

1. **This soldier served under William Stanley in Leicester's expedition to the Netherlands and fought for Spain in the Eighty Years' War. This man's name was discovered by Robert Cecil, who led a network of spies. A collaborator with Robert Catesby, this figure used an unoccupied room belonging to John Whynniard for one action. He then gave the name "John Johnson" and was taken to the Star Chamber and the Tower of London before being (*) executed. For 10 points, name this man whose effigy is burned on the fifth of November and who was involved in the Gunpowder Plot.**

ANSWER: Guy Fawkes [or Guido Fawkes; prompt on John Johnson before mention]

020-10-23-05102

2. **Organisms in this phylum have pincer-like structures called pedicellariae (PED-ee-sell-AIR-ee-ay). One species in this phylum has a set of large teeth arranged in "Aristotle's lantern." Some members of this phylum contain a petalidium, a pattern of ambulacral plates through which tube feet project. A sieve plate called a madreporite is the entry point to the (*) water vascular system, which serves as the respiratory system for most members of this phylum. For 10 points, name this phylum in which adults have pentaradial symmetry, which includes sea urchins, sea cucumbers, and starfish.**

ANSWER: Echinodermata [or echinoderms]

003-10-23-05103

3. **One recurring character in this comic strip was inspired by a dishonest attorney played by W.C. Fields and has the punnish name of Larsen E. Pettifogger. Another character in this strip is often referred to as a "fink" and is served by such men as the alcoholic Bung and the "chicken-hearted" (*) Sir Rodney. The title figure of this strip occasionally summons a ghost for banter and is married to the domineering Blanche. For 10 points, identify this Parker and Hart strip about a miniscule king of a fictional medieval kingdom who employs a sorcerer.**

ANSWER: *The* Wizard of Id

019-10-23-05104

4. **In a rotating reference frame, the Coriolis version of this quantity is negative two times the cross product of the angular velocity vector of the reference frame and the radial velocity. Torricelli's equation includes a term of 2 times the net distance times this quantity. Its (*) centripetal form is equal to the tangential velocity squared divided by the radius. It occurs to a mass when a force acts upon that mass. For 10 points, name this rate of change of velocity.**

ANSWER: acceleration

001-10-23-05105

5. **One depiction of this man sees him looking up at a man in a red coat while a man in green points towards him. John Trumbull painted him "resigning his commission" and "apotheosis" of him can be found in the dome of the Capitol Rotunda. In addition to being depicted in Grant Wood's *Parson Weem's Fable*, this man was also painted in the "Lansdowne" and "Athenaeum" portraits, the latter of which can be found on a certain piece of (*) currency. For 10 points, name this man who was also depicted by Emmanuel Leutze "crossing the Delaware."**

ANSWER: George Washington

083-10-23-05106

6. **This author wrote a novel in which the orphan Christie Devon and a woman of ill repute named Rachel are taught self-respect by the laundress Cynthy Wilkins. In addition to *Work*, she wrote a sequel to her most famous work in which Dan Kean kills a man in self-defense following a card game. Professor Bhaer and his wife run the Plumfield school in several of her novels which center on (*) Meg, Amy, Beth, and other members of the March family. For 10 points, name this author of *Jo's Boys* and *Little Women*.**

ANSWER: Louisa May Alcott

030-10-23-05107

7. **This man wrote a biography of the Luccan ruler Castruccio Castracani and completed a seven chapter treatise on *The Art of War*. He asserted the primacy of the republic over other forms of government in his *Discourses on Livy*. Another work by this man notes that “armed prophets have been victorious, and all unarmed prophets have been destroyed” and warns that “it is much safer to be (*) feared than loved.” For 10 points, name this Florentine historian and philosopher and author of *The Prince*.**

ANSWER: Niccolo Machiavelli

015-10-23-05108

8. **This contemporary and friend of Alexander Ostrovsky wrote a story in which a man becomes obsessed with finding his stolen horse Malek Adel, which is collected along with “Hamlet of Shchigrovsky District” in his *Sportsman's Sketches*. This author of *Diary of a Superfluous Man* wrote about a character who dies after being nicked by a scalpel in a work that features Madame Oditznoff, (*) Arkady Kirsanoff, and the central nihilist. For 10 points, name this author who created Bazarov in his novel *Fathers and Sons*.**

