

1. One work by this man explains verbal acts known as "mands." Another work by this psychologist argues that the prevalence of a belief in free will has limited the possibility for social engineering. This psychologist wrote *Verbal Behavior* and *Beyond Freedom and Dignity*. He also invented an air crib for infants and experimented on pigeons. For 10 points, name this American behaviorist, who created a namesake box to research operant conditioning.

ANSWER: Burrhus Frederic **Skinner**

058-09-7-08101

2. Electromagnetic metamaterials can have a negative value for this quantity. A material has two different values for this in birefringence. This value is equal to the square root of the product of a medium's permittivity and permeability. The ratio of this value for two media is related to the ratio of sines of its namesake angles by Snell's Law. For 10 points, name this ratio of the speed of light in a vacuum to the speed of light in a medium, which is about 1.33 for water.

ANSWER: **index of refraction** [or **refractive index**; or **ior**]

001-09-7-08102

3. One empire based in this present-day country split into the Changamir and Monomotapa (MAH-no-muh-TAH-pah) in the late fifteenth century. This country's flag depicts a soapstone bird found at the site of its most famous ruins. The Lancaster House Agreement gave this country its current government and was signed by ZAPU leader Joshua Nkomo and its current leader, a ZANU-PF politician. For 10 points, name this country that was called Rhodesia during rule by the white minority and has been led to hyperinflation by Robert Mugabe.

ANSWER: Republic of **Zimbabwe**

003-09-7-08103

4. Two portions of this organ's superior temporal gyrus are named for Brodmann and for Wernicke (VER-nick-ee). One part of this organ, the substantia nigra, produces dopamine; that part is part of the basal ganglia, like its striatum. Those components are implicated in Parkinson's disease and Huntington's disease. The lobes of one part of this organ include the occipital and parietal, and this organ includes a portion involved in motor control called the cerebellum. For 10 points, name this central organ of the nervous system, contained in the cranium.

ANSWER: **brain**

022-09-7-08104

5. Ricercars (ry-chur-CAR-ayz) and canzonas (can-ZOH-nuz) were early examples of this musical form. They begin with one voice stating the theme, and another voice entering later to play the theme in a different key. J. S. Bach (BAHK) wrote "The Art of" this type of music. Bach also paired pieces in this musical form with preludes in The Well-Tempered Clavier (kluh-VEER). For 10 points, name this musical form consisting of many voices in imitative counterpoint, which Bach also paired with a toccata (tow-Kah-tuh) in D minor.

ANSWER: **fugues** (fyoogs)

004-09-7-08105

6. During this President's administration, the CIA helped overthrow Guatemala's leader Jacobo Arbenz. His farewell address warned about the dangers of the "military industrial-complex." This man's Vice-President participated in the Kitchen Debate with Nikita Khrushchev and gave a speech discussing the dog Checkers. This man twice defeated Adlai Stevenson on a ticket with Richard Nixon. For 10 points, name this successor of Harry Truman as President, who was the former Supreme Allied Commander in World War II.

ANSWER: Dwight David **Eisenhower**

027-09-7-08106

7. One work of art that exemplifies this movement depicts an airplane firing rockets to destroy an enemy fighter. An artist associated with this movement worked out of a studio called the Silver Factory. The painting *Whaam!* emerged from this movement, and was created with the Ben-Day dot technique by Roy Lichtenstein. This movement also saw the creation of fifty silk-screen images of Marilyn Monroe and a painting of a solitary Campbell's Soup can. For 10 points, name this 1960s artistic movement exemplified by the works of Andy Warhol.

ANSWER: **Pop** Art

052-09-7-08107

8. In one of this man's poems, the narrator claims "I've been a-climbin' on, and reachin' ladders, and turning corners" after telling her child "life for me ain't been no crystal stair." In another of his poems, he asserts "my soul has grown deep like the rivers." In another work, this poet asks if something "dr[ies] up, like a raisin in the sun?" This poet wrote "Mother to Son" and "The Negro Speaks of Rivers." For 10 points, name this poet who asked, "What happens to a dream deferred?" in his poem "Harlem."

ANSWER: James Mercer Langston **Hughes**

027-09-7-08108

9. This company offered a namesake million dollar prize for any group that improved its rating algorithm by ten percent or more. This company was accused of "throttling" for its practice of delaying services to its most active customers. This company uses Microsoft Silverlight for its "Watch Instantly" feature, and recently expanded to the Xbox 360 and Playstation 3. For 10 points, name this company that allows customers to rent DVDs through the mail by paying a monthly fee.

