1. **A theorem regarding these objects deals with the presence of singularities in tangent vector fields defined on their surfaces. The volume of an n-dimensional version of these objects is inversely proportional to the gamma function of one-half. Triangles in a form of geometry named for these objects can have three (*)** right angles. The coordinate system named for these objects uses the coordinates r, theta, and phi. These objects have a surface area to volume ratio of three r. For 10 points, identify these objects that are the set of points equidistant from a given point in three dimensions.
ANSWER: **sphere**s [or 2-**sphere**; or n-**sphere**; or **ball**; or **circle**s]

BONUS: What English verb is equivalent to the French "tomber" and the Italian "cadere" (cah-DEE-ree)?
ANSWER: to **fall**

2. **A poet from this country wrote a group of poems called *Cradlesongs* in her book *Tenderness: Songs for Children.* Another writer from this country wrote of Clara, who vows to never again speak to her husband Esteban Trueba (troo-EY-buh) after being slapped by him. The authors of (*)** *Sonnets of Death* and *House of the Spirits* were from this country. For 10 points, name this South American nation, the home country of the writers Gabriela Mistral, Isabel Allende (eye-EN-day), and Pablo Neruda.
ANSWER: **Chile**

BONUS: What ancient civilization's history is divided into an Old Kingdom, Middle Kingdom, and New Kingdom?
ANSWER: **Egypt**

3. **Minerva saved a victim of this man who had achieved insight by looking at the spine of a fish. This man used honey to attract an ant into walking through a seashell. After this man pushed his nephew Perdix off of the Acropolis, Minerva turned Perdix into a (*)** partridge. Either this man or the daughters of Cocalus (coh-CAL-us) killed his former employer, the husband of Pasiphae (PASS-if-ey). For 10 points, name this father of Icarus who designed the Labyrinth.
ANSWER: **Daedalus** [or **Daedalos**; or **Taitale**]

BONUS: What mountain is the highest peak in North Carolina and the highest point east of the Mississippi River?
ANSWER: Mount **Mitchell**

4. **This value can be found by subtracting the initial state from the maximum of the transition state on some diagrams. An equation that sets this value equal to negative R-T times the natural log of the ratio between the equilibrium constant and the frequency factor is named for (*)** Swedish chemist Svante Arrhenius (SUH-vahn-tuh uh-REE-nee-us). Catalysts lower this value for chemical reactions. It is usually represented as "E sub a." For 10 points, name this value defined as the minimum energy required for a chemical reaction to occur.
ANSWER: **activation** energy [or **E** sub **a** until it is read]

BONUS: What structures, that come off the arch of the aorta before dividing into external and internal branches in the neck, are the arteries that carry blood to the head?
ANSWER: **carotid** arteries

5. **In Ray Bradbury's novel *Dandelion Wine,* Colonel Freeleigh dreams of being one of these objects. A substance made from these objects is thrown at Edgar by Heathcliff in *Wuthering Heights.* John Steinbeck's novel *In Dubious Battle* involves a strike of workers who procure these objects. Several of these objects are thrown at (*)** Gregor Samsa by his father in Franz Kafka's *The Metamorphosis.* For 10 points, name this type of fruit that is tragically eaten by Adam and Eve in *Paradise Lost.*
ANSWER: **apple**s

BONUS: What inefficient sorting algorithm is named for the manner in which smaller elements float to the top of the list?
ANSWER: **bubble** sort

6. **These things originate in source regions that are flat and have light surface winds. These things are designated with a combination of a small c or small m, for continental or marine, and a big P or big T, for polar and tropical. On surface weather maps, transition zones between them are marked by lines with equally spaced (*)** triangles, semicircles, or a combination of both and are called fronts. For 10 points, name these large bodies of air that have a consistent temperature and moisture content.
ANSWER: **air mass**es

BONUS: In what type of chemical bond do atoms share electrons?
ANSWER: **covalent**

7. **The Tempo program is used to find and model these objects, which are sometimes surrounded by a plerion. An example of these objects in Virgo is surrounded by the first discovered extrasolar planets. A binary example of them was used to indirectly prove the existence of (*)** gravitational waves by Hulse and Taylor. Burnell and Hewish named the first discovered one LGM-1 and noted that its emissions were periodic. For 10 points, name these highly magnetized rotating stars that periodically emit radiation.
ANSWER: **pulsar**s [or **pulsating star**s; prompt on neutron **star**s]

