

2016 SOLON

PACKET 04:

TOSSUPS:

1. **This element is extracted in a powdered form by the Wohler process. The mineral corundum is made from an oxide of this element, which with iron forms emery. This element is refined in the (\*) Hall-Heroult process after its ore bauxite is extracted in the Bayer process. This metal, found in feldspar, is the most abundant metal in the Earth's crust. FTP, name this element out of which soda cans are made, symbolized Al.**

ANSWER: Aluminum (accept Al before mentioned) [SM]

2. **This dynasty put down the rebellion of the Trung Sisters in Vietnam. This dynasty was usurped by Wang Mang, who founded the Xin [SHIN] Dynasty. During this dynasty, Daoist insurgents led the Five Pecks of Rice Rebellion and the (\*) Yellow Turban Rebellion, which eventually led to its fall and the Three Kingdoms Period. FTP, name this dynasty founded by Liu Bang which takes its name from the majority ethnic group of China.**

ANSWER: Han Dynasty [HP]

3. **Alexander Dreyschock was most famous for playing a C minor work of this composer, which opens *Allegro con fuoco* with sixteenth note runs, mainly in the left hand. This composer's Raindrop prelude opens with a repeated A-flat motif. Franz (\*) Liszt is the dedicatee of his Opus 10, nicknamed the Revolutionary Etude, and this man also composed the Minute Waltz. FTP, name this Polish composer and piano virtuoso.**

ANSWER: Frederic Chopin [CS]

4. **During one type of these ceremonies, some Twelver Shiites enter a temporary *mut'ah*. Saptapadi, which involves walking around a fire seven times, formalizes the end of one in Hindu tradition. In a parable, missing a feast for one of these leads to (\*) "weeping and gnashing of teeth." Jews perform this ceremony under a chuppah [HUPPAH], which ends with the crushing of a glass by the male participant. FTP, name these ceremonies where rings might be exchanged.**

ANSWER: Wedding(s) (accept marriages or other common-knowledge equivalents) [CS]

5. **This figure who "Walks at Midnight" in a Vachel Lindsay poem was once in love with Anne Rutledge. "Ever-returning spring" brings a "trinity which includes the "thought" of this man who in another poem is "fallen cold and dead." A "great star early (\*) droop'd in the western sky" is like this man, to whom "a sprig" of "heart-shaped leaves of green" of lilac is given. FTP, Whitman wrote "O Captain! My Captain!" as an elegy for what president?**

ANSWER: Abraham Lincoln (prompt generously on "the president of the US" or the like) [The first poem mentioned is Vachel Lindsay's "Abraham Lincoln Walks at Midnight] [CS]

6. For the terms in the Taylor polynomial for the hyperbolic sine and cosine functions, this operation is repeatedly performed. The tip-to-tail or the parallelogram method is used to when performing this on two vectors. The probability that (\*) either of two mutually exclusive events will occur is equal to this operation performed on the individual probabilities. FTP, identify this operation, which is the inverse of subtraction.

ANSWER: Summation (accept addition or word forms) [EF]

7. A New Yorker cartoon observes that on the Internet, no one knows you're one of these. A Facebook group about "spotting" these animals is notorious for its draconian rules. In a webcomic, these animals are placed in (\*) lobster costumes; that comic is [this animal] Fort. This animal is often paired with the caption "I Have No Idea What I'm Doing," and these animals may be defined as "big ol' puppers." FTP, name these animals, whose Shiba Inu breed is so internet, much cool, wow.

ANSWER: Dogs (accept doggo or doge [DOHJ], accept pupper before mentioned, accept Dogfort or Dogspotting)

8. The term "A king's ransom" was coined after one man was kidnapped while returning from this conflict by Leopold V. Guy of Lusignan's loss at the Battle of Hattin sparked this conflict, which also saw the Sieges of (\*) Acre and Damascus. One leader drowned in the Saleph river on his way to this conflict; that leader was Frederick Barbarossa. FTP, name this conflict, where forces led by Richard I sought to conquer Jerusalem from Saladin.

ANSWER: The Third Crusade (prompt on Crusade) [GP/HP]

9. This constellation contains the star Alcyone, and the Hyades cluster is found in this constellation. A lunar mountain range that shares its name with this constellation is located in the Sea of Serenity, and this constellation's brightest star is (\*) Aldebaran [al-DEB-uh-ron]. This constellation corresponds with the dates April 20th to May 21st, and it contains the Crab Nebula. FTP, name this constellation between Aries and Gemini that is shaped like a bull.

