

RTO 2016

Round 3

Tossups:

1. **The developmental cycles of cicadas are based around these numbers. These numbers are guaranteed to be units in modular arithmetic. The harmonic series of these numbers has been proven to be divergent. The Riemann conjecture, if true, holds important information about these numbers.** (*) Goldbach's conjecture deals with these numbers as does most of modern cryptography. Factoring is a tough problem because of the scarcity of these numbers, most of which are odd. FTP, name these numbers, some of which include Mersenne, Fibonacci, Fermat, 2, and 7.

Primes

2. **This painting is the subject of the book by Michael Jacobs, *Everything is Happening*, which tells the story of how it was sent to neutral Switzerland in 1939 because it was considered such a valuable part of the heritage of its nation. The 20th century French philosopher, Michel Foucault, said of this** (*) 17th century painting that it was the "first self-conscious work of modern art" because of how it draws the viewer into the painting as they view the reflection of the royal couple in the mirror watching how the painter painted their daughter. Some 18th century art critics thought the inclusion of dwarves in FTP which painting depicting the daughter of King Philip IV of Spain by Diego Velazquez?

Las Meninas or The Maids of Honor

3. **This day comes with the obsolete tradition of eating vegetarian items such as colcannon and potato pancakes. Indira Gandhi was gunned down on this day and Harry Houdini died of gangrene and peritonitis from ruptured appendix. In France and similarly in** (*) Mexico, a related holiday is celebrated by remembering the dead and putting chrysanthemums on their graves. Celebrations of this holiday includes apple bobbing, attending bonfires, or attending costume parties. FTP, name this holiday followed by All Saints' Day on which children partake in guising or "trick-or-treating" on October 31.

Halloween (or All Hallows' Eve)

4. **The Peggy Eaton affair happened under this president. The main platform of people who opposed this president eventually formed the Whig Party. This president oversaw the** (*) Nullification Crisis in South Carolina and opposed the Second Bank of the United States. A nickname for this president was "Old Hickory." For ten points, name this president of the United States, preceded by John Quincy Adams and succeeded by Martin Van Buren, who gained fame after a victory at the Battle of New Orleans.

Andrew Jackson

5. **During World War Two, a battle was fought here between the Soviets and Germans as a part of the defense of Moscow, which the Soviets eventually lost. In 1812, this field also served as the spot where Russian troops made a** (*) last stand for Moscow against Napoleon, and was the single deadliest day during the Napoleonic Wars. For ten points, name this battle field near Moscow where Napoleon is said to have lost the campaign to take Russia.

Borodino Field

6. **Independently of Alonzo Church, this man worked on the *Entscheidungsproblem* [ehn-shai-dungs-prob-lemm] and determined that there's no algorithm to determine if an arbitrary assertion has a proof. An old Apple logo** (*) was thought by some to be a reference to this man's death. This man worked on a "bombe" that would test rotor settings at Bletchley Park during World War II. He was convicted of

gross indecency and was forced to undergo hormone therapy. FTP, name this man who helped break the Enigma code and invented criteria for determining if a machine can identify itself as human with his namesake test.

Alan Mathison Turing

7. **One of this composer's concert overtures is also known as Fingal's Cave and was actually inspired by his visit to the eponymous Scottish archipelago. That piece was dedicated to King Frederick William IV of Prussia. This composer also composed a Symphony No. 3 in A Minor, also known as the (*) Scottish.** This composer achieved fame and fortune very early in his life, and other works of his include the Italian Symphony and his Songs Without Words. For ten points, name this Romantic composer of music for A Midsummer Night's Dream.

Felix Mendelssohn

8. **In a novel by this author, an artist ruins her unfinished painting with a blob of red paint, but it is still bought by a man who is killed while fighting a duel in Switzerland over her. Another of his novels includes a scene in Gloriani's garden (*) in which the protagonist delivers a speech including the line "Live all you can, it's a mistake not to" to Little Bilham. His character Christopher Newman decides not to blackmail Madame de Bellegarde with a letter provided by Mrs. Bread. FTP, name this author of "The American" and "The Ambassadors."**

Henry James (prompt on James)

9. **The restaurant Sixteen is in this city's second tallest building, which is owned by a 2016 presidential candidate. The title of a 2015 film detailing this city was controversial because its portmanteau of the city's name and Iraq, likening the area to a (*) war zone. An airport in this city has the most aircraft traffic in the world. That airport is O'Hare International Airport. This "City of Big Shoulders" is the seat of Cook County. Rahm Emanuel, the mayor of this city, fired its police chief after the late-2015 release of a video of a police officer, Jason Van Dyke, shooting teenager Laquan McDonald sixteen times. For ten points, name this setting of *The Good Wife*, the "Windy City."**

