



1. This scientist built on Godel's (GER-dul) incompleteness theorem to show that the halting problem is undecidable. He co-names a theorem with Alonzo Church which states that a function is algorithmically computable if and only if it is computable on a device named for this man. That device manipulates the symbols on an infinitely long tape. He also devised a test to distinguish between humans and machines. For 15 points, name this English computer scientist who likely died after eating a cyanide-laced apple.

ANSWER: Alan Mathison **Turing**

066-12-85-11101

BONUS: What property states that if elements a and b are members of a set, then a plus b is also a member of that set?

ANSWER: **closure** under addition

132-12-85-1110-1

2. This country had a dispute with a neighboring country over Tuzla Island in the Kerch Strait, which connects the Sea of Azov and the Black Sea. The 2004 Orange Revolution occurred in this country. The Dnieper (NEE-pur) river flows from the north to south in this country, and an autonomous republic within this country lies on the Crimean peninsula. For 15 points, name this country in Eastern Europe which borders Russia and whose city of Pripjat was the site of the 1986 Chernobyl nuclear disaster.

ANSWER: **Ukraine**

194-12-85-11102

BONUS: Name the peninsula which was ruled at different times by the Silla and Choson dynasties.

ANSWER: **Korean** peninsula [or **Hanguk** bando]

020-12-85-1110-1

3. One type of these compounds are defined as having a low Hammett function. Polyprotic kinds of this substance have multiple K_a values. The Ostwald and contact processes produce two common substances of this type. These substances can be defined as electron pair acceptors or proton donors by the Lewis and Bronsted-Lowry definitions, respectively. These substances increase the hydrogen ion concentration in water by the Arrhenius definition. For 15 points, name these substances with pH values below 7, often contrasted with bases.

ANSWER: **acids**

131-12-85-11103

BONUS: Antelope Island is the largest landform within what American lake, a remnant of the prehistoric Lake Bonneville which is fed by the Bear, Weber, and Jordan rivers?

ANSWER: **Great Salt** Lake

019-12-85-1110-1

4. An ion of this element is converted to other forms by the SOD enzymes. Hydrogen bonds can form when hydrogen bonds to nitrogen, fluorine, or this element. This element is the most abundant element in the Earth's crust. The triatomic allotrope of this element absorbs ultraviolet rays in the stratosphere; that allotrope is ozone. For 15 points, name this second-most abundant element in Earth's atmosphere behind nitrogen, an element with atomic number 8 and atomic symbol O.

ANSWER: **oxygen**

131-12-85-11104

BONUS: What Welsh poet wrote the line "Rage, rage against the dying of the light," in his poem "Do Not Go Gentle into That Good Night"?

ANSWER: Dylan **Thomas** [or Dylan Marlais **Thomas**]

030-12-85-1110-1

5. One character in this play lovingly buys curtains and plans to take a bath in her new house. Another of its characters prefers the Nigerian student Joseph Asagai to the wealthy and arrogant George Murchison. In this play, Willy Harris steals an insurance settlement that Lena wants to use to buy a house and which Walter wants to use to open a liquor store. For 15 points, name this play set in the apartment of the Younger family and written by Lorraine Hansberry.

ANSWER: A **Raisin in the Sun**

015-12-85-11105

BONUS: What is the literary term for overused, overly familiar phrases like "between a rock and a hard place"?

ANSWER: **cliche**

052-12-85-1110-1

6. The critical value of this man's namesake dimensionless number represents a transition from conduction to convection. The ultraviolet catastrophe resulted from a law for blackbody radiation he co-named with Jeans breaking down at short wavelengths. One phenomenon named for him has a cross-section proportional to the inverse-fourth power of the wavelength. This man names a method of estimating angular resolution, his namesake criterion. For 15 points, name this English physicist who names a type of scattering which gives the sky its blue color.

ANSWER: John William **Strutt**, 3rd Baron **Rayleigh** [accept either underlined portion]

048-12-85-11106

BONUS: Name the brass instrument played by jazz composer and bandleader Glenn Miller.

ANSWER: **trombone**

014-12-85-1110-1

7. Broadening of these things resulting from the Heisenberg uncertainty principle gives rise to a Lorentzian distribution. These things can also be broadened by the Doppler effect due to random thermal motion. Fraunhofer names a set of them first observed in the Sun. Using a prism, they can be observed in a flame test. For hydrogen, their wavelength can be calculated using the Rydberg formula and can be grouped into series like the Balmer. For 15 points, name these atomic fingerprints, discrete wavelengths observed in excited atoms.

ANSWER: atomic **spectral lines** [or **emission lines**; or **absorption lines**]

066-12-85-11107

BONUS: What general commanded the Confederate right flank at the Battle of Fredericksburg and was shot and killed by friendly fire after winning the Battle of Chancellorsville?

