

## Round 9

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Sophie Netzel • Lauren Onel • Aleija Rodriguez • Zane Smalley • Kristin Strey  
Ethan Strombeck • Lana Kay Tutterow • Tyler Vaughan • Trevor Vice

### Tossups

(1) **Against the wishes of this building’s designer, steel rods were added to its concrete patios for support. This home was originally supposed to face Bear Run, but was instead (\*) cantilevered over it, to the displeasure of Edgar Kaufmann. For ten points, name this family home in Southwestern Pennsylvania designed by Frank Lloyd Wright to sit over a small creek.**

ANSWER: Fallingwater (accept Kaufmann House before “Kaufmann” is read)

(2) **These mathematical objects are symmetric if they are equal to their transpose. One of these objects is called triangular if it contains all zeroes above or below its main diagonal, in which case multiplying the values along the diagonal will give the (\*) determinant. Adding these objects is only possible if they have the same number of rows and columns. For ten points, name these mathematical objects that often look like a rectangular array of numbers.**

ANSWER: matrix (accept matrices; accept square matrix; accept triangular matrix)

(3) **In this literary work, a man angrily throws apples at his son until one becomes lodged in his back. Three boarders refuse to pay rent in this work after they are interrupted while listening to Grete play her (\*) violin. This work’s protagonist wakes up one morning to discover that he suddenly has a segmented belly and many thin legs. For ten points, name this novella about Gregor Samsa’s transformation into an enormous insect-like animal, written by Franz Kafka.**

ANSWER: The Metamorphosis (accept Die Verwandlung; do not accept “Metamorphoses”)

(4) **The Battle of Germantown was fought in what is now this city, which was occupied by William Howe after the Battle of Brandywine. This city’s central grid, between the Schuylkill [skool-kel] and Delaware Rivers, hosted both the (\*) Constitutional Convention and both Continental Congresses. Independence Hall and the Liberty Bell are found in, For ten points, what largest city in Pennsylvania?**

ANSWER: Philadelphia

(5) **Due to its malleability, Hans Geiger and Ernest Marsden chose this element for use in an experiment in which radium emitted a beam of alpha particles. The deflection of some of those particles when they struck a (\*) thin sample of this element led to the discovery of the atomic nucleus. Ernest Rutherford commonly names an experiment involving a “foil” of, for ten points, what precious metal that is found above silver on the periodic table?**

ANSWER: gold (accept Au)

(6) German thinkers in this field like Kurt Koffka promoted a *Gestalt* approach to it. The “individual” approach to this field of study was pioneered by a man whose studies on siblings led him to coin the term (\*) “inferiority complex.” Scientists in this field may use the MBTI questionnaire, which analyzes introversion and extraversion. Alfred Adler and Carl Jung studied, for ten points, what science of the mind, personality, and behavior?

ANSWER: psychology

(7) This figure argued with Manwë when he tried to send this figure as the third Istar in a group with Alatar, Pallando, and Curumo, who traveled to Middle Earth as (\*) Saruman. This figure used the elven Ring of Fire to defend against Durin’s Bane, a Balrog, while guiding the Fellowship to Mordor. For ten points, name this character created by J.R.R. Tolkien, a wizard who was reborn as “the White.”

ANSWER: Gandalf the White (accept Gandalf the Grey; accept Olórin)

(8) This place is within walls that were left unfinished when Svadilfari [svad-ill-far-ee] was drawn away by an Aesir [ay-seer] to prevent losing the sun, moon, and Freya. At (\*) Ragnarök, giants led by Loki will destroy this place, one of the nine realms in the branches of Yggdrasil [IGG-dra-seel]. Valhalla is located in, for ten points, what realm of Norse mythology, the home of Odin and Thor?

ANSWER: Asgard

(9) These things create alternating patterns of shading when passed through a diffraction grating. Thomas Young described sending these things through a paper with a double slit, showing that they also behave like particles. Between 400 and 700 nanometers, this phenomenon is (\*) visible to the human eye. Photons are the quantum of, for ten points, what kind of wave that can be split by a prism into various colors?