ANSWER: Taurus [SM]

10. A character in this novel tells his daughter that girls like to be crossed in love now and then. Mr. Hurst mocks its protagonist for preferring books to cards. Lady Catherine de Bourg tells the protagonist not to (\*) marry her nephew in this novel, in which Charlotte Lucas marries Mr Collins. Georgiana is briefly involved with Mr. Wickham and Jane marries Mr. Bingley in—FTP—what novel about Fitzwilliam Darcy and Elizabeth Bennet, by Jane Austen?

ANSWER: Pride and Prejudice [CS]

11. One of these places was constructed by Zaha Hadid in Guangzhou. Richard Wagner called for the construction of one of these places in Bayreuth for the premier of his *The Ring Cycle*. La Scala is a very popular one of these places in (\*) Milan. One of these places designed by Jorn Utzon was meant to represent the sails of a ship. FTP, name these types of places, such as one in Sydney, where musicians perform pieces such as *Don Giovanni*.

ANSWER: Opera Houses (accept reasonable common-knowledge equivalents) [HP]

**12. In this language, Senghor and Césaire founded the Negritude movement. A playwright in this language wrote about Alceste, who abandons society after losing a court case. That playwright died playing his own Argan, who is (\*) *The Imaginary Invalid*. Another play in this language sees Inez, Garcin, and Estelle trapped together in a single room in Hell. FTP, name this language of Molière [“Mole”-ee-”air”] and Jean-Paul Sartre [SART].**

ANSWER: **French** language (or **Français**) [CS]

**13. Diarmuid ua duibhne [DER-mid oh-DINAH] had two colorful examples of these weapons, each with their own magical powers. Cu Chulainn has a whalebone one named Gae Bulg, and Hagen kills Sigurd by (\*) throwing one of these. St. George is often depicted with one of these weapons, and Izanagi and Izanami used one to create the islands of Japan. Odin’s is called Gungnir and is made from Yggdrasil [JGG-drah-sill]. FTP, name these long weapons.**

ANSWER: **spear(s)** [Duibhne’s spears are really cool and you should go look them up] [GP]

**14. Emile Durkheim claimed that higher social control in this faith made its members less likely to commit suicide. A philosopher of this faith wrote *Sic et Non* after an affair with Heloise. Another of this faith referred to Aristotle as “the philosopher” and included his *quinque viae*, or (\*) ‘five ways’ to prove that a Triune Being exists in his most famous work. FTP, name this faith whose adherents included Abelard and Aquinas, who wrote eucharistic hymns like “Adoro te devote” in church Latin.**

ANSWER: **Catholicism** (prompt on “Christianity” but do not accept or prompt on other denominations) [CS]

**15. This man’s namesake “rings” are visible when a convex lens is placed on a glass plane. He demonstrated that the rate of an object’s heat loss is proportional to the temperature difference between the object and its surroundings; that is his namesake (\*) Law of Cooling. He wrote about separating white light with a prism in his *Opticks*, and he names the SI unit of force. FTP, name this British scientist who probably never had an apple fall on his head.**

ANSWER: Sir Isaac **Newton**

**16. This king bought Queen’s Palace, which became Buckingham Palace. He dismissed the “Ministry of All the Talents,” which included his enemy Charles James Fox, who resigned after this king blocked his East India Bill. (\*) Lord North resigned as prime minister to this ruler, and this ruler rejected the Olive Branch Petition from the Second Continental Congress. FTP, name this king who led Britain during the American Revolution.**

ANSWER: **George III** (prompt on “George” alone) [CS]

**17. Members of this phylum can have asconoid, leuconoid, or syconoid body types. These organisms have a jelly-like interior called mesohyl and uses spicules made of either silica or calcium carbonate for structural support. Animals in this phylum filter (\*) water through**

their osculum and choanocytes. These organisms are the only animals that are asymmetrical. FTP, name this phylum of simple, immobile organisms also called sponges.