ANSWER: Stonewall **Jackson** [or Thomas Jonathan **Jackson**]

030-12-85-1110-1

8. One character in this work delivers a speech asking, “What though the field be lost?” and determines to follow “study of revenge, immortal hate, and courage never to submit or yield.” At the end of this work, two characters observe the waving of a flaming sword over their former home. Those characters have a lengthy discussion with the messenger Raphael before being banished for eating the fruit of the Tree of Knowledge. For 15 points, name this epic poem about the fall of man by John Milton.

ANSWER: **Paradise Lost**

014-12-85-11108

BONUS: Pawnee, Indiana is the setting for what show that includes characters such as Lil’ Sebastian, Ron Swanson, and the Amy Poehler-portrayed Leslie Knope?

ANSWER: **Parks and Recreation**

030-12-85-1110-1

9. In one section of this work, a boy is murdered and thrown into a pile of manure by the local Jews, whose crime is exposed when his corpse continues to sing “Alma Redemptoris Mater.” In another section of this work, a carpenter sleeping in a boat hanging from his ceiling is awoken by the cries for water of the student Nicholas, who is branded on the bottom by the clerk Absolon. For 15 points, name this diverse collection of stories told by pilgrims such as the Prioress and the Miller on the way to the shrine of Thomas Becket, a work of Geoffrey Chaucer.

ANSWER: **The Canterbury Tales**

014-12-85-11109

BONUS: This is a 30-second calculation question. Reduce the quantity $3 + 4i$ divided by $2 - 5i$ to standard form.

ANSWER: **$(-14 + 23i)/29$ [or $-14/29 + 23i/29$]**

080-12-85-1110-1

10. This man's forces defeated the Scots under David Leslie at the Battle of Dunbar. This man was long vilified for the massacres at Drogheda (DRAW-eh-duh) and Wexford during his invasion of Ireland. With Thomas Fairfax, he won the key Battle of Naseby. After this man's death, his son Richard was in power for less than a year before Charles II was put on the throne. For 15 points, name this man who served as Lord Protector during the interregnum that resulted from the execution of Charles I.

ANSWER: Oliver **Cromwell**

015-12-85-11110

BONUS: What Italian sculptor created the first free-standing nude since antiquity with his bronze statue of David?

ANSWER: **Donatello**

014-12-85-1110-1

11. The protagonist of this work can be identified by his springy step when wearing a mask to represent one of the *egwugwu*. After accidentally killing the son of Ezeudu when his gun explodes at Ezeudu’s funeral, the protagonist of this novel is exiled for seven years. Afraid to appear weak like his father, the protagonist deals the killing blow to his foster son Ikemefuna (ih-kay-meh-FOO-nuh), and he hangs himself after failing to instigate a rebellion against the British colonists. For 15 points, name this novel about the Umuofian Okonkwo written by Chinua Achebe.

ANSWER: **Things Fall Apart**

014-12-85-11111

BONUS: What American composer of *Chicester Psalms* and the *Kaddish* symphony wrote the score to *West Side Story*?

ANSWER: Leonard **Bernstein**

019-12-85-1110-1

12. This country's leader Marcelo Caetano (kai-TAH-noh) was overthrown in the 1974 Carnation Revolution. Caetano had carried on the *Estado Novo* regime established in this country by Antonio Salazar. This country was led by Braganza and Aviz dynasties. One of its princes was nicknamed Henry the Navigator for his contributions to naval exploration. For 15 points, name this home country of explorers Bartolomeu Dias and Vasco da Gama that colonized Brazil.

ANSWER: **Portugal** [or **Portuguese Republic**; or **Republica Portuguesa**]

015-12-85-11112

BONUS: This is a 20-second calculation question. What is the midpoint of the line segment joining the points (3, 7) and (8, 12)?

ANSWER: **(11/2, 19/2)** units [or **(5.5, 9.5)**]

197-12-85-1110-1

13. This man met his business partner, Phineas Miller, after coming to live at Mulberry Grove, the plantation of Nathanael Greene's widow. This man earned one contract by disassembling and assembling ten guns in front of Congress, demonstrating the effectiveness of interchangeable parts. His most significant invention used hooks and a grid to separate seeds from fibers. For 15 points, name this man who contributed to the growth of slavery by inventing the cotton gin.

ANSWER: Eli **Whitney**

015-12-85-11113

BONUS: This is a 30-second calculation question. Consider a triangle with two sides of lengths 5 and 6, with an angle of 60 degrees between them. What is the length of the third side?