ANSWER: Ivan Sergeyevich Turgenev

026-10-23-05109

9. **This man acted as assistant to Andrew Talcott, helping to build Fort Calhoun and Fort Monroe. He found a flanking route at the Battle of Cerro Gordo during the Mexican-American War. This man took over Joseph Johnston's post after Johnston was wounded at the Battle of Seven Pines. This man won at the Battles of the (*) Wilderness and Cold Harbor, as well as Fredericksburg and Chancellorsville. He suffered losses at Antietam and Gettysburg. For 10 points, name this leader of the Confederate army.**

ANSWER: Robert Edward Lee

024-10-23-05110

10. **The western portion of this body of water contains the Small Sea Strait, which forms a passageway to its largest island of Olchon. The Angara, a tributary of the Yenisei, is the only river that flows out of this body of water located just south of the city of Irkutsk. One of the challenges of building the Trans-(*)Siberian railway was circumventing this body of water which lies north of Ulan Bator. For 10 points, name this source of roughly 20% of the world's fresh water, the deepest lake in the world located in eastern Russia.**

ANSWER: Lake Baikal

064-10-23-05111

11. **This commander failed to capture Tobruk from Allied forces but he decisively defeated Allied forces at the Battle of Kasserine Pass. Later, he was transferred to improve the Atlantic Wall and was in charge of the area during the invasion at Normandy. Earlier, he had lost a battle that took place north of the Qattara Depression and ended German hopes of capturing the (*) Suez Canal.** For 10 points, name this "Desert Fox," the German commander of the Afrikakorps who lost to Bernard Montgomery at the Battle of El Alemein during the North African theater of World War II.

ANSWER: Erwin Johannes Eugen Rommel

064-10-23-05112

12. **One story about the fate of this object was likely inspired by the tale of Batradz, culture hero of the Alans. Its name is ultimately derived from the Latin word for "steel." In early texts, it is Girflet who discards this object; in later tales, a mysterious hand drags it beneath the water when it is thrown away by (*) Bedivere. Nimue is sometimes said to have provided this object, though other tales claim that it was forged to replace the broken Sword in the Stone. The Lady of the Lake bestows, for 10 points, what magical sword wielded by King Arthur?**

ANSWER: Excalibur [or Caliburn]

019-10-23-05113

13. **An eating competition with a woman known as The Elephant occurs in this novel, which also details a massacre of banana-farm workers. It ends with one character finally deciphering a message written by the gypsy Melquíades, who earlier introduces another character to ice. During his military conquests, that character fathers seventeen children with the name (*) Aureliano. This novel sees Úrsula live to a supernatural age, and with her husband José Arcadio Buendía she establishes the town of Macondo.** For 10 points, name this novel by Gabriel García Márquez.

ANSWER: One Hundred Years of Solitude [or Cien años de soledad]

083-10-23-05114

14. **This man disguised his army as monks while besieged in the convent of Santo Domingo. He duped Isidro Barradas into abandoning Tampico without a fight in Spain's last attempt to retake his country. After losing a leg during the Pastry War, this leader ordered it buried with full military honors. As president, he signed the (*) Treaty of Velasco after a failed attempt to quash a rebellion in a northeast state ended at San Jacinto.** For 10 points, name this Mexican general, president, and dictator who commanded the forces that besieged the Alamo.

ANSWER: Antonio López de Santa Anna

003-10-23-05115

15. **Changes in this quantity are related to changes in the unemployment rate by Okun's Law. Its namesake deflator can be used to compare values of it across time accounting for inflation, a statistic which can be useful in contrast to the consumer price index. It differs from a similar statistic by excluding products manufactured by a given country's citizens in (*) foreign countries. Often calculated by summing consumption, investment, government spending, and the difference between exports and imports, for 10 points, name this measurement from economics that rates how much activity occurs within the borders of a given country.**

ANSWER: Gross Domestic Product

040-10-23-05116

16. **One chamber concerto for this instrument was inspired by its composer's father's struggle with Alzheimer's. In addition to John Adams' *Gnarly Buttons*, Carl Maria von Weber wrote two notable concertos for this instrument. Mozart's concerto for this instrument features several passages over its "break" and was originally written for (*) basset horn, while Aaron Copland's concerto for this instrument was written for Benny Goodman. For 10 points, Gershwin's *Rhapsody In Blue* opens with a glissando from this ebony single-reed woodwind.**