ANSWER: Porifera (accept Sponges until mentioned) [RM]

**18. The construction of the Dike Kokaral across the Berg Strait split this lake, where biological weapons were tested on Rebirth Island. The Syr Darya flows from the Tian Shan Mountains into this lake, and the Karakum Canal taps into its (\*) Amu Darya tributary. This lake has lost 80% of its water since 1960, and its eastern part disappeared in 2008. FTP, name this shrinking lake shared by Kazakhstan and Uzbekistan.**

ANSWER: Aral Sea [PP]

**19. In the right of this painting, the artist's signature can be seen on a pair of broken boards. In the bottom right, a shako lies in front of a dead soldier and next to a man in a breastplate. A bearded man with a top hat kneels and holds a (\*) musket in the left of this painting. A boy waves two pistols next to its topless title figure who carries the tricolor French flag. FTP, name this painting depicting the 1830 July Revolution, by Eugene Delacroix.**

ANSWER: Liberty Leading the People [CS/HP/RM]

**20. The Lecompton Constitution was drafted by pro-slavery advocates in this state. One man supported the use of slavery in this state through the "Freeport Doctrine". The Pottawatomie Massacre and the sacking of (\*) Lawrence occurred during a conflict in this state, where Border Ruffians from Missouri fought to allow slavery. FTP, what state was plagued by the issue of popular sovereignty, leading to its namesake "Bleeding"?**

ANSWER: Kansas [GP/HP]

Tiebreaker:

**21. One novel set in this country features a boy with a large nose who possesses special powers due to the hour of his birth, and another novel by the same author sees Gibreel Farishta [Jib-REEL Fuh-RISH-tah] and Saladin (\*) Chamcha survive an explosion on a plane. A poet from this country wrote the collection *Gitanjali* as well as this country's national anthem, "Jana Gana Mana." For ten points, name this country, home of Salman Rushdie and Rabindranath Tagore [Ra-BIN-drah-nath Ta-GORE].**

ANSWER: India (accept Bharat or Hindustan) [TB]

BONUSES:

1. Margaret Fuller edited this movement's journal *The Dial*. For Ten Points Each,

[10] Name this literary movement whose members included Jones Very and Amos Bronson Alcott, as well as a man who refused to pay taxes during the Mexican-American War, as recounted in “Civil Disobedience.”

**ANSWER: Transcendentalism** (accept word forms)

[10] This author of “Civil Disobedience” also wrote a work about his time living on Walden Pond that includes a battle of red and black ants in its section “Brute Neighbors.”

**ANSWER: Henry David Thoreau**

[10] Hawthorne’s time at the Transcendentalist commune Brook Farm is the basis for “The Blithedale [one of these].” He also wrote a “Dolliver” one, and Luo Guanzhong wrote one “of the Three Kingdoms.”

**ANSWER: Romance** [CS]

**2.** This art school was founded by Walter Gropius, and works associated with it include his *Monument to the March Dead*. For ten points each:

[10] Name this art school. One of its practitioners adopted the axiom “Less is more,” Herbert Bayer designed a sans-serif font named for it, and its name refers to construction or building.

**ANSWER: Staatliches Bauhaus**

[10] Before it was closed in 1933, the Bauhaus existed in three different cities, all in this home country of Gropius. The Bauhaus was founded in this country’s city of Weimar [**VYE-mar**].

**ANSWER: Germany** (accept **Deutschland**)

[10] This influential modernist architect was the last director of the Bauhaus. He described his buildings as “skin and bones” and is known for designing the Barcelona Pavilion and the Seagram Building.

**ANSWER: Ludwig Mies van der Rohe** (prompt on “van der Rohe” alone, accept Maria Ludwig Michael **Mies**) [TB]

**3.** For ten points each, name the following about heroes of the War of 1812.

[10] This Tennessee general defeated the British at the Battle of New Orleans, two weeks after the Treaty of Ghent ended the war. He later became the seventh president of the United States.

**ANSWER: Andrew Jackson**

[10] This general won the Battle of the Thames in 1813 against the Shawnee leader, Tecumseh. He also defeated Tecumseh’s brother Tenskwatawa [**Ten-SKWA-wah-tah-wah**] at the Battle of Tippecanoe.

**ANSWER: William Henry Harrison**

[10] Harrison’s victory at the Battle of the Thames was preceded by this man’s victory at the Battle of Lake Erie. After winning the battle, he reportedly said “We have met the enemy and they are ours.”