ANSWER: square **root (of) 31** units [or **radical 31** units]

197-12-85-1110-1

14. This man collaborated with George Johnston to push the Virginia Stamp Act Resolutions through the House of Burgesses in 1765. During the Revolutionary War, he served as the first governor of Virginia. This man's most famous action is relayed in an account by William Wirt and took place at St. John's Church in Richmond. For 15 points, name this revolutionary who declared "I know not what course others may take; but as for me, give me liberty or give me death!"

ANSWER: Patrick **Henry**

015-12-85-11114

BONUS: Name these visible aggregates of tiny water droplets or ice crystals in the atmosphere that help warm the Earth by reflecting infrared wavelengths.

ANSWER: **clouds**

066-12-85-1110-1

15. One composition of this type employs two orchestras and a boys' choir and sets poems by Wilfred Owen. That composition, written by Benjamin Britten, is the "War" one. Another composition of this type was completed by Franz Xaver Süssmayr after the premature death of its composer, Wolfgang Amadeus Mozart. Compositions of this type often include such movements as the *Kyrie eleison* and *Dies Irae*. For 15 points, name this type of liturgical composition, a special type of Mass for the dead.

ANSWER: **Requiem** Mass [prompt on **Mass** until mentioned]

014-12-85-11115

BONUS: What is the commonly used name of the controversial Florida law invoked in the Trayvon Martin case that states that is sometimes called the "Shoot First" or "No Duty to Retreat" law?

ANSWER: **Stand Your Ground** law

030-12-85-1110-1

16. One character in this opera sings an aria beginning, “Votre toast, je peux vous le rendre” in Lillas Pastia’s tavern. Outside a factory, the title character of this opera sings about how love is a rebellious bird before throwing a flower to her future lover. This opera, which includes a famous *habanera* and Escamillo’s “Toreador Song,” ends after Don Jose desperately stabs the title coquette. For 15 points, name this Georges Bizet opera about a gypsy.

ANSWER: Carmen

014-12-85-11116

BONUS: In what form of computing are instructions carried out concurrently?

ANSWER: parallel computing

066-12-85-1110-1

17. This author described Bill Clinton as “the first black president.” She wrote about Milkman Dead III, who learns he can fly after killing Guitar Baines at the end of *Song of Solomon*. The last American to win the Nobel Prize in literature, this author wrote a novel in which Paul D. and Denver discover that Sethe is haunted by the memory of killing her oldest daughter to spare her from a life of slavery. For 15 points, name this African American novelist of *Beloved*.

ANSWER: Toni Morrison [or Chloe Anthony Wofford]

015-12-85-11117

BONUS: What object is known as a "lyzka" in Polish, a "loffel" in German, or a "cuchara" in Spanish?

ANSWER: a spoon

019-12-85-1110-1

18. One character in this film discovers that another character is actually a girl when he wrestles with her on a slope covered in white flowers. In this film, an elder dies after refusing to leave his home, a mill located across a strategically important stream. In the central battle in this film, the attackers possess three muskets, one of which kills Kikuchiyo, who is only a nominal member of a certain class. For 15 points, name this Akira Kurosawa film in which a village of poor farmers is protected by the title group of warriors.

ANSWER: Seven Samurai

014-12-85-11118

BONUS: Name this largest galaxy in the Local Group, with which the Milky Way galaxy will likely collide in several billion years.

ANSWER: Andromeda Galaxy

066-12-85-1110-1

19. Before it was switched to Mecca, Muslims prayed in the direction of this city, the site of the al-Aqsa mosque. In the Quran, Muhammad ascends to heaven from this city after riding the horse Buraq here, an event called the Night Journey. The site of Muhammad’s ascension is thought to be marked by the Dome of the Rock here. Other religious sites in this city include the Via Dolorosa, the Wailing Wall, and the Church of the Holy Sepulchre. For 15 points, name this Israeli city.

ANSWER: Jerusalem

015-12-85-11119

BONUS: What culture believed it was founded by Manco Cápac and worshipped the god Viracocha?

ANSWER: Incans

015-12-85-1110-1

20. The venue for this tournament is named after the winner of the 1973 "Battle of the Sexes" match. In 2011, Serena Williams yelled at the chair umpire during her loss in this tournament's women's singles championship game, and defeated Victoria Azarenka to win in 2012. The winner of the men's singles championship at this event in 2012 was the first British player to win a Grand Slam event since Fred Perry in 1936. For 15 points, name this tennis tournament played at the Billie Jean King National Tennis Center whose 2012 men's singles winner was Andy Murray.

ANSWER: **United States Open** Tennis Championships [or **U.S. Open**]

194-12-85-11120

BONUS: This is a 30-second calculation question. How many positive integers less than 1000 are divisible by 15?