ANSWER: light waves (accept photon before it is read; prompt on waves before it is read)

(10) In the 17th century, hundreds of these people were sent by Louis XIV to settle cities in New France and became known as the *filles du roi* [fees duhr-wah]. When he was asked why these people made up half of his Cabinet, Justin (\*) Trudeau remarked “Because it’s 2015.” Emily Stowe and other Canadian suffragettes campaigned to extend voting rights to, for ten points, what people who, in America, earned the vote thanks to the 19th Amendment?

ANSWER: women (accept filles du roi or King’s Daughters before it is read; accept any additional information relating to Canadian women)

(11) A band with this name sang about going “From Soho down to Brighton” to play games. The first baseman in a classic Abbott and Costello comedy routine and the rock band behind “Pinball Wizard” have this name, which also describes creatures that live on a (\*) speck of dust and are saved by an elephant who declares, “A person’s a person, no matter how small.” For ten points, name this questioning word that also names a frequently-regenerating Doctor in a British sci-fi TV series.

ANSWER: Who (accept The Who; accept Whos or Horton Hears a Who; accept Who’s on First; accept Doctor Who)

(12) **Nationalists spread a rumor that this man spread cholera in Saint Petersburg by importing poisoned Canadian apples. This man was found in the Malaya Nevka after he gained power by apparently stopping the (\*) bleeding of the hemophiliac Alexei.** For ten points, name this advisor to the Romanov family, a Russian mystic and supposed healer who was poisoned, shot, and thrown into a river in 1916.

ANSWER: Grigori Yefimovich Rasputin

(13) **The narrator of this story says that he has endured a “thousand injuries” as a justification for his actions. A character in this story is insulted for being unable to distinguish the title drink from sherry. This story’s narrator claims to be a (\*) mason while his enemy begs to be released “for the love of God.”** Montresor bricks Fortunato into a cellar wall in, for ten points, what Edgar Allan Poe short story titled for an expensive wine?

ANSWER: The Cask of Amontillado

(14) **This river empties into the Atlantic Ocean from Banana after traveling in a counterclockwise arc. The Lualaba and Chambeshi Rivers are two major tributaries of this second-longest river on its (\*) continent.** The capital cities of Brazzaville and Kinshasa are on, for ten points, what African river that shares its name with both those cities’ home countries, a Republic and a Democratic Republic?

ANSWER: Congo River

(15) **Milankovitch cycles predict a forty-one-thousand-year period for these events. The entire Quaternary period is sometimes called a “Great” one of these events, and a “Little” one began in the fourteenth century. The most recent North American stage of these events filled the (\*) Great Lakes and submerged the Bering Strait land bridge.** For ten points, name these events, in which glaciers advanced to cover much of the Northern Hemisphere.

ANSWER: ice ages (prompt on “glacial age” or “glaciation”)

(16) **Priests in this religion play the Priye Ginen to begin important events. Recently-departed souls in this religion travel to Guinee, an afterlife ruled by the tuxedo-wearing Papa Legba. In the (\*) Haitian version of this religion, witches legendarily have the power to turn people into zombies. Loas are worshiped in,** for ten points, what religion that originated in Africa, and that does not focus on stabbing dolls with needles?

ANSWER: Vodoun (accept Haitian Voodoo)

(17) **This leader of the 1874 Black Hills Expedition graduated last in his class at West Point with an amazing 726 demerits in four years. This man was the losing commander at a battle also known as the Battle of the Greasy Grass, where (\*) Crazy Horse and Sitting Bull led a rout of his 7th Cavalry.** For ten points, name this US Army officer who died in 1876 at the Battle of the Little Bighorn, also known as this man’s Last Stand.