ANSWER: clarinet

082-10-23-05117

17. **A metal halide is placed along with one member of this group in a type of high intensity discharge car headlights. Neil Bartlett notably reacted that member of this group with six fluorines. An isotope of potassium decays into another member of this group, which allows for a certain kind of radiometric dating. Those two members, (*) xenon and argon, are found along with radon, krypton, neon, and helium in this group. For 10 points, name this group of highly unreactive elements.**

ANSWER: noble gases [or inert gases; accept group **18**]

024-10-23-05118

18. **After winning a lot at gambling, one character in this opera throws his winnings in his former lover's face now that she is with Baron Douphol. It includes the duet "Libiamo ne' lieti calici," which is a brindisi, or drinking song. Annina is the title character's maid in this opera, which sees Giorgio tries to convince that character to breakup with his son. In Act III, Alfredo rushes into the room to proclaim his love for the (*) title character before she dies from consumption. For 10 points, name this opera about the courtesan Violetta, written by Giuseppe Verdi.**

ANSWER: *La Traviata* [or *The Fallen Woman*]

001-10-23-05119

19. **This character confesses to taking the "likeness of a roasted crab." To help his king convince his queen to knight an Indian prince, he promises to "put a girdle about the Earth." He jeopardizes a performance of *Pyramus and Thisbe* by turning Bottom's head into an ass's head. (*) Demetrius falls for Hermia after this servant of Oberon mistakenly squirts a flower's love juice in his eyes. For 10 points, name this fairy who exclaims, "What fools these mortals be!" in *A Midsummer Night's Dream*.**

ANSWER: Puck [or either underlined name of Robin Goodfellow]

079-10-23-05120

20. **Heinrich Olbers discovered two large examples of these objects. In 1801, Gauss developed new regression techniques for tracking one. The problematic *Hayabusa* project returned a sample from one of them. Giuseppe Piazzi discovered the largest one. A particular one was visited by the NEAR mission. One of these is the smallest (*) dwarf planet. A collision with one of these created the Chicxulub crater. For 10 points, name these large rocks in space, one of which impacted the Yucatán Peninsula 65 million years ago.**

ANSWER: asteroid

001-10-23-05121

21. **This man's political works include *Everybody's Political What's What* and *Fabian Essays in Socialism*. Captain Bluntschli eventually proposes to Raina in his play set during the Serbo-Bulgarian war, *Arms and the Man*. The arms tycoon Sir Andrew Undershaft donates money to the Salvation Army in his play (*) *Major Barbara*. He wrote a play that sees Henry Higgins attempt to reform the speech and manners of Eliza Doolittle in order to win a bet. For 10 points, name this author of *Pygmalion*.**

ANSWER: George Bernard Shaw

001-10-23-05122

22. Spain entered this conflict under the Family Compact, and the Duke of Brunswick won a major battle of this war at Krefeld. One portion of this war was ended by the Peace of Hubertusburg. Frederick the Great lost 18,000 men in six hours at Kunersdorf during this war. This conflict was sparked in part by the Diplomatic Revolution that was prompted by the Treaty of Westminster. The (*) American portion of this conflict saw the French lose Quebec. For 10 points, name this war that was fought as the French and Indian War in North America and lasted in Europe from 1756 to 1763.

ANSWER: Seven Years' War [prompt on French and Indian War before mentioned]

030-10-23-05123

23. As nonces, these entities are used to prevent replay attacks. One way to find these is the Mersenne twister and these are used in Monte Carlo simulations. Unless an outside source of entropy is present, the algorithm producing them is seeded with the current time or similar value. A collection of these numbers should follow a (*) statistical distribution and be free of patterns allowing one to determine the next one produced based on the previous ones produced. For 10 points, name these numbers that are usually generated using the rand function.

ANSWER: pseudo-random numbers [or pseudo-random number generators before "numbers should"]

001-10-23-05124

1. This substance is found in the subarachnoid space of the ventricular system. For 10 points each:

[10] Name this fluid that is removed for testing in a lumbar puncture, a procedure also known as a spinal tap.

ANSWER: **cerebrospinal** fluid [or **CSF**]

[10] Testing CSF after a lumbar puncture is a common technique to diagnose this disease, which is the inflammation of namesake protective membranes surrounding the brain and spinal cord.

ANSWER: **meningitis**

[10] If your CSF has too much glutamine in it, you may have Reye's syndrome, which is associated with consumption of this salicylic-acid-based painkiller in young children.