**ANSWER: Oliver Hazard Perry** [GP/TB]

**4.** When swinging an object attached on a rope in a circle, this force keeps the object from flying off. For 10 points each:

[10] Name this force that acts radially inward in keeping objects in circular motion.

**ANSWER: Centripetal Force**

[10] The counterpart to centripetal force, centrifugal force, is *this kind* of force. This adjective refers to the fact that centrifugal force doesn't really exist, but is used to explain phenomena such as the force on a driver as a car turns.

ANSWER: **Fictitious** (accept **fictitious** forces; accept **inertial** forces; accept **apparent** forces; accept **d'Alembert** forces even though that isn't an adjective)

[10] The centripetal force, like gravity and the spring forces, is this kind of force, in which the work done by a force is independent of the path it takes.

ANSWER: **Conservative** Forces

5. She was known as the "Virgin Queen." For ten points each,

[10] Name this last Tudor monarch of England. She was the daughter of Henry VIII and Anne Boleyn.

ANSWER: **Elizabeth I** (prompt on "Elizabeth")

[10] Elizabeth I counted on Lord Howard and this vice-admiral to defeat the Spanish Armada in 1588. This "sea dog" circumnavigated the globe aboard his ship the *Golden Hind*.

ANSWER: (Sir) Francis **Drake**

[10] Drake also undertook a "Great Expedition" in 1585, which included a journey to resupply this colony in modern North Carolina. This settlement founded by Sir Walter Raleigh was mysteriously abandoned.

ANSWER: **Roanoke** Colony (accept **Roanoke** Island) [TB]

6. This god will kill and be killed by the Midgard Serpent during Ragnarok. For ten points each:

[10] Name this Norse god of thunder, a son of Odin.

ANSWER: **Thor**

[10] Thor's primary weapon is this warhammer. This hammer's handle is shorter than it should be because Loki interrupted its forging while in the form of a biting fly.

ANSWER: **Mjolnir** [MYOL-neer]

[10] After the giant Thrym stole Mjolnir from Thor and demanded Freya as his ransom, Thor performed this action to get close to Thrym. In some accounts, Achilles did this in Skyros to avoid the Trojan War.

ANSWER: **dressed like a woman** (accept **cross-dressing** or **disguised as a woman** or any other clear-knowledge equivalent) [TB]

7. At this temperature, the vapor pressure of a liquid is equal to the pressure of the gas above it. For 10 points each,

[10] Name this point, the temperature at which a liquid changes into a gas. It is 100 degrees Celsius for water.

ANSWER: **Boiling Point** (prompt on actual numbers)

[10] The boiling point of a liquid solvent can be raised with the addition of a solute. Boiling point elevation is one of these properties that depend only on the concentration, not the identity, of the solute.

**ANSWER: Colligative** properties

[10] This measure of concentration is often used in calculation of colligative properties. It is equal to the moles of solute divided by kilograms of solvent.

**ANSWER: Molality** (do NOT accept molarity or normality) [EF]

**8.** In one novel, Daniel Deronda discovers he is of this ethnicity. For Ten Points:

[10] Name this ethnicity of Barabbas, who inhabits Malta in a Christopher Marlowe play. A moneylender of this ethnicity named Shylock requires “a pound of flesh” from Antonio in *The Merchant of Venice*.

**ANSWER: Jewish**

[10] This female novelist wrote *Daniel Deronda*. In another of her novels, Dunstan Cass steals the gold of a “Weaver of Raveloe.” Silas Marner later adopts Eppie in that novel by this author of *Middlemarch*.

**ANSWER: George Eliot** (or Mary Ann **Evans**)

[10] According to this essay, few famous writers are, like George Eliot, women, since women usually lacked “500 pounds” and the title workplace. This essay illustrates that through Judith Shakespeare’s life.

**ANSWER: “A Room of One’s Own”** [by Virginia Woolf; “Judith Shakespeare” is an entirely fictional character] [CS]

**9.** Name some edgy 90s and early 2000s songs, for ten points each:

[10] This band sings “these wounds they will not heal” in this song, from *Hybrid Theory*. A video of Shrek and Shadow the Hedgehog appears before the official Linkin Park video if one Googles “[the title] in my skin.”

**ANSWER: Crawling**

[10] A YouTube parodies of one song by this band features skeletons screaming “Can’t wake up,” in response to the repeated “Wake me up” of this band’s song “Bring Me To Life.” This band was fronted by Amy Lee.