ANSWER: **66**

197-12-85-1110-1

21. The first United Nations peacekeeping mission was sent to this body of water after its northern terminus, Port Said, was seized in 1956. The Bar Lev line on its eastern bank was built after a war in which the Yellow Fleet was trapped in its Great Bitter Lake. The British valued this notably flat waterway developed by Ferdinand de Lesseps as their lifeline to India, since it avoided having to sail around Africa. For 15 points, name this Egyptian waterway connecting the Red and Mediterranean Seas.

ANSWER: **Suez** Canal

153-12-85-11121

BONUS: During the 1605 Gunpowder Plot, what Catholic was found underneath the House of Lords with a bunch of explosives?

ANSWER: Guy **Fawkes**

080-12-85-1110-1

22. The protagonist of this work is described as opening his "word-ward" as he delivers a speech. One opponent of that protagonist bleeds to death after his arm is ripped off. In his final battle, the protagonist of this work is assisted by Wiglaf, who rebukes his fellows for cowardice. The title character of this work is a Geat warrior who defends Hrothgar's mead hall from a monster and the monster's mother. For 15 points, name this Anglo-Saxon epic about a hero who slays Grendel.

ANSWER: **Beowulf**

014-12-85-11122

BONUS: Name the man who was helped by Robert Kennedy in becoming the first African-American student at the University of Mississippi in 1962.

ANSWER: James **Meredith**

023-12-85-1110-1

23. Some cells in this organ are "Merkel" cells, while projections on it are called rete (REET) ridges. Affected by Grover's disease, this organ has one part subdivided into the stratum granulosum (GRAN-you-low-sum) and the stratum spinosum. It contains various mechanoreceptors. Major cell types in this organ include keratinocytes (care-UH-tin-OH-cytes). For 15 points, name this largest organ of the human body, which serves as a major physical barrier and is divided into the dermis and epidermis.

ANSWER: **skin** [or **dermis**; or **epidermis** until it is read]

052-12-85-11123

BONUS: What substances, which include mayonnaise, are colloids in which a liquid is dispersed in another liquid?

ANSWER: **emulsions**

048-12-85-1110-1

24. In 2012, a clip was released showing four soldiers in this country urinating on three corpses. Uniformed police officers and soldiers in this country have killed over 100 fellow servicemen in "green-on-blue" attacks. This country's poppy fields supply 90% of the world's illicit opium, which is used to fund its insurgency. Its president is Hamid Karzai. For 15 points, name this country where the Taliban is fighting coalition forces, which have been there since a 2001 invasion.

ANSWER: Islamic Republic of **Afghanistan**

080-12-85-11124

BONUS: This is a 30-second calculation question. How many distinct ways are there to arrange the letters in the name AMANDA?

ANSWER: **120**

174-12-85-1110-1

25. This language answers the questions "koho" and "co" with the accusative case, and, like Albanian, it contains the insult "kurva." Unique features of this language's orthography include the "r with a hook over it." Dialects of this language include Chod and Central Moravian. It is the second-most-spoken West Slavic language, behind Polish. For 15 points, identify this Central European language which has extensive mutual intelligibility with Slovak.

ANSWER: **Czech** language [or **Cestina**; prompt on **Bohemian**]

019-12-85-11125

BONUS: What character fights Daniel Webster in court over the fate of the farmer Jabez Stone in a Stephen Vincent Benet short story?

ANSWER: the **Devil** [or Mr. **Scratch**]

104-12-85-1110-1



26. Augustin de Candolle demonstrated these phenomena using the action of a plant's leaves. These phenomena can be shifted by stimulating the suprachiasmatic nuclei in the hypothalamus, and they are influenced by cues known as zeitgebers. These phenomena are partially influenced by melatonin, though they are more heavily influenced by environmental cues such as light. For 15 points, identify these "biological clocks" which influence our daily cycles and sleep patterns.

ANSWER: circadian rhythms

189-12-85-11126

BONUS: Which brain region behind the brain stem is responsible for ensuring coordinated, precise movements?

ANSWER: cerebellum

104-12-85-1110-1

27. This character is an old man known as "the trapper" in *The Prairie*. He aids Judge Marmaduke Temple and is known as Hawkeye in *The Pioneers*. In another novel, this character helps the Munro sisters get to Fort William Henry and befriends Chingachgook and the Mohawk warrior Uncas. He is the protagonist of *The Deerslayer*, *The Pathfinder*, and *The Last of the Mohicans*. For 15 points, name this character created by James Fenimore Cooper.

ANSWER: Natty Bumppo [or Natty Bumppo; or Nathaniel Bumppo; or Hawkeye before it is read]

015-12-85-11127