ANSWER: **aspirin**

026-10-23-05201

2. In this film, Wendell Corey plays the protagonist's cop buddy and Grace Kelly plays his socialite girlfriend. For 10 points each:

[10] Name this film in which James Stewart plays a photographer who witnesses a murder while spying on his neighbors while wheelchair bound.

ANSWER: **Rear Window**

[10] *Rear Window* was directed by this director of *The Birds* and *Strangers on a Train*.

ANSWER: Sir Alfred Joseph **Hitchcock**

[10] In this Hitchcock film, Ingrid Bergman's character is poisoned after discovering that a group of ex-pat Germans is keeping uranium in wine bottles.

ANSWER: **Notorious**

015-10-23-05202

3. This ruler created the Table of Ranks in his country to make positions merit based rather than based on birth. For 10 points each:

[10] Name this czar of Russia who also imposed a beard tax on his boyars in an effort to westernize.

ANSWER: **Peter the Great** [or **Peter I** of Russia; or **Pyotr Veliky**; or **Pyotr Alekseyevich**; prompt on **Peter**]

[10] Peter the Great was victorious at the Battle of Poltava, which occurred during this war between Russia and Sweden.

ANSWER: **Great Northern** War

[10] This king of Sweden during the Great Northern War led his troops to victory at the Battle of Narva, but, after the tide of the war changed, he died during a siege of Fredrikshald.

ANSWER: **Charles XII** of Sweden [prompt on **Charles**]

023-10-23-05203

4. This medieval thinker refuted the common arguments for the existence of God to show that theology was not a science. For 10 points each:

[10] Name this Nominalist who advocated simplicity in arguments with his namesake “razor.”

ANSWER: William of **Ockham**

[10] This opponent of Ockham combined Aristotelian philosophy with Catholic theology in his *Summa Theologica*.

ANSWER: Thomas **Aquinas**

[10] This author of the *Ordinatio* used the “triple primacy” to argue for the existence of God, as well as producing a notable defense of the Immaculate Conception.

ANSWER: John **Duns** Scotus

080-10-23-05204

5. It was ruled by the deposed last emperor of China, Henry Puyi. For 10 points each:

[10] Name these puppet regime which Imperial Japan set up in occupied Manchuria in 1934.

ANSWER: **Manchukuo** [or **Manzhouguo**]

[10] One of the first setbacks Japan received in World War II was the April 1942 bombing raid named for this American, who led a fleet of planes off the *Hornet*.

ANSWER: James Harold **Doolittle**

[10] As part of the transformation of defeated Japan into a constitutional monarchy, this emperor delivered the "Jewel Voice Broadcast" renouncing his claim to divinity.

ANSWER: Michinomiya **Hirohito** [or the **Showa** emperor]

019-10-23-05205

6. Ludwig van Beethoven wrote three of these pieces for Count Razumovsky, and active examples of this ensemble include the Emerson, Juilliard, and Kronos. For 10 points each:

[10] Name this chamber music grouping consisting of two violins, a viola, and a cello.

ANSWER: **string quartet**

[10] This Hungarian used arch form in several of his six string quartets. He is also known for *Music for Strings, Percussion and Celesta* and his *Concerto for Orchestra*.

ANSWER: Béla **Bartók**

[10] This composer's first string quartet, subtitled "In My Life", ends with a musical depiction of his advancing deafness. He also wrote *Ma Vlast*.

ANSWER: Bedrich **Smetana**

082-10-23-05206

7. The line integral of this quantity with respect to area equals the charge enclosed divided by the permittivity of free space. For 10 points each:

[10] Name this quantity. The electric force equals this quantity times charge.

ANSWER: **electric field**

[10] This vector equals the cross product of the electric and magnetic fields, divided by the permeability of free space. Its magnitude is equal to the intensity.

ANSWER: **Poynting** vector

[10] The ratio of the electric field magnitude to that of the magnetic field equals this quantity, which according to relativity is the same in all reference frames.

ANSWER: **speed of light** [or **c**]

003-10-23-05207

8. Like the *Odyssey*, this epic poem contains a scene in which a man must bend a strong bow. For 10 points each:

[10] Name this epic whose hero, Arjuna, fights in the war between the five Pandava brothers and the hundred Kauravas.