ANSWER: George Armstrong Custer

(18) **In a story by this author, Elias Openshaw is found dead in a garden pool shortly after receiving a letter inscribed with the letters “KKK” and containing the title “Five Orange Pips.” A character created by this author idolizes (\*) Irene Adler in “A Scandal in Bohemia” and lives at 221B Baker Street. Doctor John Watson narrates many works by, for ten points, what author who created Sherlock Holmes?**

ANSWER: Sir Arthur Conan Doyle

(19) **A Handel concerto for this instrument is called “The Harmonious Blacksmith.” Domenico Scarlatti wrote most of his 555 sonatas for this instrument, a relative of the spinet and virginal. Because this instrument’s strings are (\*) plucked, it has no dynamic range, inspiring the need for another, ultimately more popular instrument. For ten points, name this Baroque and Classical keyboard instrument, the predecessor to the piano.**

ANSWER: harpsichord (prompt on “keyboard” before it is read)

(20) **The red dye Prontosil was the first successful “sulfa” type of these compounds, many of which contain a four-membered beta-lactam ring. One of these drugs that disrupts Gram-positive cell walls was discovered accidentally by (\*) Alexander Fleming in mold. Overuse of these drugs has led to the rise of MRSA. For ten points, tetracycline and penicillin are what type of medication that treats bacterial infections?**

ANSWER: antibiotics (prompt on “drug” before it is mentioned)

## Bonuses

(1) Astronomer Carl Sagan is the namesake of both the number of stars in the observable universe and an indefinite quantity equal to “billions and billions.” Answer these questions about some of his other work, for ten points each.

Sagan chaired the committee that selected music by Bach, Stravinsky, Chuck Berry, and others for inclusion on the Golden Records attached to these spacecraft. The first of these craft flew by Jupiter and Saturn and left the Solar System in 2004.

ANSWER: Voyager 1 and 2

In 1980, Sagan hosted this thirteen-part television series on PBS that popularized many concepts in astronomy. With over 500 million viewers, this series is still the most-watched science program in TV history.

ANSWER: Cosmos: A Personal Voyage

A sequel to *Cosmos*, subtitled *A Spacetime Odyssey*, was aired in 2014 with this scientist and friend of Carl Sagan as host. This man is a frequent talk show guest and Reddit AMA participant, and he published *Astrophysics for People in a Hurry* in 2017.

ANSWER: Neil deGrasse Tyson

(2) In a poem about this concept, it accompanies the speaker past a “School, where Children strove / At Recess - in the Ring” and stops in front of a grave that the speaker sees as a “House that seemed / A Swelling of the Ground.” For ten points each,

Name this event at the end of life, which rides in a carriage with the speaker and Immortality in a poem that begins “Because I could not stop for” this concept, “He kindly stopped for me.”

ANSWER: death (accept **Because I could not stop for Death**)

This American poet wrote that “There is no Frigate like a Book / To take us Lands away” as well as “Because I could not stop for Death.”

ANSWER: Emily Elizabeth Dickinson

Emily Dickinson contrasts this concept with “Confident Despair” and says that “Had [she] presumed” to do this, “The loss had been to [her].” In another poem, Dickinson describes this concept as “the thing with feathers - / That perches in the soul.”

ANSWER: hope (accept **Had I presumed to hope**; accept **“Hope” is the thing with feathers**)

(3) This city was supposedly founded by the legendary Dido, lover of Aeneas. For ten points each,

Name this city, the center of an empire that went to war with Rome, backed by an army led by Hannibal Barca and his war elephants.

ANSWER: Carthage

Carthage and Rome participated in these three conflicts that showed the prowess of the Carthaginian navy, but resulted in Hannibal's death and Carthage's fall.

ANSWER: Punic War(s)

In response to Cato the Elder's frequent demands, Rome destroyed Carthage after the 3rd Punic War and, according to legend, the Roman soldiers did this to the land so that nothing would ever grow there.

ANSWER: salting the earth (accept anything related to salt)

(4) One of these things named "Tristan" is made of the notes F, B, D sharp, and G sharp. For ten points each,

Name these musical structures made of several notes played together. They form the basis for musical harmony.

ANSWER: chords

This composer included the Tristan chord in the prelude to his opera *Tristan and Isolde*. This composer is best known for his massive *Ring* cycle of operas.

ANSWER: Richard Wagner ([ree-kart VAHG-ner], but be lenient)

Another famous chord was used by Igor Stravinsky to represent Petrushka, one of these toys that is brought to life. Pinocchio is another living one of these toys, which are featured in Punch and Judy shows.

