1. In crayfish, glands named for this color are essentially kidneys. Spherical colonies of *Volvox* usually have this color, which is responded to by M-type cone cells. A molecule named for this color has beta sheets arranged into a barrel configuration and was originally isolated from *Aequorea victoria*, a jellyfish. A pigment of this color contains a magnesium atom embedded in a porphyrin ring. For 10 points, name this color emitted by a certain fluorescent protein, which is also the color of chlorophyll.
ANSWER: **green**

2. In a story from this collection, Duke Theseus of Athens holds a tournament in which Arcite (AR-kih-tay) triumphs over his friend Palamon. In another story from this collection, a disgraced knight learns that what women desire most is sovereignty over their husbands. The frame narrative of this collection follows a group of pilgrims to the shrine of Thomas Becket including the Knight, the Miller, and the Wife of Bath. For 10 points, name this collection of verse stories by Geoffrey Chaucer.
ANSWER: *The **Canterbury Tales***

3. For coordination complexes, this value is called the stability constant. The derivative of the log of this quantity with respect to temperature is given by the van't Hoff equation. The natural log of this quantity is proportional to the Gibbs free energy. This quantity is more accurately calculated using activities, and it is found using the law of mass action. For 10 points, name this value symbolized K, which is found by taking the ratio of the products to the reactants.
ANSWER: **equilibrium** constant [or **K** until it is read]

4. In this poem, the speaker describes boulders as "loaves and some so nearly balls," and commands them to "Stay where you are until our backs are turned!" The central object of this poem separates the speaker's apple trees from pine trees, and the speaker envisions elves working to break it down, which necessitates the title activity. For 10 points, name this poem by Robert Frost, which concludes with the line, "Good fences make good neighbors."
ANSWER: "**Mending Wall**"

5. These phenomena rotate around amphidromic points. Laplace developed a set of partial differential equations used to model these phenomena. The bore of these phenomena opposes the natural direction of water flow. When these phenomena are classified as diurnal, locations experience one high and one low per day. The Bay of Fundy is famous for having the greatest range for these phenomena. For 10 points, identify these rises and falls in sea levels tied to the gravitational forces of the Sun and Moon.
ANSWER: **tide**s

6. One musician who played this instrument included the calypso-inspired "Saint Thomas" on his influential album titled for this instrument *Colossus.* This instrument was used to create "sheets of sound" on songs like the ballad "Naima" on the album *Giant Steps.* Another player of this instrument inaugurated bebop along with Dizzy Gillespie and was nicknamed "Bird." For 10 points, name this woodwind instrument played by Sonny Rollins, John Coltrane, and Charlie Parker.
ANSWER: tenor **sax**ophone

7. The magnetic dipole strength of a single electron is about one of a unit named for this man. Along with Werner Heisenberg, this scientist developed the complementarity principle and the Copenhagen interpretation of quantum mechanics. This scientist theorized that atoms emitted light in fixed wavelengths because electrons in atoms only existed at certain energies. For 10 points, name this Danish physicist who developed a model of the atom with quantized energy levels represented by concentric circles.
ANSWER: Niels **Bohr**

8. This man wrote a story in which a wife tells her husband that one of their seven children is not his, but refuses to tell him which one. In another story by this author of "Useless Beauty," Elisabeth Rousset is pressured into sleeping with a Prussian officer. Another story by this man ends with Madame Forestier (for-ES-tee-ay) telling Mathilde Loisel (lwah-ZEL) that the title piece of jewelry was fake. For 10 points, name this French short story writer of "Ball of Fat" and "The Necklace."
ANSWER: Guy de **Maupassant** (GEE deh MOE-puh-sahnt)

9. This band was originally called Fecal Matter, and Chad Channing was the drummer on their first album. A song by this band notes "teenage angst has paid off well." They covered David Bowie's "The Man Who Sold the World" at their 1994 MTV Unplugged concert. The cover art of this band's second album shows a naked baby swimming toward a dollar bill on a fishing line. That album, *Nevermind,* featured the hit "Smells Like Teen Spirit." For 10 points, name this rock band led by Kurt Cobain.
ANSWER: **Nirvana**

