# NEW TRIER SCOBOL SOLO 2012
## ROUND 3
*Questions written and edited by David Reinstein*
*with Sam Donow, Tom Egan, Mark Grant, Jonah Greenthal, Tanay Kothari, and Mike Laudermith*

**1.** This theorem is a consequence of both the boundedness theorem and the fact that the reciprocal of the difference of a function minus its least upper bound on a compact set cannot be bounded. Though it is not a more general case of Rolle's theorem, it can be used to prove Rolle's theorem, and the points predicted to exist by this theorem and Rolle's theorem turn out to be identical. In some proofs of the fundamental theorem of calculus, this is applied before the intermediate value theorem. Name this theorem which states that any continuous function over a bounded and closed interval must attain minimum and maximum values.
ANSWER: **extreme value** theorem [or **EVT**]

**2.** This leader signed an Education Reform Act that established a National Curriculum and introduced City Technology Colleges that were not run by the government. In addition, this prime minister passed a national law changing local taxes so that they were based on the number of adults instead of house rental values, which led to Poll Tax Riots across the country and was known as Community Charge. Taking office after the Winter of Discontent under James Callaghan and then taking a strong stance against Arthur Scargill in a massive miners' strike, this leader was allied with Ronald Reagan. Name this leader of the United Kingdom during the Falklands War who was nicknamed "Iron Lady".
ANSWER: (Baroness) Margaret "Maggie" (**Roberts**) **Thatcher** [accept either underlined name]

**3.** Bekhukotai is the final Torah portion from this book, which gives the value of various people based on age and gender when they are vowed to God. Though this book does not describe the events celebrated during the Passover holiday, it explains how to celebrate it and the High Holy Days. Its eleventh chapter contains the laws relating to the concept of *kosher*, while two other verses are sometimes cited as a criticism of homosexuality. It primarily deals with laws about priests and holiness, and its name is taken from the Jewish tribe of priests. Name this third book of both the Jewish Torah and the Christian Old Testament, between Exodus and Numbers.
ANSWER: **Leviticus** [or **Vayikra**]

**4.** One of the few impact craters on this object is named Guabonito and located in its Shangri-la region near Xanadu. It also contains Kraken Mare, which is believed to be the largest of several bodies of liquid. By observing shifts in its crust, scientists now believe that this object contains an underground ocean possibly including water, which may be something that this has in common with some moons of Jupiter. Its atmosphere consists primarily of nitrogen with a little methane, and it has the densest atmosphere of all satellites in the solar system. Occasionally passing near the Cassini spacecraft, name this largest moon of Saturn.
ANSWER: **Titan**

**5.** One member of this profession is Tom Dacre, whose head was shaved. Tom has a dream in which thousands of people who hold this job are locked in black coffins and then set free by an angel, with the message being that if all do their duty, they need not fear harm. Another person with this job cries in notes in woe and has parents who went to church to pray to God who "[made] up a heaven of our misery". These characters appear in two late 18th-century poems published in separate collections showing the two contrary states of the human soul. Name this job often done by children, the subject of poems in *Songs of Innocence* and *Songs of Experience* by William Blake.
ANSWER: **chimney sweeper** (prompt partial answers such as "sweep", "sweeper", or "chimney sweep")

**6.** In June, a person from this country became the first woman other than a queen to address both houses of British parliament following the electoral success of her National League for Democracy. It is now facing a rebellion in its northern Kachin State, where residents have refused to support a dam that would provide energy for China. In October, Human Rights Watch released satellite photos showing that this country's town of Kyaukpyu was the site of rioting in which Buddhists destroyed hundreds of buildings belonging to Rohingya Muslims. Its president Thein Sein [THAYN ZAYN] has worked with his highest profile rival, Aung San Suu Kyi [CHEE]. Name this country recently run by its military, which faces uncertainty over its name and whether its capital is at Yangon.
ANSWER: **Burma** [accept Republic of the Union of **Myanmar**]

**7.** Ricardo Viñes [vin-YAYZ] premiered a piece this composer wrote in which each section was dedicated to a member of Les Apaches [lez ah-pash], a group of radical French composers they both belonged to. That piece was *Miroirs* [meer-war], or *Reflections*. When Paul Wittgenstein [VIT-gun-shtyne] lost his right hand in World War I, this composer wrote him a *Piano Concerto for the Left Hand*. He included a Malagueña as the second movement of his *Rapsodie espagnole*. One of his pieces has a constant rhythm of snare drums and consistently builds in volume as the lead changes instruments, starting with the flute and eventually including most of the orchestra. Name this composer who often based his works around Spanish dances, including his 1928 "Bolero".
ANSWER: (Joseph-)Maurice **Ravel**

