trigonometry**

*10 points per part*

It is defined by the ratio of arc length to radius for a circle.		
<b>1</b>	Name this unit used to measure angles, especially in calculus where it is more convenient than degrees.	<b><u>radian</u></b> (s)
<b>2</b>	To the nearest degree, how many degrees make up one radian?	<b><u>57</u></b> degrees
<b>3</b>	Find the number of revolutions around a circle equal to one hundred pi radians.	<b><u>50</u></b> revolutions

**Question #24: Mathematics – Trigonometry**

*10 points per part*

The Pythagorean Theorem is a special case of this law.		
<b>1</b>	Name this law that can be used to find the length of one side of a triangle given the lengths of the other two sides and the measure of the angle between them.	law of <b><u>cos</u></b> ines
<b>2</b>	What is the cosine of 90 degrees?	<b><u>zero</u></b> [do not accept responses like “no answer” or “undefined”; do not accept answers that include units]
<b>3</b>	Find the length of the side of a triangle if the angle opposite that side measures 60 degrees, one of the sides measures 1 unit, and the other side measures 2 units.	<b><u>root 3</u></b> units [or the <b><u>square root of 3</u></b> or <b><u>radical 3</u></b> or equivalents, do not accept “3”]



**Question #25: Social Studies – World History**

*10 points per part*

This person's "Three Principles of the People" focused on nationalism, democracy, and social reform.		
<b>1</b>	Name this founder of the <b>Kuomintang</b> [kwoh-min-TAYNG] who fled to Japan following the rise to power of <b>Yuan Shikai</b> [yoo-AHN shee-KAI].	<b>Sun</b> Yat-Sen [or <b>Guofu</b> , <b>Sun</b> Zhongshan, <b>Sun</b> Deming, or <b>Sun</b> Dixiang; prompt on <b>Yat-sen</b> ]
<b>2</b>	This man was Sun Yat-sen's successor as the leader of the Kuomintang. He fled to Taiwan following his loss in a civil war.	<b>Chiang</b> Kaishek [or <b>Jiang</b> Jieshi, <b>Chiang</b> Chieh-shih, or <b>Chiang</b> Chung-cheng; prompt on <b>Kaishek</b> ]
<b>3</b>	Chiang Kaishek's forces were unable to capture the Red Army during this retreat. At its conclusion, Mao Zedong and <b>Zhou Enlai</b> [zhoh en-"LIE"] rose to the Chinese Communist Party leadership.	<b>Long March</b> [accept <b>Changzheng</b> ]

**Question #26: Social Studies – World History**

*10 points per part*

This person's popularity sank due to his proposed policy of "Trialism", which gave the Slavs an equal voice along with Germans and Magyars.		
<b>1</b>	Name this man who complained to <b>Fehim Čurčić</b> [feh-HEEM KUR-chik], the mayor of <b>Sarajevo</b> [sar-uh-YAY-voh], about having a bomb thrown at him shortly before his assassination.	Archduke Franz <b>Ferdinand</b>
<b>2</b>	Franz Ferdinand was assassinated by this member of the Black Hand, who failed in two suicide attempts immediately following the attack.	Gavrilo <b>Princip</b>
<b>3</b>	The ultimate goal of the Black Hand was the liberation of members of this ethnic group from being under Hapsburg or Ottoman rule.	<b>Serbians</b> or <b>Serbs</b>



**Question #27: Science – Physics**

*10 points per part*

These two statements can be derived from the laws of conservation of charge and conservation of energy.		
<b>1</b>	Name these rules used in circuit analysis. One is known as the “junction rule” and the other is called the “loop rule”.	<b>Kirchhoff’s</b> [KUR-kawff(’z)] circuit laws
<b>2</b>	Kirchhoff’s loop rule states that the sum of any voltages around a closed loop must equal this value.	<b>zero</b>
<b>3</b>	The junction rule states that the sum of this quantity entering a node must equal the sum exiting. This quantity is measured in amperes.	(electrical) <b>current</b>

**Question #28: Science – Physics**

*10 points per part*

This hypothetical process consists of two <b>isentropic</b> [“eye”-sin-TRAH-pik] and two <b>isothermic</b> [“eye”-soh-THUR-mik] steps.		
<b>1</b>	Identify this thermodynamic cycle, named for a Frenchman, which extracts the maximum possible amount of work from a heat engine.	<b>Carnot</b> [kar-noh] cycle or <b>Carnot</b> engine
<b>2</b>	For the Carnot engine, this value is equal to one minus the ratio of the temperatures of the cold and hot reservoirs. This quantity is the work done by the engine divided by the energy put into the engine.	thermodynamic <b>efficiency</b>
<b>3</b>	According to the first law of thermodynamics, thermal efficiency cannot be greater than this number, as otherwise energy would be created.	<b>one</b> [or <b>100%</b> ]