10. Rutherford B. Hayes tried to break the power of this faction by reorganizing the New York Custom House Ring and dismissing Alonzo Cornell. The leader of this faction was the one-time bodyguard of Thaddeus Stevens, Roscoe Conkling. This faction tried to nominate Ulysses S. Grant for a third term at the 1880 RNC; when that failed, they were represented by Chester A. Arthur on the Garfield ticket. For 10 points, name this Gilded Age faction of the Republican Party opposed to the Half-Breeds.
ANSWER: **Stalwart**s [prompt on the **Republican**s]

11. Police found this man thanks to a tip from former Miss Iceland Anna Bjornsdottir (BYORNZ-daughter). His brother, Billy, was a politician and college president who was forced to resign in 2003 over contact with this man. This fixture on Most Wanted lists was arrested in 2011 at age eighty-one while living in Santa Monica. For 10 points, name this captured fugitive who was sentenced to two consecutive life terms for crimes committed while leading Boston's Winter Hill Gang.
ANSWER: James Joseph "Whitey" **Bulger** Jr.

12. On a trip to Spain, this artist painted a teenage musician working in the band of the Imperial Guard in his *The Fifer.* In one painting, this man depicted a bowl of oranges next to a blonde serving alcohol. This painter used Victorine Meurent as the model for a nude woman eating next to two clothed men in his *Luncheon on the Grass.* This man invited controversy for his painting of a lounging prostitute staring defiantly at the viewer. For 10 points, name this Impressionist painter of *Olympia.*
ANSWER: Edouard **Manet** [do not accept "Monet"]

186-13-95-07112

13. Flourine-18 is attached to a derivative of this molecule in the most common PET tracer. PEP carboxykinase is an enzyme key to a process that generates this molecule from smaller precursors. This molecule is phosphorylated by hexokinase in the first step of a process that generates two net ATP by splitting this molecule into two molecules of pyruvate. For 10 points, name this monosaccharide with formula C 6–H 12–O 6, a sugar that is an important source of energy.
ANSWER: **glucose** [or **dextrose**]

048-13-95-07113

14. This president's Secretary of State negotiated a treaty that banned England and the United States from colonizing Central America. This man, whose administration negotiated the Clayton-Bulwer Treaty, was the father-in-law of Jefferson Davis, who led the Mississippi Rifles under his command. Known as "Old Rough and Ready," he won his greatest victory at Buena Vista. For 10 points, name this Mexican War general who won the Presidency in 1848 and was succeeded on his death by Millard Fillmore.
ANSWER: Zachary **Taylor**

080-13-95-07114

15. This poem describes a visitor "beguiling all my sad soul into smiling" from whom the speaker wishes no "token of that lie thy soul hath spoken." This poem describes a "pallid bust of Pallas" and "the Night's Plutonian shore." This poem is set "upon a midnight dreary" while the speaker "pondered weak and weary" before being visited by the title creature. For 10 points, name this Edgar Allan Poe poem about a bird who repeatedly replies, "Nevermore."
ANSWER: "The **Raven**"

014-13-95-07115

1A. What American author wrote about Edna Pontellier in *The Awakening*?
ANSWER: Kate **Chopin**

1B. What distinct regions in space, which contain a singularity, have an event horizon beyond which no light can escape?
ANSWER: **black hole**s

2A. What leader of North Korea was allegedly heavily inebriated when he ordered the execution of his uncle Jang in 2013?
ANSWER: **Kim Jong Un** [prompt on **Kim**]

2B. What city burned down in a 1666 great fire that was recorded in Samuel Pepys' (PEEPS) diary?
ANSWER: **London**

3A. This is a 20-second calculation question. What is the sum of the roots of the equation x-squared minus 4x minus 5 equals 0?
ANSWER: **4**

3B. This is a 20-second calculation question. What is the distance from the center of a circle with radius 13 to a chord of that circle with length 10?
ANSWER: **12**