Chicago

10. **This type of molecule often has a poly A tail and GTP cap on its ends. One kind of it passes through A, P, and E sites in order to function and can be(*) described by a cloverleaf diagram. It is duplicated by reverse transcriptase in some viruses and spliceosomes remove its introns while keeping its exons. One type of it is transcribed in a ribosome to make a protein and another carries the information from the nucleus to that ribosome. FTP, name this type of macromolecule that uses Uracil instead of Thymine.**

RNA (Accept "mRNA" before "One kind...")

11. **The Finnish currency bill for 100 markka used to have this man on it before they adopted the euro. The last thirty years of his life are dubbed "The Silence of Järvenpää" (*) (yar-ah-ven-par) because he didn't produce any major works. One of his works was originally written for his brother's play, *Kuolema*, but it is better known as a concert piece. He wrote incidental music to Shakespeare's *The Tempest*. Perhaps his most famous piece was written as a covert protest against Russian censorship and had to be put under pseudonyms like *A Scandinavian Choral March*.. Most of this man's pieces are based on his home country's national epic and former Norse mythology; that epic is the *Kalevala*. FTP, name this Finnish composer of *Valse triste*, the choral symphony *Kullervo*, and tone poems like *Tapiola* and *Finlandia*.**

Jean (or Johann Julius Christian) Sibelius

12. **The most expensive version of this company's electronics has a design which allows it to be chain-linked to other pairs. Bose sued this company for infringing on noise-cancelling (*) patents. Later,**

Monster Inc. filed lawsuits against this company for frauds and anti-competitive business practices. Three companies owned this brand: In 2010, HTC bought it for 309 million dollars; HP owns the "audio" brand of this; and on August 1, Apple acquired this company for 3 billion dollars. Its only speaker is called the Pill and it has 4 types of headphones on sale. For ten points, name this company which was founded by Dr. Dre and Jimmy Iovine.

Beats

13. **This theorem follows from continuity and Picard's little theorem. A proof of this theorem considers the function $1/f$, which is entire and bounded, and therefore must be constant by Liouville's theorem. Because algebraic extensions have finite subextensions, this theorem is equivalent to there being no (*) nontrivial finite extension of the complex numbers. This theorem implies that irreducible complex polynomials are linear, and non-constant complex polynomials are a product of linear factors. For 10 points, name this theorem stating that nth degree polynomials have n complex roots.**

Fundamental Theorem of Algebra

14. **The only significant, surviving, medieval parts of this structure are the Chapel of St. Mary Undercroft and a tower built to house the treasure of Edward III the Jewel Tower. The first royal palace was built here in the eleventh century by Canute the Great. A fire in 1512 forced Henry VIII to move his court the Palace of Whitehall. Another fire broke out in this palace in 1834 caused (*) by an overheated stove after which Sir Charles Barry was designated to rebuild it. During World War II, a bomb damaged the equestrian statue of Richard the Lionheart in the courtyard of this structure. It features the Victoria and Elizabeth Towers. FTP, name this building on the River Thames, the target of the Gunpowder Plot, which houses the Parliament of the United Kingdom.**

The Palace of Westminster (prompt on Houses of Parliament or British Parliament or Parliament of the United Kingdom or anything like that)

15. **One short story by this author takes place in the Acroceraunian Hills and the narrator of that story ends up throwing out the titular character from his house. In this man's final novel, the titular character climbs aboard a Mississippi steamboat on April Fools Day. The (*) "Lightning-Rod Man" and "The Confidence Man" are both by this author. In one of his more famous novels, the title character is hanged for killing John Claggart. Another titular character works at a dead letter office and would "prefer not to." FTP, name this American author of works such as *Billy Budd*, *Sailor*, *Bartleby*, *the Scrivener*, and *Moby Dick*?**

Herman Melville

16. **In one song by this artist, she says "I dare you to let me be your one and only." Earlier songs by this artist include "Chasing Pavements" and "Turning Tables." This artist composed the theme song to the most recent (*) James Bond film, in which she sings "you may have my number, you can take my name, but you'll never have my heart." That song is "Skyfall." In another one of her songs, she sings that she's in "California dreaming about who we used to be." For ten points, name this English singer-songwriter, whose album 25 spent six weeks at number one on the Billboard 200.**