BONUS: Two men build Cloudcuckooland to block off sacrifices to the gods in *The Birds,* a play by what Ancient Greek comedy writer of *The Frogs?*
ANSWER: **Aristophanes** (air-ih-STAHF-uh-nees)

8. **The second section of this novel intersperses events such as Prue's death in childbirth with the decay of a house. At the beginning of this book, James imagines killing his father because he insists the weather will be bad. The matriarch of the central family dies abruptly in this novel's section (*)** "Time Passes." In this novel, Lily Briscoe finally completes her painting and the Ramsays take a boat to the title structure. For 10 points, name this novel by Virginia Woolf.
ANSWER: ***To the Lighthouse***

BONUS: What vector is defined as the shortest linear distance between two points?
ANSWER: **displacement** vector

![hsapq logo]

SET A:

1. BONUS: What nineteenth-century American poet wrote "To a Waterfowl" and "Thanatopsis?"
ANSWER: William Cullen **Bryant**

2. BONUS: What Nigerian playwright wrote *The Lion and the Jewel* and *Death and the King's Horseman?*
ANSWER: Wole **Soyinka**

3. BONUS: Name the artist of the unfinished *Athenaeum* (AA-thuh-NAY-um) who painted the *Lansdowne* and one-dollar bill likenesses of George Washington.
ANSWER: Gilbert Charles **Stuart**

4. BONUS: This is a 30-second calculation question. A bag has ten ping pong balls in it, numbered one through ten inclusive. Three people each draw a ball from the bag without replacement. What is the probability that each of them drew an odd number?
ANSWER: **1/12**

SET B:

1. BONUS: What first major battle of the Civil War pitted P.G.T. Beauregard against Irvin McDowell and gave Stonewall Jackson his nickname?
ANSWER: Battle of **First Bull Run** [or **First Manassas**; prompt on partial answer]

2. BONUS: This is a calculation question. In triangle VCU, altitude VO has length 9 units. If the side lengths of VCU are all integers, what is the smallest possible length of CU?
ANSWER: **24** units

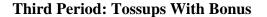3. BONUS: What author created Rowena and Cedric of Rotherwood in his novel *Ivanhoe?*
ANSWER: Walter **Scott**

4. BONUS: Name the founder of the Tuskegee Institute who delivered the Atlanta Compromise speech and wrote the autobiography *Up From Slavery.*
ANSWER: Booker Taliaferro **Washington**

9. **This city was the original site of the company that makes CaramelCrisp popcorn, Garrett Popcorn Shops. This city is home to the three-million-gallon Abbott Oceanarium, inside its Shedd Aquarium. The Lurie Garden and Crown Fountain are both located in a park in this city, where (*)** Anish Kapoor's sculpture *Cloud Gate* sits. The Smith Museum of Stained Glass Windows and a Ferris wheel can be found on this city's Navy Pier. For 10 points, name this Midwestern city where Millennium Park is home to a stainless-steel, bean-shaped sculpture.
ANSWER: **Chicago**

023-14-102-06109

BONUS: What leader singer of Nine Inch Nails wrote film scores for *The Social Network* and *The Girl with the Dragon Tattoo?*
ANSWER: Trent **Reznor**

015-14-102-0610-11

10. **Pompey's son Sextus Pompeius led a revolt on this island. The First Punic War began when the Mamertines (MAH-mur-teenz) occupied its city of Messana. A city on this island was led by the tyrants Dionysius I and Hiero (HEER-oh) II, who commissioned (*)** Archimedes to design a claw and a heat ray for its defense. It was the origin and power base of the Mafia. For 10 points, name this island which includes the city of Syracuse and which is separated from Italy by only two miles.
ANSWER: **Sicily** [or **Sicilia**]

015-14-102-06110

BONUS: What term is used to describe the novels of Gabriel Garcia Marquez and Toni Morrison, which incorporate fantastical elements into a naturalistic narrative?
ANSWER: **magic**al **realism**

014-14-102-0610-11

11. **This event was ended prematurely when Christina Maslach, who later married its organizer, objected to what was going on. Conducted in the basement of Jordan Hall, this event featured a man emulating a character from the film *Cool Hand Luke,* earning him the inaccurate nickname (*)** "John Wayne." Of the twenty-four participants, twelve were named guards and quickly began physically abusing the others. For 10 points, name this 1971 Philip Zimbardo experiment testing the abuse of power, which took place at a California university.
ANSWER: **Stanford prison** experiment