4A. What city houses the Grand Ole Opry and Vanderbilt University?
ANSWER: **Nashville**, Tennessee

4B. What law states that the partial pressure of a solute in a gas above a solution is equal to the concentration of the solute times the law's namesake constant?
ANSWER: **Henry**'s law [do not accept "Raoult's law"]

5A. What leader of the Christian Democratic Union became the first Chancellor of West Germany?
ANSWER: Konrad **Adenauer**

5B. What type of lepton bears a negative-one charge like the electron but is two hundred times heavier and denoted by the Greek letter for m?
ANSWER: **muon**s [do not accept or prompt on "mu"]

6A. What German philosopher declared that "God is dead" in *The Gay Science* and also wrote *Thus Spoke Zarathustra?*
ANSWER: Friedrich **Nietzsche**

6B. What new 2013 drama starring Karl Urban concerns a futuristic society in which cops are paired with android counterparts?
ANSWER: ***Almost Human***

7A. What silent-era actor and director created such films as *Modern Times* and *City Lights*?
ANSWER: Charlie **Chaplin**

7B. Constantine converted to Christianity after having a vision of a cross before winning what battle?
ANSWER: Battle of the **Milvian Bridge** [or **Pons Milvius**]

8A. What figure of speech compares two incongruent things using the word "like" or "as"?
ANSWER: **simile**

8B. What type of number in computer programming approximates a real number and has a namesake unit for their computation built into the CPU?
ANSWER: **float**ing-point number

9A. This is a 30-second calculation question. In a best two-out-of-three match, if the better quizbowl team wins each game with probability three-fifths, what is the probability the teams split the first two games?
ANSWER: **12/25**

9B. This is a 30-second calculation question. How many solutions are there between 0 and 2pi, inclusive, to the equation sine-cubed of x minus 3 sine-squared of x plus 2 sine of x equals 0?
ANSWER: **4**

10A. What dictator of Cambodia and leader of the Khmer Rouge created the "killing fields?"
ANSWER: **Pol Pot** [or **Saloth Sar**]

10B. What oratorio by George Frideric Handel features the "Hallelujah" Chorus?
ANSWER: ***Messiah***

1. This letter denotes a statement proven by Ken Ribet that, in turn, helped prove Fermat's last theorem. This letter with a hat over it is used to denote the residual in statistics. This letter is used to denote the neighborhood around a function f(x), while delta is used to denote the neighborhood around x, in a particular definition of a limit. This letter is also used to denote the eccentricity of a conic section. For 10 points, give this Greek letter that denotes an arbitrarily small quantity.
ANSWER: **epsilon**

048-13-95-07117

2. In 2006, this author revealed that he was a member of the Waffen-SS in *Peeling the Onion.* A novel written by this man features a character named Eddi Amsel, who creates a group of scarecrows. Another character created by this author can shatter glass with his voice and decides to stop growing after receiving the title instrument on his birthday. For 10 points, name this German author of *Cat and Mouse* who wrote about Oskar Matzerath in *The Tin Drum.*
ANSWER: Gunter **Grass**

227-13-95-07118

3. This country's southeastern Chirac Pastures are claimed by the left-wing opposition party in a neighboring country. This country claims control over Leila Island as well as Melilla (meh-LEE-yah) and Ceuta (say-OO-tah), which are currently under the de facto control of Spain. This country's southern half has long been run by the breakaway Polisario (poh-lee-SAH-ree-oh) Front under the name Western Sahara. For 10 points, name this country, the home of Tangiers and Casablanca.
ANSWER: Kingdom of **Morocco** [or Al Mamlakah al **Maghrib**iyah]

019-13-95-07119

4. A particularly short one of these beings won a bet against a tyrant by crossing the universe within three steps. The last of them will arrive on a white horse to bring in the end of the current age. The seventh of these divinities killed the demon Ravana to rescue his wife Sita, and the eighth mentored Arjuna in the *Mahabharata* (mah-ha-BAH-ruh-tuh). Rama and Krishna are two of, for 10 points, what ten terrestrial incarnations of the preserver god from Hindu mythology?
ANSWER: **avatar**s of **Vishnu**