ANSWER: **Netflix**

045-09-7-08109

10. This author wrote a work about the Hamilton and Trask families based on the Cain and Abel story. In another of his novels, Candy helps fantasize about creating a farm before another character accidentally kills Curly's wife. In another work, this writer of *East of Eden* wrote about a family's journey with the preacher Jim Casy to California, from Oklahoma, during the Dust Bowl. For 10 points, name this author who wrote about Lenny and George in *Of Mice and Men* and the Joad family in *The Grapes of Wrath*.

ANSWER: John Ernst **Steinbeck**, Jr.

005-09-7-08110

11. During this war, one side built a long pontoon bridge over the Genitchi Strait. One side in this war defended Home Hill during the Battle of Inkerman. Florence Nightingale earned the moniker "Lady with the Lamp" for tending to wounded soldiers during this war. At one of its battles, Cardigan and Raglan sent a unit headlong into Russian artillery at Balaclava in the "Charge of the Light Brigade." For 10 points, name this war which pitted the French, British, and Ottomans against the Russians from 1853 to 1856.

ANSWER: **Crimean** War

015-09-7-08111

12. In one work by this man, the "person of consequence" refuses to help out a simpleton who is unable to change reports from the first person to the third person without great effort. In another work by this man, a barber finds the title object baked in his breakfast bread and tries to throw it away into the Neva River. In one of this author's novels, Pavel Chichikov collects dead serfs who are recorded as alive on the census. For 10 points, name this Russian author of the short stories "The Nose" and "The Overcoat" and the novel *Dead Souls*.

ANSWER: Nikolai Vasilievich **Gogol**

034-09-7-08112

13. One battle in this conflict resulted in the Duke of Villeroi (VEE-luh-WAH) being captured at Cremona. The settlement of this war granted England a monopoly on the trans-Atlantic slave trade. The allies achieved victory at this war's Battle of Oudenarde (WEE-duh-nard) after Eugene of Savoy and the Duke of Marlborough united their armies. This conflict was ended when Philip V was recognized as heir of Charles II by the Peace of Utrecht. For 10 points, name this war that attempted to prevent a Bourbon king from ascending to the throne.

ANSWER: War of the **Spanish Succession**

032-09-7-08113

14. When glaciers cover these objects, a landform called a tuya (TOO-yuh) is formed. Maars (MARZ) and tuff rings are examples of these objects. A lahar (luh-HAR) is a mud flow that is caused by the action of these features, which can produce pahoehoe (pah-HOY-hoy) and aa (AH-ah). Pyroclastic flows can occur when they become active. Their types include composite cone and cinder cone. This geologic feature is common in the Ring of Fire. For 10 points, name these mountains that form when lava erupts to the earth's surface.

ANSWER: **volcanoes**

063-09-7-08114

15. Grover devised a quantum version of one of these algorithms and admissible heuristics are used in the A*(A star) type of this algorithm. Another form of this process starts in the middle of a list and only considers the half that might have a certain value. Both the interpolation and binary form of this algorithm can only be run on ordered lists. The linear form of this algorithm can be run on any list and runs through every value. For 10 points, name this algorithm named for its function of looking through lists for a certain key element.

ANSWER: **search** algorithms

023-09-7-08115

1A. What adjective, derived from the name of a monarch, is often applied to the era in which Alfred Lord Tennyson and Robert Browning wrote many of their works, or to a rigid system of morality that eschews any public reference to bodily activities?

ANSWER: Victorian

1B. Eighty-four percent of animal species belong to what phylum, which includes lobsters, spiders, and insects?

ANSWER: Arthropoda [or arthropods]

2A. A 2009 sequel for the Wii built on the success of what 2006 Nintendo DS game, which reintroduced the original side-scrolling mechanic for Nintendo's flagship character?

ANSWER: New Super Mario Brothers

2B. "Starlight," "Take a Bow," and the title track are some of the radio-friendly songs this British band's 2006 album *Black Holes and Revelations*. Identify this band, which released the follow-up *The Resistance* in 2009.

ANSWER: Muse

3A. A meager twenty-five-dollar fine for violating the law is causing many Virginia restaurant owners to find profit in defying what restriction, that took effect on December 1, 2009 across the Commonwealth?

ANSWER: ban on smoking in restaurants and bars [accept any phrasing that expresses knowledge of a smoking restriction of some kind]

3B. Founded in 1883 at Johns Hopkins University, it has since sold more than six million copies of its *Handbook for Writers of Research Papers*. What is this organization, whose namesake citation style is used in place of the APA and Chicago styles in certain fields?