ANSWER: puppets (accept marionettes; prompt on dolls)

(5) This concept, along with interest and money, are the three subjects of a *General Theory* that was published in 1936. For ten points each,

Name this economic concept that theoretically cannot be "full" in a competitive labor market, according to the aforementioned *General Theory*, in part because the number of people engaged in this activity is not determined by the wages earned by it.

ANSWER: employment (accept labor; accept working; accept other equivalents; do not accept unemployment)

This British economist wrote *The General Theory of Employment, Interest, and Money*, which outlines a theory of macroeconomics now commonly named for him.

ANSWER: John Maynard Keynes [canes]

In *The General Theory*, Keynes criticizes Say's Law, which argues that production of a good generates this phenomenon for the good. This consumer-oriented phenomenon is usually contrasted with the employer-oriented supply.

ANSWER: demand

(6) Jaundice of the skin will result if one component of this bodily fluid is not excreted fast enough. For ten points each,

Name this greenish-yellow fluid that is produced in the liver and sent through a namesake duct to the small intestine to aid the digestion of fats.

ANSWER: bile

Bile is stored in this small organ beneath the liver. About half a million Americans have this organ removed each year because of the formation of cholesterol stones.

ANSWER: gallbladder

Bile helps the digestion of lipids by forming one of these mixtures in which tiny drops of fats are dispersed in water. Mayonnaise and vinaigrette dressing are also considered this type of mixture.

ANSWER: emulsion (prompt on “colloid”)

(7) This man, who was given his last name by an Imperial recruiter, shoots Tobias Beckett before he has a chance to kill him. For ten points each,

Name this smuggler who meets Chewbacca and pilots the *Millennium Falcon* through the Kessel Run in a 2018 prequel film.

ANSWER: Han Solo (accept either or both names)

In *Solo: A Star Wars Story*, Lando Calrissian is played by this actor, who plays Earn Marks on *Atlanta* and enjoys a rapping career as Childish Gambino.

ANSWER: Donald Glover

Ray Park reprises this role in *Solo*. This Sith Lord is shown with robotic legs, which he receives in *Clone Wars* after having been cut in half in *Phantom Menace*.

ANSWER: Darth Maul

(8) According to the Uttardhyayana [oo-tahr-dyah-yah-nah], this concept determines whether a person is reincarnated as a demon, an ant, or something else entirely. For ten points each,

Name this common concept in Indian religions, that dictates that individual choices, both good and bad, affect the conditions of one’s rebirth.

ANSWER: karma (accept kamma)

The Uttardhyayana is a sacred text of this religion. This religion is divided into “white-clad” and “sky-clad” sects and practices intense non-violence.

ANSWER: Jainism (accept Jain Dharma)

Jains can voluntarily undergo an extreme type of this religious practice called Sallekhana that ends with their death. More commonly, this practice involves temporarily avoiding consuming food.

ANSWER: fasting

(9) Two weeks before his death, this man asked the *New York Evening Sun* to publish his obituary early, so that he might read it. For ten points each,

Name this 19th-century businessman who worked with James Bailey to create the world's biggest circus.

ANSWER: Phineas Taylor "P.T." **Barnum**

This opera singer toured America on P.T. Barnum's invitation in the early 1850s. This singer, known as the "Swedish Nightingale," inspired a mania and earned hundreds of thousands of dollars for charity.

ANSWER: Jenny **Lind**

P.T. Barnum also had a political career in this state, where he served as mayor of Bridgeport. He also co-sponsored an anti-contraception bill, which was struck down in the 1965 *Griswold* case, while he was a state senator in Hartford.

ANSWER: **Connecticut**

(10) Ancient Greek tragic plays often include a "deus ex machina" [day-oos ex mah-kee-nah] or "god from the machine," a literary device in which a god or other character comes onto the stage to resolve the play's central problem, often while being moved by a "mechane" [meh-kah-nay] device to make it look like they are flying. Answer some questions about deus ex machina in the works of ancient Greek tragedians, for ten points each.