080-13-95-07120

5. There are three irregular verbs in this tense, including "ir" (EER), which takes endings starting with "I-B"; and "ser," which becomes "E-R" plus the endings for this tense. Regular verbs in this tense take the endings "-a," (AH) "-as," (AHS) "-a," (AH) "-amos," (AHM-ohs) "-ais," (eye-EES), and "-an" (AHN). For 10 points, identify this Spanish verb tense used for actions that were in progress in the past, as opposed to completed actions, which use the preterite.
ANSWER: Spanish **imperfect** tense [or **imperfecto**]

019-13-95-07121

6. In 1844, this city underwent nativist riots after Hugh Clark proposed a temporary suspension of Bible-reading in schools. This city's black community established the African Methodist Episcopal Church. During the Revolutionary War, the British captured this city after the battles of Brandywine and Germantown. This city hosted the Second Continental Congress and was where the Declaration of Independence was signed. For 10 points, name this "City of Brotherly Love" founded by William Penn.
ANSWER: **Philadelphia**

7. This man published a series of essays about his review of the work of Joseph Black. This man was assisted by his wife Mary-Anne Paulze, who is depicted next to him in a Jacques-Louis David (DUH-veed) portrait. This man synthesized water in a bell jar to prove that it wasn't an element and disproved Joseph Priestley's theory of phlogiston. He wrote the first elementary textbook of his field, the Elementary *Treatise of Chemistry*. For 10 points, name this discoverer of the law of conservation of mass, a French chemist.
ANSWER: Antoine-Laurent de **Lavoisier**

8. The second part of this poem describes "real holy laughter in the river" and begins by referring to a "sphinx of cement and aluminum" before invoking the god Moloch. Its third section includes the refrain, "I'm with you in Rockland." This poem, published in 1956 by Lawrence Ferlinghetti, resulted in a notorious obscenity trial. This poem begins, "I saw the best minds of my generation destroyed by madness." For 10 points, name this long poem by Allen Ginsberg.
ANSWER: *Howl*

9. The conservation of linear momentum is derived from the fact that a system's Lagrangian is invariant for this kind of transformation. A Lorentz transformation of this type is called a boost. A matrix for this kind of transformation has ones along the diagonal and appropriate values on the rightmost column. This kind of transformation is calculated by adding a displacement vector to the position. For 10 points, name this type of transformation, a move without rotation that preserves orientation.
ANSWER: **translation**

10. This city's valley causes pollution problems for the Guaire (goo-ah-EE-ray) River, and it spills over the boundary of Miranda state. The Parque Central area of this city is taking over municipal functions from the surroundings of the Miraflores (mee-rah-FLOR-ehs) Palace. This city's National Pantheon contains the tomb of Simon Bolivar. For 10 points, name this city which still leads Valencia and Maracaibo as the population and economic center of Venezuela.
ANSWER: **Caracas**

11. This team lost the 1946 World Series to the Cardinals after Enos Slaughter's "mad dash." Mookie Wilson reached first base against this team as part of a tenth inning comeback in Game Six of the 1986 World Series, which included a ball rolling past first baseman Bill Buckner. A victory in the 2004 World Series ended this team's 86-year-long Curse of the Bambino. For 10 points, name this American League team that plays at Fenway Park and is the fierce rival of the New York Yankees.
ANSWER: **Boston** Red Sox [or Boston **Red Sox**; prompt on **Sox**]

12. A poem by Baudelaire (boh-duh-LAIR) compares a woman to one of these, addressing her as "You who entered my heart like the stab of a knife." Lord Byron was the model for one of these named Lord Ruthven, the title character of a story by John Polidori. Jonathan Harker narrates an epistolary novel in which one of these is hunted by Dr. Van Helsing. For 10 points, name these supernatural beings, the most famous of which is Bram Stoker's Dracula.
ANSWER: **vampire**s