**Question #29: Literature – World Literature**

10 points

When asked whether he has heard of another character, this character responds by asking, “The world’s biggest windbag?”. This character’s introduction to **Treville** [treh-VEEL] was stolen by the “Man from **Meung** [myoon],” who turned out to be the Comte de **Rocheport** [rosh-for]. After being insulted at a game of tennis by **Bernajoux** [bair-nah-zhoo], this Gascon won the ensuing duel. **Brisemont** [brees-mawn] drinks poisoned wine meant for this character, sent by his nemesis Milady de Winter. Name this swordsman who befriends Athos, Porthos, and **Aramis** [AIR-uh-miss] in Alexander **Dumas’** [doo-mahs’] *The Three Musketeers*.

**d’Artagnan**

**Question #30: Science – Chemistry**

10 points

Four equivalents of this compound are found in **EDTA** [E-D-T-A]. This compound is formed from the activity of **acetaldehyde dehydrogenase** [uh-see-TAL-duh-“hide” dee-“high”-DRAH-juh-nayss] in the body. The simplest amino acid, **glycine** [GLY-seen], is an amino derivative of this compound. Industrial methods that form this compound involve reacting methanol with carbon monoxide, and include the Cativa and Monsanto processes. This compound is the second-smallest **carboxylic** [“car-box-ILL”-ik] acid after formic acid. Name this acid with formula **HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>** [“H, C two, H three, O two”], responsible for the acidity of vinegar.

**acetic** acid [or **ethanoic** acid; prompt on **HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>** before it is mentioned]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
5th Section  
Toss-up Questions

**Question #31: Social Studies – U.S. History**

*10 points*

As leader of this group, John Robinson Jr. lent members currency marked for destruction. Alexander Spotswood hired many of this entity's members as tobacco inspectors. After it backed the Boston Tea Party, John Murray dissolved this group, whose secret meetings led to the First Continental Congress. George Washington, Thomas Jefferson, and Patrick Henry served in this legislature. It first met in Jamestown and later relocated to Williamsburg. Name this legislative body of colonial Virginia.	(Virginia) House of <b><u>Burgesses</u></b>
---	---

**Question #32: Mathematics – Math Concepts**

*10 points*

Modular arithmetic and this function are used to test for prime numbers using Wilson's theorem. If the "double" variant of this function is applied to an even number, the result equals two raised to half of the even number, end quantity, times this function applied to half the even number. This function can be calculated recursively by multiplying the input times the value of this function on the input minus one. If there are $n$ people, this function of $n$ is the number of orders in which the people can be lined up. Name this function represented by an exclamation point.	( $n$ ) <b><u>factorial</u></b> function
---	--





Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
Extra Section  
Toss-up Questions

**Extra Question #1: Science – Biology**

*10 points*

Stress and low levels of this quantity result in the **adrenal** [uh-DREE-nul] glands releasing **cortisol** [“COURT”-ih-sawl]. A pair of hormones that control this quantity are released by the alpha and beta cells of the islets of Langerhans. This measurement is higher in people after eating, which is why people typically fast before testing it. **Glucagon** [GLOO-kuh-gahn] increases this quantity by inducing the breakdown of **glycogen** [GLY-koh-jen]. Name this quantity lowered by insulin, which is often high in patients with diabetes.

**blood sugar(s)** level or  
**blood glucose** level

**Extra Question #2: Social Studies – World History**

*10 points*

One of the legends of this structure is that part of it collapsed from the tears of a widow, revealing the bones of her dead husband. After being extended, this structure did not serve its purpose during the **Tumu** [TOO-moo] Crisis. It was extended to Yumen, and many of its separate sections were built during the Warring States period. Overlapping at **Badaling** [bah-dah-leeng] and extending from Shan-hai-guan to Jia-yu-guan, it was originally conceived by Shi Huang Di and later built to its greatest extent during the Ming Dynasty. Name this long structure built to keep the Mongols out of China.

**Great Wall** of China [or  
**Wan Li Chang Cheng** or  
**10,000-Li-Long Wall**]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

Round 8  
Extra Section  
Toss-up Questions

**Extra Question #3: Mathematics – Math Concepts**

*10 points*

If this value can only be achieved by the trivial solution of a linear combination of vectors, then the set of vectors is independent. This number is the constant term for each equation of a homogeneous system. If a matrix's determinant is this number, the matrix is called singular and cannot be inverted. This value is the cardinality of the empty set, and if a quadratic equation's discriminant has this value, then the equation has exactly one solution. This number is the additive identity. Name this real number that cannot be divided by.

zero

**Extra Question #4: Fine Arts – Art History**

*10 points*

The engineers **Émile Nougier** [ay-meel noog-yay] and Maurice **Koechlin** ["COKE-lawn"] hired the architect Stephen **Sauvestre** [saw-vest-ray] to design this structure. This structure inspired the structures of the Long Ta, Funkturm Berlin, and the second tallest structure in Japan, but the one in Japan is painted orange and white. This structure's second floor has a restaurant, named for Jules Verne, that is still accessed by an Otis elevator. This structure is located at the end of the **Champ de Mars** [shawm day mar] near the **Seine** [sen] river. Name this tower built for the 1889 World's Fair on the centenary of the French Revolution in Paris.