In the *Oresteia*, a tragic trilogy by Aeschylus [ESS-kill-us], this Greek goddess of wisdom is brought in as a deus ex machina to establish the court of her namesake city as a means of settling disputes.

ANSWER: **Athena**

This Greek tragedian used Heracles as a deus ex machina in his play *Philoctetes* [fih-LOCK-teh-teez], but left the device out of his "Theban plays" trilogy, which includes this author's *Antigone*, *Oedipus Rex*, and *Oedipus at Colonus*.

ANSWER: **Sophocles**

At the end of a tragedy named for this mythical sorceress, Euripides [yoo-RIH-pih-deez] used the mechane to lift this woman and the bodies of her sons in the chariot of Helios as she escapes from the unfaithful hero Jason.

ANSWER: **Medea**

(11) Answer the following about the Green-Tao theorem, for ten points each.

The Green-Tao theorem concerns these lists of numbers that, unlike a set, are allowed to repeat values. A series is generated by adding the values within these mathematical objects.

ANSWER: **sequences**

Specifically, the Green-Tao theorem looks at the sequence of these numbers. The first of these numbers are 2, 3, 5, 7, 11, and they cannot be divided evenly by integers other than themselves and 1.

ANSWER: **prime** numbers (accept **primes**)

The Green-Tao theorem says that, for any natural number  $n$ , there is a list of  $n$  prime numbers that form this type of sequence, in which any two consecutive numbers are always separated by the same difference.

ANSWER: **arithmetic** sequence

(12) This citizen of the Massachusetts Bay Colony was tried in 1637 for “traducing,” or slandering, the local ministers. For ten points each,

Name this 17th-century woman who was sentenced in a trial overseen by John Winthrop for holding prayer sessions for women and speaking out against religious gender norms.

ANSWER: Anne Hutchinson

Hutchinson and the Massachusetts Bay Colony belonged to this religious sect, known for its strict adherence to the Bible and proclivity for witch hunting.

ANSWER: Puritans (accept word forms, like Puritanism)

After Anne Hutchinson was exiled, she followed the advice of Roger Williams, another victim of banishment, and settled at Portsmouth in what is now this US state.

ANSWER: Rhode Island and Providence Plantations

(13) Most of the money spent on the Manhattan Project was not used to construct bombs, but to prepare material capable of sustaining this process. For ten points each,

Identify this process in which the nucleus of a heavy atom splits into two lighter nuclei. The energy released by the “Little Boy” bomb resulted from uranium forming smaller barium and krypton atoms by this process.

ANSWER: nuclear fission

Besides smaller nuclei, the fission of uranium-235 also produces these particles that start a chain reaction in the bomb’s core. Unlike the positive protons, these particles in the nucleus have no charge.

ANSWER: neutrons

In December, 1942, this physicist demonstrated that neutrons could sustain a chain reaction when he built the first nuclear reactor under the University of Chicago’s football field’s stands. This man is also the namesake of element 100.

ANSWER: Enrico Fermi

(14) Answer the following about the works of Henrik Ibsen, for ten points each.

Henrik Ibsen was a playwright from this Scandinavian country. His play *Peer Gynt* was originally performed in Oslo in this modern country.

ANSWER: Kingdom of Norway (accept Kongeriket Norge)

This play by Ibsen explores the life of Nora Helmer, who leaves her husband Torvald after describing her frustration with her living situation, since she has come to feel like a plaything living in the title structure.

ANSWER: A Doll’s House (accept Et dukkehjem)

In a play by Henrik Ibsen named for one of these animals, Hedvig shoots herself under the pretense of killing a “Wild” one of these water birds.

ANSWER: duck (accept The Wild Duck or Vildanden)

(15) The Golden Horn cuts into this city and was once spanned by a large chain to prevent enemy ships from getting in. For ten points each,

Name this Turkish city that was previously named Byzantium and Constantinople.

ANSWER: Istanbul

Istanbul lies on both banks of this narrow strait that links the Black Sea to the Sea of Marmara. Further west, the Dardanelles strait links the Sea of Marmara to the Mediterranean.