ANSWER: **Mahabharata**

[10] In this oft-read section of the Mahabharata, Arjuna's chariot-driver delivers a long sermon on the nature of Brahma and the obligations of a Hindu.

ANSWER: **Bhagavad Gita**

[10] This dark blue-skinned avatar of Vishnu, currently the namesake of an actively proselytizing sect, is the narrator of the Bhagavad Gita.

ANSWER: **Krishna**

019-10-23-05208

9. This poetry collection includes the sections "Wine" and "Revolt." For 10 points each:

[10] Name this modernist collection that shocked Parisian audiences with its eroticism when it was published in 1857.

ANSWER: *Les **Fleurs du Mal*** [or *The **Flowers of Evil***]

[10] This French poet wrote *Les Fleurs du Mal*.

ANSWER: Charles **Baudelaire**

[10] The poem "The Beacons" in section "Spleen and Ideal" of *Les Fleurs du Mal* is about members of this profession, also shared by the title characters of "Fra Lippo Lippi" and "Andrea Del Sarto."

ANSWER: **painters** [prompt on **artists** or equivalents]

026-10-23-05209

10. In 2010 this team became the first in NFL history to go undefeated against its division and fail to make the playoffs. For 10 points each:

[10] Name this AFC West team that has severed ties with coach Tom Cable and quarterback JaMarcus Russell.

ANSWER: Oakland **Raiders** [or **Oakland Raiders**]

[10] 2010 saw the Raiders flip flop at quarterback between Bruce Gradkowski and this Auburn alum who was traded from Washington in 2010.

ANSWER: Jason **Campbell**

[10] The best player on the Raiders may be this consensus best punter in the NFL, who has played with the Raiders since being drafted from Texas A&M in 2000.

ANSWER: Shane **Lechler**

015-10-23-05210

11. Answer the following about places of worship, for 10 points each.

[10] Only nine of this religion's Houses of Worship exist in the world, including the one in Wilmette, Illinois. Important leaders in this religion include Shoghi Effendi and the Báb.

ANSWER: **Bahá'í** Faith

[10] A small niche called a mihrab can be found in these buildings, which are often attached to a minaret and serve as places of worship for Muslims.

ANSWER: **mosque**

[10] Temples for Zoroastrians are characterized by the presence of this substance, which is a symbol for Ahura Mazda and is often called atar.

ANSWER: **fire**

083-10-23-05211

12. The prime minister for the last part of his presidency was Edouard Balladur. For 10 points each:
[10] Name this socialist president of France who served from 1981-1995.

ANSWER: François Maurice Marie **Mitterrand**

[10] This politician from Rally for the Republic succeeded Mitterrand. In the U.S., he is known for criticizing the invasion of Iraq.

ANSWER: Jacques René **Chirac**

[10] In 2002, Rally for the Republic reorganized and became this party, of which Nicolas Sarkozy is a member.

ANSWER: **UMP** [or **Union pour un Mouvement Populaire**; or **Union for a Popular Movement**]

001-10-23-05212

13. These can have single, double, or quadruple precession. For 10 points each:

[10] Name these representations of numbers defined in IEEE 754 that are contrasted with fixed point numbers.

ANSWER: **floating point** numbers

[10] Single precession floating point numbers are 32 bits long, meaning they consist of four of these units of memory.

ANSWER: **bytes**

[10] In PCs, floating point numbers are usually operated on using the second edition of this SIMD instruction set family that partly superseded x87.

ANSWER: **SSE** [or **Streaming SIMD Extensions**; or **SSE2**; or **Streaming SIMD Extensions 2**]

001-10-23-05213

14. This character's love of stroking soft things causes him to accidentally kill Curly's wife. For 10 points each:

[10] Name this ranch hand who dreams of owning a rabbit farm with his friend.

ANSWER: **Lennie Small** [accept either name]

[10] Lennie Small and George Milton are characters in this novella named for a line from a Robert Burns poem.

ANSWER: ***Of Mice and Men***

[10] This author of *The Moon is Down* and *The Grapes of Wrath* wrote *Of Mice and Men*.

ANSWER: John **Steinbeck**

015-10-23-05214

15. This sculptor's works include a depiction of Bacchus and the *Battle of the Centaurs and Lapiths*. For 10 points each:

[10] Name this Renaissance sculptor, whose other works include sculptures for the tomb of Pope Julius II and a marble *David*.