Adele

17. **This author's first manuscript, *The Professor*, was written under the pseudonym Currer Bell and was not published. Her second novel, *Shirley*, which discusses the role of women in society and industrial unrest, was published after the death of the author's (*) three sisters. In her most renowned novel, this author tells the story of a plain orphan girl who attends Lowood and grows up to be a governess for Adele Varens. This protagonist falls in love with her employer. FTP, name this sister of Branwell, Anne, and Emily, the author of *Jane Eyre*.**

Charlotte Bronte

18. In this play, one man feels forced to marry his mistress after being recommended as the "most original moralist in England." One character in this play threatens to teach Nepomuck (*) the techniques she learned. The main character hopes to be able to work in a flower shop better, and she eventually marries Freddy. The play begins with a professor of English from India, Colonel Pickering, meeting Professor Henry Higgins. FTP, name this play about the phonetics lessons of Eliza Doolittle, written by George Bernard Shaw.

Pygmalion

19. On his deathbed, this man asked Dan O'Leary to burn his writings, but O'Leary refused so now historians can read many of this man's writings, including information on his love affair with Manuela Saenz ("sah-ends"). His (*) *Decree of War to the Death* speech allowed killing anyone who didn't support the independence cause. The "Organic Decree" made this man president, a position from which he stepped down in 1830. He led a lot of independence movements known as the "Admirable Campaign" in South America. FTP, name this "Liberator" and former president of Gran Columbia, who freed Venezuela and a country named after him.

Simon Bolivar

20. This man killed Cleitus the Black, his savior at the Battle of the Granicus, while drunk. A Roman copy of a commissioned depiction of this figure is known as the Azara(*) herm. This man's empire was split among the Diadochi after his death, and he supposedly solved the Gordian Knot by cutting it in half. FTP, name this Macedonian king, the son of Philip II who conquered the largest empires of his time, had a horse named Bucephalus, and named a bunch of cities after himself, the most famous of which had a big library.

Alexander the Great (accept Alexander III of Macedon)

21. This structure is located near the semicircular canals, and makes 2.5 turns about the modiolus. Located in this structure is the Reissner's membrane, which separates the scala vestibula from the scala media. The Organ of Corti is located inside this cavity, along which runs the (*) basilar membrane. Rapid increases and decreases in pressure are caused by the stirrup pushing on the oval window of this structure. This causes hair cells on the membrane to bend, and thus transduction occurs. This spiral cavity of bone contains two fluid chambers. FTP, name this structure in the body that is named from the Latin word for "snail shell" for its coiled appearance, located in the inner ear.

Cochlea

Bonuses Round Three

1. FTPE, name these recent movies that all deal with a zombie apocalypse

A.

This 2013 film based on a novel tells the story of Gerry [pronounced Jerry] Lane's struggle to investigate the spreading pandemic while protecting his family. In a suspenseful scene inside a deserted hospital, Gerry finds out that all he has to do to keep the braineaters from attacking him is to infect himself with another deadly disease! The main character is played by Brad Pitt.

World War Z

B. This film, uniquely told from a zombie's perspective, tells the romantic love story of R, a zombie that eats brains to have feelings, and Julie, a human daughter of a Colonel whose life goal is to protect people from zombies. R gives up feasting on his natural food source and starts to talk for Julie, which ends up turning him back into a sort-of-human that can bleed again. The main characters are portrayed by Nicholas Hoult and Teresa Palmer.

Warm Bodies

C. In this 2007 horror comedy film, the main character attempts to balance dealing with his girlfriend, mother, and stepfather with fighting off the sudden outbreak of zombies. The Winchester, the place where the main character and his girlfriend always go, ends up being the fateful location for this film's plot. After the apocalypse, the zombies are used as servants and for cheap entertainment. Actors in this movie include Simon Pegg as the title character, and Nick Frost.

Shaun of the Dead

2. This period began after the Sengoku period of Japan.

A. FTPE, name this period from 1603 to 1867 where Japan was ruled from Edo castle by shoguns.

Tokugawa shogunate

B. The Tokugawa shogunate was formed after Tokugawa Ieyasu won this battle in 1600.

Battle of Sekigahara

C. This man was largely responsible for initiating the unification of Japan. He conquered nearly a third of Japan before being killed in a coup d'etat. He was succeeded by Totoyomi Hideyoshi.

Oda **Nobunaga**

3. Kings and queens had some pretty weird nicknames. FTPE, name the monarch, given their epithet and a short description.

A.

"The Bewitched." This unfortunate king of Spain was born with many genetic abnormalities due to the inbreeding of his Habsburg forebears. His death led to the War of Spanish Succession.