**ANSWER: Evanescence**

[10] Jay-Z sampled this song on “Holy Grail.” Kurt Cobain asks the listener to “entertain us” in this song from *Nevermind*, which ends with Cobain repeating “A denial, a denial.”

**ANSWER: Smells Like Teen Spirit** [credit]

**10.** This artist said of the mountain Cerro Perdanal that “God said if I painted it enough, I could have it.” For ten points each:

[10] Name this painter, the “mother of American modernism,” whose works include *Jimson Weed* and *Cow’s Skull: Red White, and Blue*.

**ANSWER: Georgia O’Keeffe**

[10] Along with New Mexico landscapes, O'Keeffe is known for painting these colorful and intricate blooming subjects from very close up.

**ANSWER: Flowers**

[10] This husband of Georgia O'Keeffe was known for his photography, which helped establish the medium as an accepted art form. His works include *The Steerage* and *A Snapshot: Paris*.

**ANSWER: Alfred Stieglitz** [RM]

**11.** Give the following about MIT linguist Noam Chomsky, for ten points each:

[10] Chomsky's claim that exposure to language is not enough to learn it is called the "poverty of *[this thing]*" argument. This term refers to anything external that alters behavior, such as the ringing of a bell.

**ANSWER: stimulus**

[10] This psychologist divided stimuli into eliciting, discriminative, reinforcing and emotional types. He wrote the Chomsky-critiqued *Verbal Behavior*, made a namesake box, and experimented with pigeons.

**ANSWER: B.F. Skinner** (or Burrhus Frederic **Skinner**)

[10] Chomsky's *Syntactic Structures* argued for a difference between syntax and *[this study]* of meaning with the grammatically correct, but nonsensical sentence "Colorless green ideas sleep furiously."

**ANSWER: semantics** (do not accept "semiotics," which is a related but distinct field) [CS]

**12.** This river forms the western boundary of the Golan Heights, and its tributaries include the Yarmouk and Zarqa. For ten points each:

[10] To the east of this river is a country that shares its name, and to the west is Israel; this river also runs through the Sea of Galilee.

**ANSWER: Jordan** River

[10] The Jordan River empties into this sea, whose surface and shores are Earth's lowest elevation on land. This sea is famous for its 34.2% salinity.

**ANSWER: Dead** Sea

[10] The largest city of this desert in southern Israel is Beersheba. Eilat and the Gulf of Aqaba are at the southern end of this desert.

**ANSWER: Negev** Desert [EL/PP]

**13.** The structure of this compound was imaged using X-ray diffraction by Rosalind Franklin. For ten points each,

[10] Name this genetic material of a cell, stored in the nucleus. It is composed of nitrogen bases, adenine, cytosine, thymine and guanine.

**ANSWER: DNA**



[10] DNA is converted into mRNA in the nucleus in this process. This process precedes translation, and retroviruses can perform this process in reverse.

**ANSWER: Transcription**

[10] This enzyme is the primary catalyst of transcription and produces transcript RNA for corresponding DNA strands.

**ANSWER: RNA Polymerase**

**14.** His novel *The Red Room* launched his literary career. For Ten Points Each,

[10] Name this author who derided his character Miss Julie as a “man-hating half-woman.” He also wrote *The Ghost Sonata*, a play in which the Colonel’s wife becomes a mummy and lives in a closet.

**ANSWER: August Strindberg**

[10] Strindberg wrote in this language. *The Red Room* satirizes life in Stockholm, a city where this language is widely spoken.

**ANSWER: Swedish (or Svenska)**

[10] The 18-member Swedish Academy is responsible for awarding this prestigious literary prize. When accepting this prize in 1950, William Faulkner said that “man will not merely endure: he will prevail.”

**ANSWER: The Nobel Prize in Literature [TB]**

**15.** The couple in Gwendolyn Brooks' “The Bean Eaters,” are described with this color, as is an object that reminds a narrator of a “debased Romanesque.” For Ten Points Each:

[10] Name this color which partly titles the most famous locked-room mystery by Gaston Leroux. Charlotte Perkins Gilman wrote a short story titled for a wallpaper of this color.

**ANSWER: Yellow (accept “The Yellow Wallpaper;” accept *The Mystery of the Yellow Room* or *Le mystere de la chambre jaune*)**

[10] This author of *Crome Yellow* is more famous for a novel in which John the Savage hangs himself in a lighthouse after running from a society without Shakespeare, *Brave New World*.