ANSWER: **Michelangelo** di Lodovico Buonarroti Simoni

[10] Another famous sculpture by Michelangelo is this one, which depicts Mary holding the dead body of Christ.

ANSWER: ***Pieta***

[10] For the tomb of Pope Julius II, Michelangelo sculpted "Dying" and "Rebellious" types of these figures. Hiram Powers is best known for his "Greek" one.

ANSWER: **slaves**

080-10-23-05215

16. This speech concludes that "we shall fight them to the uttermost, having behind us the producing masses of the nation and the world." For 10 points each:

[10] Name this 1896 Democratic National Convention speech, in which William Jennings Bryan argued in favor of silver coinage.

ANSWER: **Cross of Gold** speech

[10] Bryan was cross-nominated in 1896 by the Democrats and this party, which evolved from earlier farmers' interest groups.

ANSWER: **Populist** Party [or **Populists**; or **People's** Party]

[10] Another figure in the early Populist Party was this railroad machinist, who succeeded Uriah Stephens as the leader of the Knights of Labor.

ANSWER: Terence Vincent **Powderly**

019-10-23-05216

17. Name some things about sports in painting, for 10 points each.

[10] This French artist depicted four horses in midair in *The Epsom Derby*. His other paintings include *Madwoman Afflicted with Envy* and *The Charging Chasseur*.

ANSWER: Théodore **Géricault**

[10] George Bellows portrayed two men engaging in this sport in *Stag at Sharkey's* and *Dempsey and Firpo*.

ANSWER: **boxing**

[10] This American painter depicted four boys fighting over a basketball as one of his covers for *The Saturday Evening Post*. His other paintings include the *Four Freedoms* and *Rosie the Riveter*.

ANSWER: Norman Perceval **Rockwell**

080-10-23-05217

18. Perhaps the key to this man's discoveries was the discovery of the semilunar valves by his teacher, Hieronymus Fabricius. For 10 points each:

[10] Name this physician to Charles I of England, who, in 1628, discovered and published about the fact that the heart causes blood to circulate in the human body.

ANSWER: William **Harvey**

[10] Among the prior writers whose work Harvey overturned was the Greek namesake of this text, which promises "I will give no deadly medicine" and opens by invoking "Apollo the physician."

ANSWER: the **Hippocratic Oath**

[10] Harvey was one of a bevy of Enlightenment scientists who helped debunk the authority of this second-century Greek, whose prolific dissection experiments were the basis of medicine for 1500 years.

ANSWER: **Galenos** of Pergamum

019-10-23-05218

19. The title character of this poem realizes the curse is upon her when "The mirror crack'd from side to side." For 10 points each:

[10] Name this poem in which a woman floats down the river to Camelot after Sir Lancelot discovers her in her tower.

ANSWER: "The **Lady of Shalott**"

[10] "The Lady of Shalott was written by this Victorian poet laureate and author of "The Charge of the Light Brigade."

ANSWER: Alfred, Lord **Tennyson**

[10] Tennyson wrote "Tis better to have loved and lost than never to have loved at all" in this poem, which he spent seventeen years on after the death of Arthur Henry Hallam.

ANSWER: **In Memoriam A.H.H.**

015-10-23-05219

20. This island is a dependency of Chile and is located 2,200 miles west of that nation. For 10 points each:
[10] Also known as Rapa Nui, name this easternmost Polynesian island that is home to gigantic monolithic stone heads.

ANSWER: **Easter** Island [or **Isla de Pascua**]

[10] Located about 1,200 miles away from Easter Island, this island was settled by mutineers of the *HMS Bounty* in 1790 who were eventually rediscovered in 1808, and the mutineers' descendants continue to live here.

ANSWER: **Pitcairn** Island

[10] Pitcairn Island is located about 1,350 southeast of this island, the largest in French Polynesia. Its town of Papeete is the capital of French Polynesia and it was originally known as "New Cythera."

ANSWER: **Tahiti**

030-10-23-05220

21. There are Hessian and Hermitian variants of these objects. For 10 points each:

[10] Name these arrays used in mathematics that contain a certain number of rows and columns.

ANSWER: **matrix** or **matrices**

[10] For a square two by matrix, this value is equal to the product of the upper left and lower right values minus the product of the upper right and the lower left values.

ANSWER: **determinant**

[10] With a prefix from the German for "innate", this value satisfies the characteristic polynomial of a squarematrix.

ANSWER: **eigenvalue**

064-10-23-05221