052-14-102-06111

BONUS: This is a 20-second calculation question. You invest 10 dollars at one percent interest, compounded continuously. Rounded to the nearest dollar, how much money will you have after one hundred years?
ANSWER: $**27**

190-14-102-0610-11

12. **A 1957 concert by this man and his band at Harlem's Apollo Theater is dramatized in a biopic starring Gary Busey as this singer. One of his songs states that, "Love like yours will surely come my way, A hey, a hey hey," and is "Everyday." This man makes use of the Bo Diddley Beat in "Not Fade Away." He played in a band called The (*)** Crickets, and his hits included "That'll Be the Day" and "Peggy Sue." For 10 points, name this rock and roll pioneer who died in a 1959 plane crash with the Big Bopper and Richie Valens.
ANSWER: Charles "Buddy" **Holly**

BONUS: Charles Cornwallis surrendered to George Washington at what final major engagement of the American Revolutionary War?
ANSWER: Battle of **Yorktown**

13. **This composer's Symphony Number 4 in D minor opens with a fast movement marked *Lebhaft* (LAYB-hoft). This composer was confined to an asylum after throwing himself into the Rhine in a failed suicide attempt brought on by syphilis. This composer included "Traumerei" (TROW-mer-ai) in a set of piano pieces called (*)** "Scenes from Childhood." This composer's first symphony is nicknamed the "Rhenish." For 10 points, name this German composer who wrote a number of famous pieces for his wife, Clara Wieck.
ANSWER: Robert **Schumann**

BONUS: What English philosopher denied the existence of innate ideas in his *An Essay Concerning Human Understanding?*
ANSWER: John **Locke**

14. **The influence of this group increased when Peter Porter took over the House Committee on Foreign Affairs and Langdon Cheves became the chairman of the House Ways and Means Committee. John Randolph coined this term, which denoted a group of politicians from (*)** Southern and Western states. Some elements of this faction, led by Henry Clay, agitated for an invasion of Canada. For 10 points, identify these Democratic-Republicans who convinced James Madison to enter a conflict with Britain in 1812.
ANSWER: war **hawk**s

BONUS: At what 480 BCE battle did three hundred Spartans led by King Leonidas hold off a larger Persian army?
ANSWER: Battle of **Thermopylae**

15. **This city's location of Red Hill was reportedly the site of a massacre of Circassian nationalists. This city banned the construction of a Pride House, which a judge said would "provoke social-religious hatred." The resort of Roza Khutor (koo-TOR) is near this city. Stephen Fry's open letter to David (*)** Cameron suggested finding a location other than this city for a 2014 event. Its mayor, Anatoly Pakhomov, controversially claimed this city featured no homosexual residents. For 10 points, name this Russian city, the host of the 2014 Winter Olympics.
ANSWER: **Sochi**

BONUS: What NBA team made the 2013 Eastern Conference Finals through strong performances from Paul George and Roy Hibbert?
ANSWER: Indiana **Pacers** [or **Indiana** Pacers]

16. **George Balanchine re-choreographed this ballet specifically for Gelsey Kirkland. Some characters in this ballet perform a "round dance" and play a game with golden apples. Leopold Stokowski was renowned for his recordings of the berceuse (BARE-soo-zuh), the infernal (*)** dance, and other highlights from three suites excerpted from this ballet. Its protagonist destroys an egg holding the immortality of his enemy, and sees thirteen dancing princesses before encountering the title creature in the realm of Kaschei (kuh-SHAY) the Immortal. For 10 points, name this Stravinsky ballet about Prince Ivan.
ANSWER: *The **Firebird*** [or *L'**oiseau de feu***; or ***Zhar-ptitsa***]

BONUS: What biopolymer is commonly found in the cell walls of fungi and the exoskeletons of ants?
ANSWER: **chitin**

17. **This man headed a federal commission on water quality and twice defeated Socialist Labor candidate Eric Hass. He rose to his executive position by defeating millionaire W. Averell Harriman. This man passed a series of namesake tough drug laws and once raised his middle finger at a reporter on the campaign trail. He controversially married a divorcee named (*)** "Happy" and stated "that's life" after thirty-nine people died in the Attica prison riots. For 10 points, name this governor of New York and Vice President under Gerald Ford, who was the grandson of John D.
ANSWER: Nelson **Rockefeller**

048-14-102-06117

BONUS: What name did Andy Warhol give to his New York studio?
ANSWER: the **Factory**

015-14-102-0610-11