**ANSWER: Aldous Huxley**

[10] About this yellow substance, the speaker warns “quick, Boys!” in Wilfred Owen’s “Dulce et Decorum Est.” A T. S. Eliot poem compares it to a cat that “rubs” against “window-panes.”

**ANSWER: Mustard gas (accept “yellow smoke” or “yellow gas” or clear-knowledge equivalents, since neither poem directly calls it mustard gas; of course, do not accept “mustard” alone) [CS]**

**16.** The instrumental Pifa section of this composition is often called a “Pastoral Symphony.” For Ten Points Each:

[10] Name this oratorio which includes “Every Valley Shall Be Exalted,” and the soprano aria “I know that my redeemer liveth.” Usually, listeners stand during its “Hallelujah Chorus.”

**ANSWER: Messiah**

[10] This German-born composer of “The Cuckoo and the Nightingale” included “The Harmonious Blacksmith” in his *Airs and Variations*; he also wrote the *Messiah*.

**ANSWER:** George Frideric Handel

[10] In Mozart’s re-orchestration of the *Messiah*, a difficult tromba section is given to the horn rather than this brass instrument, which “shall sound” in that section; this instrument also opens “Also Sprach Zarathustra.”

**ANSWER:** trumpet [CS]

**17.** During this event, over a million people sometimes gather on the Jamarat Bridge and participants drink from the Well of Zamzam. For ten points each:

[10] Name this event, which also features white-clad pilgrims making seven counterclockwise circuits around the Ka’aba in the ritual of *tawaf*.

**ANSWER:** hajj (accept clear-knowledge equivalents suggesting the Muslim pilgrimage to Mecca)

[10] The hajj is one of these five basic acts of Islam that Muslims consider mandatory. Other obligations in this category include alms-giving, *zakat*, and five daily prayers, *salat*.

**ANSWER:** five pillars of Islam (accept “arkan al-Islam” or “arkan al-din”)

[10] While on the Jamarat Bridge, pilgrims perform this action, which requires at least 49 pebbles. This action can sometimes turn dangerous and lead to pilgrims being trampled on the bridge.

**ANSWER:** stoning the Devil (accept clear-knowledge equivalents suggesting hitting the Devil with rocks) [TB]

**18.** These people were targeted in the St. Bartholomew’s Day Massacre. For ten points each:

[10] Name these French Protestants who were led by Gaspard de Coligny. They were the main belligerents in the French Wars of Religion.

**ANSWER:** Huguenot(s)

[10] This Bourbon king fought for the Huguenots in the French Wars of Religion, but converted to Catholicism, claiming that “Paris is worth a mass.”

**ANSWER:** Henry IV of France (accept Henry of Navarre or Henry III of Navarre)

[10] Henry granted the Huguenots religious toleration with this 1598 document. This statute was repealed by the Edict of Fontainebleau.

**ANSWER:** Edict of Nantes (prompt on partial answer) [TB/HP]

**19.** For 10 points each, answer some questions about different time periods in Japanese history:

[10] Name this Japanese shogunate that began after its founder won the Battle of Sekigahara. Its namesake shogun ruled from Edo Castle.

**ANSWER:** Tokugawa Shogunate

[10] This shogunate began after the Minamoto Clan defeated the Taira Clan in the Genpei War. It occurred after the Heian Period.

**ANSWER: Kamakura** Shogunate

[10] This period in Japanese history supposedly began after a fleet under Commodore Perry visited Tokyo Bay. It was marked by large scale modernization under the namesake emperor.

**ANSWER: Meiji** Restoration [AZ]

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### **Tiebreaker:**

**21.** Addition on these things is performed "tip to tail." For ten points each:

[10] Name these mathematical objects that have both a magnitude and a direction. A "unit" one of these is often denoted with a "hat."

**ANSWER: vector** (accept unit vector)

[10] This function takes two vectors and turns them into a single product, a scalar. This function involves adding the products of the vector's corresponding coordinates.

**ANSWER: dot product** (accept inner product or scalar product)

[10] If the dot product of two vectors is zero, the vectors have this property. Two lines with this property have slopes that are negative reciprocals of each other.

**ANSWER: perpendicular** (accept orthogonal, accept word forms of both answers) [TB]