ANSWER: the MLA [or Modern Language Association]

4A. This is a 10-second calculation question. Multiply $(5x+3)(6x+3)$.

ANSWER: $30x^2 + 33x + 9$

4B. This is a 10-second calculation question. Add four and a half to three and a seventh.

ANSWER: $7\frac{9}{14}$ [or $\frac{107}{14}$]

5A. In what language may you wish someone "buon compleanno" (BWAN com-PLAHN-yo) on his birthday or "buon natale" (BWON nah-TAH-leh) on Christmas?

ANSWER: Italian [or Italiano]

5B. Identify the German engraver and painter of the Northern Renaissance who created *Knight, Death, and the Devil* and the magic-square-containing *Melancholia I*.

ANSWER: Albrecht Dürer

6A. This is a 20-second calculation question. A map has a scale of $\frac{3}{8}$ inch to 11 miles. If two cities are 10.5 inches apart on the map, how far apart are they really?

ANSWER: **308** miles

6B. This is a 20-second calculation question. Find all numbers not in the domain of the function $f = \frac{4x+3}{(x^2 - 12x + 32)}$.

ANSWER: **4, 8** [both answers required]

7A. The Navajo Nation operates what cartographic tourist attraction, six miles outside of Teec Nos Pos, Arizona?

ANSWER: **Four Corners** Monument

7B. What word refers to the smallest unit of sound available to a language, as opposed to the smallest unit of meaning, which is called a morpheme?

ANSWER: **phoneme**

8A. This quantity is taken into account when evaluating possible damage to delicate instruments in moving equipment. Identify this third derivative of position, which measures the instantaneous change in acceleration.

ANSWER: **jerk** [or **jolt**]

8B. What multidisciplinary scientist proved that amino acids could be produced from simpler chemicals by ultraviolet exposure, recorded messages from Earth placed on the *Voyager* and *Pioneer* probes, and introduced the concept of "nuclear winter," all while engaging in such science-popularizing activities as hosting the program *Cosmos*?

ANSWER: Carl Edward **Sagan**

9A. This is a 30-second calculation question. In triangle ABC, side AB has length 13, side BC has length 8, and the sine of angle ACB is 0.85. What is the sine of angle BAC, to the nearest hundredth?

ANSWER: **0.52**

9B. This is a 30-second calculation question. A random variable takes the value 1 with probability 0.15, the value 2 with probability 0.68, and the value 3 with probability 0.17. Find the expected value of this random variable.

ANSWER: **2.02**

10A. The Soviet Vityaz (vi-CHAZ) and the French-American Trieste were two bathyscaphes (BATH-ih-scapes) that made ten-kilometer dives to the bottom of what Pacific Ocean structure, which is the deepest known point on Earth?

ANSWER: **Mariana Trench** [or **Marianas Trench**]

10B. What titan of Swedish literature depicted a woman whose plans change from running off with the servant Jean to killing herself in his masterpiece *Miss Julie*?

ANSWER: August **Strindberg**

1. One independence movement in this country began with the Cry of Villa de Los Santos and was led by José de Fábrega. One leader of this country became penpals with the ten-year-old Sarah York before being captured when American forces blasted loud music outside the Vatican embassy. A site in this country was the subject of the Hay-Bunau Varilla Treaty and was created after this country separated from Colombia in 1903. For 10 points, name this home of Manuel Noriega, which received control of its namesake canal in 1999.

ANSWER: Republic of **Panama** [or Republica de **Panama**]

015-09-7-08117

2. An attempt to solve the "problem of demarcation" that defines this field was advanced in a book that set out the "falsification" principle, called "the logic of" this kind of "discovery," which was written by Karl Popper. Later, a sociological analysis of this field's development, which claims that it proceeds through "paradigm shifts," was written under the title "the structure of" this kind of "revolutions," by Thomas Kuhn. For 10 points, identify this intellectual pursuit, which abides by a hypothesis-centered "method" advanced by Francis Bacon.

ANSWER: **science** [or **scientific** or other word forms]

019-09-7-08118

3. The Turkevich method can be used to make nanoparticles of this metal which have applications in drug delivery. It is refined by the Wohlwill (VOLE-vill) process, and it can be mined by cyanide leaching. Its only stable isotope is 197. It is sometimes found in telluride ores, and it is the most ductile and malleable element. It reacts with chlorine, explaining why it is susceptible to aqua regia. This metal was used to detect the atomic nucleus in a namesake "foil" experiment. For 10 points, name this metallic element with symbol Au.