13. This man used an elevated, climate-controlled device with one sliding glass pane on the side to avoid wrapping his infant daughter Deborah in many layers of clothing during the winter. This inventor of the "baby tender" or "air crib" also created a device in which a lever creates either escape conditioning or positive reinforcement, usually in rats or pigeons. For 10 points, identify this psychologist whose namesake "box" was used in his experiments on behaviorism.
ANSWER: B.F. **Skinner** [or Burrhus Frederick **Skinner**]

14. In the Quran, this man asks the prophet al-Khidr (kah-DEER) why he punches a hole in a boat. He married the daughter of Jethro while serving as a shepherd. Later, he brought water out of a rock by striking it with his staff. He appointed Joshua as his successor, because he was not permitted to cross the Jordan River.For 10 points, name this man who spoke with God in the form of a burning bush and brought ten plagues on the Egyptians while leading the Hebrews out of captivity.
ANSWER: **Moses** [or **Musa**]

15. This letter, along with the chemical symbol of an element, is used in the name of a spectral line in the Balmer series that dominates the visible spectrum. This letter represents a quantity approximately equal to 1/137, the fine structure constant, and it is frequently used to represent angular acceleration. A particle which was used to discover the atomic nucleus is named for this letter. For 10 points, name this Greek letter which names the helium nucleus, a particle made up two protons and two neutrons.
ANSWER: **alpha**

1. One of this author's novels created the modern image of Robin Hood. In a novel by this author, Squire Inglewood attempts to arrest the narrator, Frank Osbaldistone, who is aided by the title outlaw. This author created a mysterious "Black Knight," who turns out to be Richard the Lionhearted in disguise, in a novel following the disinherited Cedric of Rotherwood. For 10 points, name this English novelist of *Rob Roy* and *Ivanhoe*.
ANSWER: Walter **Scott**

014-13-95-07132

2. The seventh isoform of this protein is attacked by autoantibodies in epidermolysis bullosa acquisita. This protein is rich in the glycine–X–Y motif, and vitamin C is required to create its numerous hydroxylated lysine and proline residues. This protein is secreted by fibroblasts, assembles into a triple helix structure, and is broken down to form gelatin. For 10 points, name this important structural protein found in connective tissue, the most abundant protein in humans.
ANSWER: **collagen**

048-13-95-07133

3. A poem by this writer asks a lover, "Cruel and sudden, hast thou since purpled thy nail, in blood of innocence?" and compares the sexual act to the work of an insect in which "our two bloods mingled be." He wrote, "One short sleep past, we wake eternally," in a poem addressing an entity of whom he concludes, "thou shalt die." That poem is the tenth of his *Holy Sonnets.* For 10 points, name this English poet of "The Flea" and "Death, Be Not Proud."
ANSWER: John **Donne**

014-13-95-07134

4. This letter names a function that for a positive integer n gives the factorial of n minus one. Special cases of the distribution named for this letter include the exponential and chi-squared distributions. The Lorentz factor is typically represented with this letter, as is the limiting difference of the harmonic series and the natural logarithm, the Euler-Mascheroni constant. For 10 points, identify this Greek letter that names a type of radiation much more powerful than alpha and beta radiation.
ANSWER: **gamma**

066-13-95-07135

5. The only cabinet official opposed to this treaty had to resign after the interception of letters from Joseph Fauchet. A signatory of this treaty agreed to give up demands for compensation for slaves manumitted during the Revolution. The Democratic-Republican Party partly coalesced from voters enraged at this treaty, designed by Alexander Hamilton and accepted by the Washington administration. For 10 points, name this 1794 treaty with England negotiated by the Chief Justice of the Supreme Court.
ANSWER: **Jay** Treaty [or **Jay's** Treaty]

080-13-95-07136

This is a calculation question. A water tank in the shape of an upside-down cone -- with the tip facing downward -- can be filled by a certain hose in two hours. How many minutes does it take for the hose to fill it to half its height?
ANSWER: **15** minutes

Name the folds found in the inner membrane of mitochondria which surround the matrix.
ANSWER: **crista**e