ANSWER: the Bosporus (accept Bosphorus)

Despite a metropolitan population of over 15 million and its position on the Bosporus, Istanbul is *not* the capital of Turkey; instead, this central city became the capital when Turkey became a republic in 1923.

ANSWER: Ankara

(16) By the time of the Middle Kingdom, this god had been supplanted by Osiris as lord of the underworld. For ten points each,

Name this jackal-headed Egyptian god who judged whether souls were worthy to enter the realm of the dead.

ANSWER: Anubis (accept Anpu; accept Anapa; accept Inpu; accept Inpw)

To judge the dead, Anubis utilized a scale and a feather named for this goddess of truth and balance.

ANSWER: Ma'at

The feather of Ma'at was weighed against this vital organ, which the Egyptians considered the seat of the soul. If weighed-down with wrongdoing, this organ would be devoured by Ammit.

ANSWER: heart (accept ib; accept jb; accept jib)

(17) Answer the following about everyone's favorite artist from Vinci [vin-chee], for ten points each.

Leonardo was born in Vinci but trained as an artist in this city. The Uffizi Gallery is in this city, and Brunelleschi's massive dome tops this city's Duomo.

ANSWER: Florence

After training in Florence, Leonardo created this work on the wall of the Santa Maria delle Grazie in Milan. In this painting, Jesus is framed by a rectangular window and sits at a long table with his disciples.

ANSWER: The Last Supper (accept L'Ultima Cena)

Toward the end of his life, Leonardo left Italy and traveled to France, taking with him his painting of *The Virgin and Child with* this woman. In the painting, Mary sits on this woman's lap and reaches toward her infant son, who is wrestling with a lamb.

ANSWER: Saint Anne (accept The Virgin and Child with Saint Anne)

(18) In this novel, sixteen-year-old Lydia runs away with George Wickham, who marries her after being blackmailed. For ten points each,

Name this novel, in which Elizabeth Bennett comes into conflict with Fitzwilliam Darcy, but eventually marries him.

ANSWER: **Pride and Prejudice**

This English author, whose six published “manners novels” included *Pride and Prejudice* and *Emma*.

ANSWER: Jane **Austen**

In this other Jane Austen novel, the title pair of concepts are represented by the practical Elinor Dashwood and her emotional sister, Marianne, as they deal with their relationships with Edward Ferrars, John Willoughby, and Colonel Brandon.

ANSWER: **Sense and Sensibility**

(19) In a 19th century civil war in this country, Fructuoso Rivera’s Colorados fought Manuel Oribe’s agrarian Blancos. For ten points each,

Name this South American country where wealthy businessmen in Montevideo [mon-tay-vih-DAY-oh] supported the Colorados, the eventual winning side.

ANSWER: **Uruguay**

Both sides in the Uruguayan Civil War took this action to gain support and bolster their ranks. Brazil took this action in 1888 with the Golden Law, 25 years after the USA took this action.

ANSWER: **ending slavery** (accept **freeing the slaves**; accept **abolition**; accept equivalent answers; prompt on partial answers)

The Blancos and Colorados were named because the sides wore colored armbands to tell each other apart; name either color. The opposing armies in the Russian Civil War were named for the same two colors.

ANSWER: **red** and/or **white** (accept **Red** Army and/or **White** Army)

(20) In 2016, the International Union of Pure and Applied Chemistry officially approved names for elements 113, 115, 117 and 118, the most recent additions to the periodic table. For ten points each,

Name any *one* of those four elements. The four are named after a country, a city, a state, and a physicist, respectively.

ANSWER: **nihonium**, **moscovium**, **tennessine**, or **oganesson**

Tennessee is the second US state to be honored with the name of an element. The first is this state whose flagship public university in Berkeley, near San Francisco, is also the namesake of an element.

ANSWER: **California**

All four of the new elements are unstable and must be synthesized in one of these devices that fuses nuclei together by bombarding them at high speed. CERN’s Large Hadron Collider is the most powerful one of these devices in operation.

ANSWER: **particle accelerator** (accept **synchrotron**; prompt on “cyclotron”; prompt on “atom smasher”)