ANSWER: **gold**

001-09-7-08119

4. This performer was inspired by Ray Noble's song "Cherokee" to record "Ko-Ko" with his band. His quintet included Duke Jordan, Tommy Potter, Max Roach, and Miles Davis. That quintet performed early be-bop music, which he helped pioneer. Several of his compositions, such as "Ornithology" and "Birdfeathers," have become jazz standards. For 10 points, name this alto saxophonist whose original nickname, "Yardbird", was simplified to "Bird."

ANSWER: Charlie "Bird" **Parker**

045-09-7-08120

5. One poem describes a woman "beloved in life of" this man. That poem mentioning this man is about Anne Rutledge and is found in *Spoon River Anthology*. One elegy for this man laments the "great star" in the "western sky in the night." Another elegy for him proclaims "the ship is anchor'd safe" and that for this person "they call, the swaying mass, their eager faces turning." For 10 points, name this President, whose death was lamented in Whitman's "O Captain! My Captain!"

ANSWER: Abraham **Lincoln**

002-09-7-08121

6. Sidney Rigdon was one of this group's earliest spokesmen. Militant groups connected to this religion became known as Danites. Along with Paiute Native Americans, some members of this group were perpetrators of the Mountain Meadows Massacre. They fought a namesake "war" with the U.S. government in the 1850s. They were driven out of Missouri and Illinois to a place they called "Deseret." For 10 points, name this group, founded by Joseph Smith, that was led to the Great Salt Lake in Utah by Brigham Young.
ANSWER: **Mormons** [or **LDS**; or Church of Jesus Christ of **Latter-Day Saints**]

063-09-7-08122

7. Wavefunctions of the particle in a box use this function because it can be made to meet the boundary conditions. The Gibbs phenomenon occurs in a method that approximates any function using this function and its derivative, which is called a Fourier (FOR-ee-ay) series. The magnitude of a cross-product is proportional to this function of the angle between the vectors. This function's law is the equality, for a triangle, of each side's ratio to this function of the side's angle. Its reciprocal is the cosecant. For 10 points, name this function, equal in trigonometry to the ratio of the opposite side to the hypotenuse.

ANSWER: **sine**

022-09-7-08123

8. Some members of this phylum keep their bodies clean through the use of pedicellaria (pe-deh-sell-AIR-ee-uh). Many members of this phylum exhibit pentaradial symmetry. Its species have a system of interlocking calcium carbonate plates called stereom. Creatures in it have tube feet called podia. Podia are found at the end of this phylum's main method of movement and respiration, the water-vascular system. For 10 points, name this phylum of sea cucumbers and starfish, which has a Greek name to describe members' spiny skin.

ANSWER: **Echinodermata** [or **echinoderms**]

023-09-7-08124

9. In the run-up to World War II, this city was the location of a Nazi plot that assassinated Engelbert Dolfuss and put Kurt Schuschnigg in power. Polish king John Sobieski helped defend this city in 1683 in an event that allegedly led to the invention of the croissant. That was the second of two sieges, the other being 1529, in which the Ottomans tried to take this seat of Hapsburg power. For 10 points, name this city which served as the site of an 1815 Congress that redrew the borders of post-Napoleonic Europe.

ANSWER: **Vienna** [or **Wien**; or **Viden**; or **Becs**]

003-09-7-08125

10. This country contains the world's largest piece of limestone, the Nullarbor Plain. The Morning Glory Cloud can be seen off the north of this country in the Gulf of Carpentaria. The lowest and highest points in this nation are Lake Eyre and Mount Kosciuszko, respectively. This home of the Great Dividing Range contains the cities of Darwin, Adelaide, and Brisbane and is separated from Tasmania by the Bass Strait. The home of the Great Barrier Reef is, for 10 points, what country that occupies an entire continent?

ANSWER: Commonwealth of **Australia**

020-09-7-08126

11. In this novel, a baby is born with a pig tail and is eaten by an army of ants. One character in this work, the mechanic Mauricio (mah-REE-see-oh) Babilonia, is always accompanied by butterflies. Three thousand people die in a strike against a banana company in this novel. The gypsy Melquíades (mel-KYE-uh-dees) creates a manuscript in this work, which centers on the Buendía family. It ends with the death of Aureliano and the destruction of Macondo. For 10 points, name this magical realist novel by Gabriel García Márquez.