**8.** One of this man's mistakes was letting a train go through after the death of Hayward Shepherd. His earlier activities included moving to North Elba, New York and starting the League of Gileadites. Using the alias Shubel Morgan, he led a group that killed David Cruise in Missouri, and helped a group that eventually went through Detroit to Canada. In reaction to the sacking of Lawrence, he had earlier led a group that killed five people near Pottawatomie Creek. On October 16, 1859, he led a group that captured a federal armory, but two days later his group was defeated by Marines under the command of Robert E. Lee. Name this abolitionist who led a raid on Harpers Ferry.
ANSWER: John **Brown**

**9.** In one play by this writer, Pelasgus allows a group of women to gain shelter in Argos. That work originally was part of the Danaid Tetralogy. Aristotle credited him for adding a second actor in addition to the chorus to his plays, and some of the fragments attributed to him include *Nereids* and *Proteus*. A group of plays he wrote ends with a murder trial argued by Apollo and leading to a renaming of the Furies. That murder trial is for the death of Aegisthus and Clytemnetra at the hands of Orestes. Name this playwright of *The Suppliants*, *The Persians*, and *Seven Against Thebes*, whose *Agamemnon* begins his *Oresteia* trilogy.
ANSWER: **Aeschylus**

**10.** The development of an electrically conducting form of these substances won the Nobel Prize in 2000 for Alan MacDiarmid and his associates. Many of these materials, like many silicates, undergo a glass transition when they are cooled to form crystalline structures, yet when heated they generally develop into viscous liquids. The superabsorbent types of these are used to form a type of colloids called hydrogels, and human-made examples include Kevlar, Teflon, nylon, and polyethylene. Name this category of substances composed of large complex molecules created by joining together smaller sub-units into long chains.
ANSWER: **polymer**s

**11.** Thomas Aquinas wrote that the accidental type of this was not determined by its essence while the substantial type was a person's soul, which developed Aristotle's belief that everything consists of matter and this. Aristotle used matter to refer to the basic ingredients that went into an object and this to refer to the overall object. Plato wrote that the greatest one of these, superior even to the truth and the beauty, is the good because it makes everything intelligible. Plato believed that these are outside the world of change and should be the subject of true study. Name this philosophical construct, knowledge of which allows an understanding deeper than what is known by the prisoners in the allegory of the cave.
ANSWER: __form__s [or __idea__s or __eidos__]

**12.** This opera was inspired by a play written by Carlo Gozzi, and it was completed after the composer's death by Franco Alfano. The plot of this opera is explained in its second act by the female lead, who sings "In questa reggia" [RAYJ-yah]. The protagonist of this opera is unsuccessfully urged to desist from risking his life in the aria "Signore [sin-YAWR-ay], ascolta", sung by his maid. That figure stabs herself to avoid further torture when she is brought into Altoum's court with Timur. This opera's most important aria, sung after the title character's three questions are correctly answered by Calaf, is "Nessun dorma". Name this opera by Giacomo Puccini [pooch-CHEE-nee] set in China.
ANSWER: __*Turandot*__ [TUR-ahn-doht]

**13.** This character paid eighty dollars per month to rent a "small eyesore" next to an "imitation of some Hotel de Ville" and across a bay from a second cousin once removed and her husband. He was advised by his father to think twice before criticizing anyone because others have not been given his advantages. Though his grand uncle paid somebody else to avoid fighting in the Civil War, this person fought in France during World War I after attending Yale and growing up in Minnesota. Name this narrator who becomes infatuated with golfer Jordan Baker after moving near his cousin Daisy Buchanan and next door to Jay Gatsby.
ANSWER: __Nick__ __Carraway__ [accept either]

**14.** This polity refused to carry out the recommendations of a conference it hosted ending in 1877, and as a result nobody supported it in a war against Russia that soon followed. Much earlier, in 1718, it regained the Peloponnesus in the Treaty of Passarowitz after defeating Venice, though it ceded land to the Habsburgs in the same treaty. It also won the Battle of Ridaniya, ending the Mamluk sultanate and gaining control of Egypt for Selim the First. Its weakness showed by the late 19th century during the Herzegovina Rebellion and April Uprising in Bulgaria, and it eventually was nicknamed "the sick man." Name this polity that grew during the fifteenth century under the leadership of Mehmed II and was also headed by Suleiman the Magnificent.
ANSWER: __Ottoman__ Empire

**15.** The Radon transform takes two parameters: a function and one of these. The Runge-Kutta method approximates the solutions to differential equations by considering them to behave like these in short intervals, as does Euler's method. This is the shape of the graph of $r$ equals the cosecant of theta. In 3-space, these can be expressed using symmetric equations and are formed by the intersection of two nonparallel planes. Three points that do not lie on one of these define a plane in 3-space, and any two distinct points define one of them. Point-slope and slope-intercept forms express what mathematical objects, as does the graph of a function of the form $y$ equals $m x$ plus $b$?
ANSWER: __line__s [or __linear__ functions; accept __tangent line__s after "Runge-Kutta", accept __horizontal line__s after "r equals"]