Charles II or Carlos II

B. "The Short." This man was the father of Charlemagne.

Pepin

C. "The Accountant," or the "Huckster King." He was the founder of the Tudor Dynasty.

Henry VII (Henry the Seventh, prompt on Henry)

4. FTPE, name these countries associated with dragons.

A.

This sort-of country has a flag featuring a red fire-breathing dragon. It is adjacent to England and its capital is Cardiff.

Wales

B. This country's coat of arms features its namesake saint trampling a dragon. It is located in the Caucasus and its capital is Tbilisi.

Georgia

C. This country has a white dragon on its flag. It borders China and India, and is separated by the state Sikkim from Nepal. Its capital is Thimphu.

Bhutan

5. FTPE answer these questions about famous explorers.

A.

This man took three voyages to the Pacific, the first being on the *Endeavour*. He mapped parts of Australia, Hawaii, and named Botany Bay.

James **Cook**

B. This Viking was the first to discover the Americas, starting a small colony at Vinland.

Leif **Eriksson**

C. This Scottish explorer was the first to cross Canada and get to the Pacific. His expedition preceded the Corps of Discovery by 10 years.

Alexander **Mackenzie**

6. FTPE, name these cool things about points and lines inside a triangle.

A.

The intersection of 3 medians in a triangle which is also the center of mass of that triangle.

Centroid

B. This line passes through the centroid, orthocenter, circumcenter, and the center of the triangle's 9 point circle for any non-equilateral triangle. It is named after a famous Swiss mathematician.

Euler Line

C. This theorem determines whether or not any 3 line segments with given points will intersect. A very similar theorem is named after Menelaus.

Ceva's Theorem

7. "What has it been until now in the political order? Nothing.... What does it ask? To become something"

A.

FTP, name the pamphlet these quotes come from. It derives its title from a famous historical

demographic.

What is the Third Estate?

B. *What is the Third Estate* is by this French revolutionary and clergyman who also masterminded the coup of 18 Brumaire (pronounced Broomare).

Emmanuel Joseph **Sieyès** (pronounced see-yez) (accept Abbé Sieyès)

C. The Coup of 18 Brumaire also brought this man to power as consul. He would eventually triumph over Sieyes to become First Consul for life and eventually Emperor

Napoleon Bonaparte (Accept either)

8. FTPE, name the instrument that represents the character from Prokofiev's *Peter and the Wolf*.
A.
Wolf

French horn

B. Cat

Clarinet

C. Hunter

Timpani

9. FTPE, answer some questions about *Aida*.
A.
Aida was written by this Italian composer.

Verdi

B. In *Aida*, this man is caught and buried alive by the high priest Ramphis.

Radames

C. *Aida* was supposed to commemorate the opening of this entity, but it was finished late and instead premiered at the opening of the Cairo Opera House.

Suez Canal

10. FTPE: answer these questions about the Nigerian Civil War.
A.
The Nigerian Civil war resulted from the secession of this region, mainly composed of the Igbo ethnic group, from Nigeria.

Biafra

B. This man was originally the military governor of the East Region of Nigeria and later served as the first President of Biafra from 1967 to 1970.

Chukwuemeka Odumegwu **Ojukwu**

C. This Nigerian author wrote about his experiences during the Nigeria Civil War in his 1971 collection of poems: *Beware, Soul Brother*

Chinua **Achebe**

11. Many people were angered by Beyoncé's Superbowl 50 halftime performance, but it also serves as an interesting history lesson. FTPE, answer these questions about some of her references.

A.

Beyoncé's backup dancers wore leather and berets, similar to this militant African-American group led by Huey P Newton.

Black Panthers or **Black Panther Party**

B. At one point during the dance, the formation her dancers were in was an homage to this man, who was shot while giving a speech at Manhattan's Audubon ballroom in 1965.

Malcolm X or **Malcolm Little** or **el-Hajj Malik el-Shabazz**

C. After the performance, several of Beyoncé's backup dancers took a picture holding a sign with this hashtag in honor of Mario Wood's death. This hashtag began when George Zimmerman was acquitted after shooting Trayvon Martin.

#blacklivesmatter

12. For ten points each answer these questions about projects designed by Frederick Law Olmsted.

A.

This park, designed in 1858, is located in Manhattan and covers over 850 acres.

Central Park

B. This park, located in Buffalo, New York, shares a name with the first state admitted into the Union.

Delaware Park

C. This country estate, built for George Washington Vanderbilt, is located in Asheville, North Carolina. Olmsted designed the grounds around the mansion.