ANSWER: **One Hundred Years of Solitude** [or **Cien Años de Soledad**]

030-09-7-08127

12. This mythical figure fought six-armed giants and rescued King Phineus (fin-AY-us) in Asia from some bothersome harpies. Zetes (ZEE-teez) and Calais (cah-LAY-iss), children of the North Wind, were part of a group led by this man that also included Odysseus's grandfather Autolycus (AW-toe-LYE-kus), Nestor, and Meleager (MEL-ee-EY-ger). With the help of a potion brewed by the daughter of King Aeetes (eye-EE-teez), this hero was able to elude a dragon and secure the Golden Fleece. For 10 points, name this onetime husband of Medea and leader of the Argonauts.

ANSWER: **Jason**

063-09-7-08128

13. The epigraph for this poem translates to a claim that "there are more invisible than visible beings in the universe." Its central figure sees two hundred men die shortly after a dice game gives his soul to Life-in-Death. In the frame story, the title character of this poem accosts a wedding guest and tells the tale of seeing "water, water every where" without "any drop to drink." For 10 points, name this poem from *Lyrical Ballads* that describes the title figure killing an albatross and was written by Samuel Taylor Coleridge.

ANSWER: "The **Rime of the Ancient Mariner**"

019-09-7-08129

14. In historiography, this word refers to the fallacious study of history as a march of progress towards the present. This term also refers to the party, led by Robert Walpole, which dominated mid-eighteenth-century British politics before passing the Great Reform Bill. These original opponents of the Tories also share their name with an American party, formed by Henry Clay and other anti-Jacksonian elements. For 10 points, identify this party, under whose banner William Henry Harrison and Zachary Taylor were elected to the Presidency.

ANSWER: **Whig** Party [or **whigs**; or **Whiggish** view of history; or other word forms]

019-09-7-08130

15. One of this author's fictional characters watches dead rats pile up, treats Father Paneloux, and stays in contact with his wife, who left Oran. In an essay, this author confronts the absurdity of existence by referencing a Greek figure who rolled a rock up a hill in *The Myth of Sisyphus*. In one of his novels, a character learns his mother has died and shoots an Arab on the beach. Protagonists created by this author include Dr. Rieux (ree-OO) and Meursault (mer-SOH). For 10 points, name this French existentialist who wrote *The Plague* and *The Stranger*.

ANSWER: Albert **Camus** (ca-MOO)

063-09-7-08131

1. Their strength as a function of distance can be modeled by the Lennard-Jones potential. Their namesake also names an equation of state which modifies the ideal gas law. Unlike covalent and ionic bonds, they are caused by changes in the polarizations of nearby molecules. One variety of them arises between nonpolar molecules due to induced dipoles, and is known as London dispersion forces. For 10 points, identify these generalized weak intermolecular forces, which are named after a Dutch scientist.

ANSWER: **Van der Waals** forces

024-09-7-08132

2. This figure informed a butler that he would be spared and told a baker that he would be hanged. In order to test his siblings, he plants his silver goblet in Benjamin's bag and accuses his brother of theft. This man is imprisoned after being falsely accused of attempted rape by Potiphar's wife. He interprets Pharaoh's dream about fat and skinny cattle to mean that Egypt will suffer seven years of famine. For 10 points, name this son of Jacob who possessed a multicolored coat and was sold into slavery by his brothers.

ANSWER: **Joseph** [or **Yosef**]

004-09-7-08133

3. One character in this work obsessively makes shoes in order to relieve his guilt at not being able to save a man from the guillotine. Another of its characters recognizes her brother Solomon but is blackmailed into secrecy after it is revealed that Solomon has been spying for the British and the French. That woman, Miss Pross, shoots Madame Defarge in order to protect Lucy Manette, who is in love with Charles Darnay. For 10 points, name the novel, in which Sydney Carton sacrifices himself to save Charles, a work by Charles Dickens.

ANSWER: A **Tale of Two Cities**

032-09-7-08134

4. One kind of these singers is a coloratura. The arias "Vissi d'Arte" and "O Mio Babbino Caro" were written for this kind of singer. The soubrette (SUE-bret) has this operatic voice, which sings the title roles of the operas *Tosca* and *Madame Butterfly*. Singers in this voice include Jenny Lind, Beverly Sills, and Maria Callas. For 10 points, name this highest voice of a female opera singer.

ANSWER: **soprano**

004-09-7-08135

5. A powerful desiccant is made from the pentoxide of this element. A compound containing this element is a dental etching solution and iron III oxide rust remover. This element occurs in plus-3 and plus-5 oxidation states in its two triprotic acids. It forms a variety of elemental structures in its white and red allotropes. Because this element possesses a 3-s-2-3-p-3 configuration, it can break the octet rule, unlike nitrogen, which is also in its family. For 10 points, name this element with atomic number 15 and symbol P.

ANSWER: **phosphorus**

020-09-7-08136