Eiffel Tower [or La tour  
Eiffel]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

**Round 8**  
**Extra Section**  
**Toss-up Questions**

**Extra Question #5: Literature – World Literature**

*10 points*

The year before this play takes place, the protagonist spent three weeks making ornaments that were destroyed by the family cat. One character in this drama, fearing for her wife's teeth, tried to forbid her from having macaroons. A signature from the protagonist's dead father became leverage for Krogstad to blackmail this play's main character. Name this drama about the marriage between Torvald and Nora Helmer, written by Henrik Ibsen.

*A Doll's House [or Et Dukkehjem; accept A Doll House]*



### Extra Question #6: Science – Physics

*10 points per part*

This physicist corrected Ampère’s law by adding a term called the displacement current.		
<b>1</b>	Identify this Scottish physicist, the namesake of a set of four equations used in electrodynamics.	James Clerk [“Clark”] <b><u>Maxwell</u></b>
<b>2</b>	Two of Maxwell’s equations are named for this German scientist. The one pertaining to magnetism implies that magnetic monopoles cannot exist.	(Johann) Carl Friedrich <b><u>Gauss</u></b> [rhymes with “house”]
<b>3</b>	Maxwell originally published 20 equations, which were reformulated by this man to the four by using the curl and divergence operators.	Oliver <b><u>Heaviside</u></b>

### Extra Question #7: Science – Physics

*10 points per part*

These particles are the gauge bosons for the electromagnetic interaction.		
<b>1</b>	Name these particles, the quanta of light.	<b><u>photons</u></b> [FOH-tahnz]
<b>2</b>	Einstein won his Nobel Prize for explaining the photoelectric effect, in which photons striking a metal cause the metal to eject this particle.	<b><u>electrons</u></b>
<b>3</b>	Wave-particle duality was extended from just photons to all matter by this man’s formula, which states that his namesake wavelength is equal to Planck’s constant over the object’s momentum.	Louis <b><u>de Broglie</u></b> [loo-ee duh broy]



Illinois Masonic Academic Bowl  
2016 Sectional Tournament

**Round 8**  
**Extra Section**  
**Teamwork Questions**

**Extra Question #8: Social Studies – World History**

*10 points per part*

This loser at the Battle of <b>Châlons</b> [shah-lawn] died of a nosebleed on the night of his wedding to <b>Ildico</b> [il-dee-KOH].		
<b>1</b>	Name this “Scourge of God” who owned a weapon known as the Sword of Mars.	<b>Attila</b> the Hun [or <b>Atli</b> or <b>Etzel</b> ]
<b>2</b>	After receiving a letter from Honoria containing a ring, Attila demanded half of this empire as a dowry.	<b>Western Roman</b> Empire [prompt on partial answer]
<b>3</b>	Attila’s loss at Châlons was the turning point of an invasion of this ancient region. Julius Caesar wrote a commentary on a series of wars fought here culminating in a defeat of <b>Vercingetorix</b> [vur-sin-JEH-tuh-riks].	<b>Gaul</b> [accept <b>Gallia</b> ; prompt on answers mentioning the <b>Gallic</b> Wars]

**Extra Question #9: Social Studies – World History**

*10 points per part*

This ringleader of Operation Condor was advised by the “Chicago Boys” on economic policy.		
<b>1</b>	Name this leader who was succeeded by Patricio Aylwin in 1990. He died in 2006 before a court could try him for the mass murder of political dissidents.	<b>Augusto Pinochet</b> [oh-GOO-stoh pee-noh-SHAY] (Ugarte)
<b>2</b>	Pinochet was the leader of this country, which is now headed by Michelle <b>Bachelet</b> [BA-shuh-lay]	(Republic of) <b>Chile</b> [CHEE-lay] [or República de <b>Chile</b> ]
<b>3</b>	Pinochet maintained the policy, begun by Carlos <b>Ibáñez</b> [ee-BAHN-yez] del Campo and completed by Salvador <b>Allende</b> [“eye”-YEN-day], of nationalizing mines that produced this metal.	<b>copper</b>