Biltmore Estate

13. Answer these questions about a mid-century European conflict. FTPE,

A.

Name this war in which Austrian neutrality fulfilled its promise to "shock the world with its ingratitude," which was made after Russia helped to stop a Hungarian uprising. The war started after an argument between Catholics and Orthodox Christians over the Holy Land.

Crimean War

B. Name this famed battle that was part of the siege of Sevastapol in which "someone had blundered" as was reported in the *London Times*.

Battle of **Balaclava**

C. This Lord Tennyson poem was inspired by the failed advance of the eponymous military unit during the Battle of Balaclava.

The Charge of the Light Brigade

14. FTP, answer questions about a device that was commonly used before the advent of handheld calculators.

A.

This mechanical computing device could perform many mathematical functions such as multiplication through the user performing an eponymous action with the middle segment.

Slide Rule

B. The C and D scales on a slide rule have this property. pH has this relation with the concentration of H⁺ ions.

Logarithmic

C. While its job is now largely done by computers, the E6B circular slide rule is still commonly used as a backup device for people of this profession who can use it for dead reckoning and fuel calculations.

Pilot

15. FTPE, name the presidential winners of these years.

A.

1800

Thomas **Jefferson**

B. 1912

Woodrow **Wilson**

C. 1948

Harry S. **Truman**

16. This terrorist group is also the name of the organization in *Archer*. FTPE,

A.

Name this terrorist group whose adherents attacked Paris in November 2015 to the shock of the world.

ISIS (accept ISIL or Islamic State or Daesh)

B. This leader of ISIS is perceived to be a caliph by their followers. The leader of al-Qaeda has offered a higher bounty for him than the US State Department.

Caliph Abu Bakr **al-Baghdadi** (accept Abu Du'a)

C. This is a common weapon of ISIS in which a suicide bomber drives an armored truck filled with explosives into the enemy base. American soldiers have given these truck weapons this nickname because it seems like something out of a movie.

Franken-truck

17. FTPE, name these things related to islands.

A.

This city was originally known as Edo. Name this city which includes places such as Ginza, Shinjuku, and Akibahara.

Tokyo

B. Tokyo is located on this island, the 2nd largest in the world by population.

Honshu

C. Honshu's population is 2nd only to this island, the most populous island in the world.

Java

18. On New year's day, there were over 500 reported cases of women being robbed, then raped or molested. FTPE,

A.

Most of the reports are from this German city.

Cologne (accept **Köln**)

B. The attacks occurred outside this type building, where women were forced to go through crowds of men to reach it.

Train Station (*prompt on station, accept variants of station if train is used*)

C. This party, to whom chancellor Angela Merkel belongs, has faced criticism for their immigration policy after the attacks.

Christian Democratic Union, (accept **Christian Democrats** or **CDU** or **Christlich-Demokratische Union**)

19. FTPE, answer these questions about a particular musical.

A.

This musical features Sky Masterson taking Sarah Brown to Havana to fulfill a bet, promising her one dozen genuine sinners for her mission. Those sinners include Nicely-Nicely Johnson, Big Jule, and Harry the Horse.

Guys and Dolls

B. This man, the main character of *Guys and Dolls*, has been engaged to Adelaide for fourteen years and decides to actually marry her as a cover-up for his illegal craps game.

Nathan Detroit (accept either name)

C. In a song later popularized by Frank Sinatra, Sky Masterson asks this concept to "let a gentleman see just how nice a dame you can be." That song asks this concept to "be a lady tonight."

luck

20. FTPE, name these Millennium Problems.

A.

This is the only problem that has been solved. It deals with objects that are homeomorphic to the 3-sphere.

Poincare Conjecture

B. This hypothesis states that all non-trivial zeroes of a namesake function have a real part of $1/2$.

Riemann Hypothesis

C. This is the only Millennium problem about computer science.

P versus NP or **P=NP**

21. No one cares about them in world history, but let's not forget them completely. FTPE, answer these questions about Australian literature.

A.

Name this man, the only Australian with a Nobel Prize in Literature. His books include *The Vivisector* and *The Living and the Dead*.

Patrick Victor Martindale **White**

B. This possibly most famous novel was made into a movie starring Liam Neeson. It's about a titular man who saves Polish Jews from the Nazi death camps. The name of the book or the movie is acceptable.

Schindler's List or **Schindler's Ark**

C. This Australian, inspired by the story of Poldek Pfefferberg, wrote *Schindler's Ark*. He has also made appearances in a number of films.

Thomas **Keneally**