**16.** These organs are protected by namesake "rakers" which prevent food from entering them. Unusual examples of these are found behind the legs of horseshoe crabs, and in some animals they are accessed through spiracles. Asteroidea [aas-tur-oh-ee-DAY-uh]-class animals have simple versions of these called papulae [PAA-pyoo-lay] just under their skin. These organs are supported by a cartilaginous [kar-tih-LAA-jih-nuss] arch and protected by an operculum [oh-PUR-kyoo-lum], and their primary structures are lamellae [LAA-mih-lay], which have very large surface areas. Name these organs which use a countercurrent system to extract large amounts of oxygen from water, found in fish.
ANSWER: **gill**s

**17.** This man included a frog with a pot on its head using a fishing pole and a man's leg coming out of a fish's mouth in a work which features a very tall woman with bags in her hands running from a bridge. An execution occurs in the upper right as an army with three cross-bearing shields carried by skeletal soldiers attacks a group of humans in another work. This painter of *Mad Meg* and *The Triumph of Death* included two crossed brooms on the wall and a man carrying eleven bowls on a wooden board in one painting, and two men leading their dogs over a snowy hill in another. Name this Flemish Renaissance artist of *Hunters in the Snow* and *The Peasant Wedding*.
ANSWER: Pieter **Brueghel** [BROO-gul] the Elder [accept Peasant **Brueghel**]

**18.** This author wrote about Joshua Jopp, who reads the love letters of Lucetta Templeman and publicly embarrasses her. He also wrote about Fanny Robin's attempt to marry Sergeant Francis Troy, which fails when she goes to the wrong church. One of his title characters believes she is related to Alec, who impregnates her, and is loved by Angel Clare. Much of his fiction is set in the fictional town of Wessex. He wrote about Susan and Michael Henchard in *The Mayor of Casterbridge* and about Gabriel Oak and Bathsheba Everdene in *Far from the Madding Crowd*. Name this author of *Tess of the d'Urbervilles*.
ANSWER: Thomas **Hardy**

**19.** This battle was fought near the modern-day town of Slavkov u Brna, and just prior to this battle's start the side that would win withdrew from the eponymous town feigning disorder as part of an elaborate military and diplomatic ruse. Franz von Weyrother [VY-roh-tur] and the tsar supported the attack, though Mikhail Kutuzov preferred to retreat and wait, which did not prevent Kutuzov from taking the blame for this battle's failure. A key part of the French battle strategy was evacuating the Pratzen Heights, then attacking it when Allied forces had captured it. It was fought in what is now the Czech Republic and one name for this battle honors Napoleon, Alexander I and Francis II. Name this battle that saw Napoleon end the Third Coalition and that led to the French occupation of Vienna; a battle also called the Battle of the Three Emperors.
ANSWER: Battle of **Austerlitz** [accept Battle of the **Three Emperors** before "Three"]

**20.** The area type of this, also known as the second type, has units of length to the fourth power for two-dimensional shapes. When this is calculated for objects in the *xy*-plane, its value with respect to the *z*-axis is the sum of the values with respect to the *x*- and *y*-axes. That rule is one version of the Huygens–Steiner theorem used to find this value for an axis not through the center of mass; that law is also known as the parallel axis theorem. In general, this can be found by adding mass times distance from the axis squared for each part of an object. Name this rotational analogue of mass, commonly represented with a capital I.
ANSWER: mass **moment of inertia** [or **rotational inertia** or polar **moment of inertia** of mass; prompt on **angular mass** or **rotational mass**]

**TB1.** Followers of this scientist, such as Daniel Rolander and Daniel Solander, were known as his disciples and spread out around the world to study plant life. He wrote about using plants that flower at different times of the day to create a flower clock in his work *Philosophia Botanica*. Some of his work is now outdated because of his reliance on stamens and pistils, and the natural system he hoped for is now based on Darwin's theory of evolution. Name this scientist whose *Systema Naturae* divided living things into three kingdoms and developed his binomial nomenclature.
ANSWER: Carl (von or a) **Linné** [or Carolus **Linnæus**; accept combinations of names that include **Linné** or **Linnæus**]

**TB2.** In this book, a natural philosophy professor named Krempe is disappointed to learn that the title character has studied alchemy. At another point, that title character says that his mother died because she caught scarlet fever from his adopted sister Elizabeth Lavenza. This book is told through a series of letters written by an explorer to his sister Margaret after he sets out to reach the North Pole. In this work, Justine is hanged and William is murdered after a locket is found in her pocket. Name this work in which Robert Walton's letters describe Victor's creation of life, a novel by Mary Shelley.
ANSWER: *Frankenstein*

**TB3.** This is the birth month of Walt Whitman, John Kennedy, and Malcolm X. Name this month featuring the National Day of Prayer and Mother's Day that follows April.
ANSWER: **May**