

NEW TRIER SCOBOL SOLO 2011

CHAMPIONSHIP: PHASE 3

Questions written and edited by David Reinstein

with assistance from Matt Bardoe, Tom Egan, Brad Fischer, Mark Grant, Jonah Greenthal,
Mike Laudermith, and Sharon Lorinskas



1. In 1697, David Gregory wrote a comprehensive treatise on this shape, and a challenge in *Acta Eruditorum* to find its equation prompted solutions from Huygens (HOY-gunz), Leibniz, and Johann Bernoulli. Euler (OY-lur) proved that this shape produces the surface of revolution with minimum area, while a road pitted with a continuous series of these curves will allow a square wheel to roll smoothly. This curve is traced by the focus of a parabola as it rolls along a straight line, and it is asymptotic to graphs of both exponential growth and exponential decay. Because it eliminates shear forces at joints and causes weight to be directed down into the ground rather than at an angle, Robert Hooke determined that this is the optimal shape of an arch. Having general equation y equals a times the hyperbolic cosine of the quantity x over a , name this curve that results when a cable or chain hangs under its own weight.

ANSWER: catenary [prompt on hyperbolic cosine function or cosh]

2. This person has introduced the Peace Tax Fund bill during each of the past several years, and he currently is sponsoring a bill that would require the Defense Department to post the cost of each war to an average taxpayer. This person has held the position of House Democratic senior chief deputy whip since 1991, and he has represented a district in Atlanta in Congress since defeating Julian Bond in 1986. When he recently stopped by a rally, he was denied the opportunity to speak to Occupy Atlanta. For three years, this person was the chair of the Student Nonviolent Coordinating Committee. Name this Congressman who is the only living person who addressed the 1963 March On Washington.

ANSWER: John Lewis

3. As a child, this person was tutored by the person who would become Pope Adrian VI. This leader was represented by his younger brother Ferdinand I at the Second Diet of Speyer, whose opponents started Protestantism. This leader appointed Antonio de Leyva the Governor of Milan after their decisive victory over Francis I at the Battle of Pavia. This leader's illegitimate son, John of Austria, led the Holy League at the Battle of Lepanto, and his other son became Philip II. Name this sixteenth-century ruler who oversaw the Diet of Worms, was Holy Roman Emperor, and is generally considered the first King of Spain.

ANSWER: King Charles V, HRE [or Charles I of Spain; or Carlos I of Spain; prompt on Charles; do not accept or prompt on "Charles I"; accept Charles after "first"; accept Carlos after "first"; accept "Emperor" in place of "King"]

4. One character in this novel has a pistol with a double-edged spring knife attached to the barrel. When a woman in this novel dies shortly after childbirth, one of the characters gets revenge on her husband by raising the son as a field worker. That mother is Frances, her son is Hareton, and her husband is Hindley. One character in this novel falls in love with his adoptive father's daughter Catherine but eventually marries Isabella Linton. Much of the action in this novel takes place at Thrushcross Grange and the title farmhouse. Name this novel about Earnshaw's adopted son Heathcliff, written by Emily Brontë.

ANSWER: Wuthering Heights

5. This scientist proposed the concept of twinning to explain quasicrystal formation. With Samuel Goudsmit, this man wrote *The Structure of Line Spectra*, and by electrophoresis he determined that a change of one amino acid in hemoglobin causes sickle-cell disease. The electrostatic valence rule is considered the second of this man's five rules about crystal structures, and he assumed that peptide bonds are planar to predict the alpha-helix secondary structure of proteins. Name this man who developed the first scale of electronegativity and received Nobel Prizes in both Chemistry and Peace.

ANSWER: Linus (Carl) Pauling

6. The lowest and highest notes during this piece are both achieved during octave increases on E notes, and several times during this short piece the left hand plays Low A, then Low E, then Middle A. Found by Ludwig Nohl a few decades after the composer's death and assigned a without-opus number of 59, it is also called Bagatelle 25. Written in three-eighth time in A Minor, it begins with alternating E's and D-sharps. Generally lasting about three minutes, it probably is the best-known solo piano piece by Beethoven. Name this work whose title may be wrong due to Beethoven's poor handwriting and may have in fact been written for Therese Malfatti.

ANSWER: Für Elise [accept Bagatelle 25 before it is mentioned]

7. Though they were not mentioned in this treaty, issues involving impressment, the *Creole* Incident, and the *Caroline* affair were major parts of its negotiation. The United States agreed in this treaty to search suspected slave ships flying the American flag off the coast of Africa but did not seriously follow up on that promise. The central part of this treaty clarified differing interpretations over borders in the 1783 Treaty of Paris and the Treaty of Ghent. Among many specifications, it agreed to start at the Saint Croix River. Name this treaty agreed to after the undeclared Aroostook War, signed between the United States and Britain in 1842.

ANSWER: Webster-Ashburton Treaty

8. This term describes systems for which the Euler-Lagrange equation reduces to Newton's second law, and Helmholtz's theorem decomposes any force field into a solenoidal one and one with this property. The line integral around a closed loop is zero for this type of force, whose fields are irrotational, which means their curl is zero. These forces can be represented as the gradients of potential energy functions. Exemplified by gravity but not friction, name this type of force whose work is path-independent.

ANSWER: conservative forces [accept conservative (force) fields; accept conservative vector fields; accept irrotational fields before "irrotational"; accept curl-free or other answers logically equivalent to having zero curl before "irrotational"]

9. This architect studied the Theatre of Marcellus in Rome and used its design as the basis for his Sheldonian Theatre, and he used a Byzantine squinch to hold the dome for the church he belonged to, Saint Stephen Walbrook. For his most famous work, this architect's Greek cross and Great Model designs were rejected before he came up with a modified Warrant design, later adding a one hundred foot diameter dome. This architect studied the Hôpital des Invalides in Paris before his work on the Chelsea Hospital. Name this architect who redesigned at least fifty churches after the Great Fire of London, including Saint Paul's Cathedral.

ANSWER: Christopher Wren

10. One character in this novel is forced to ask God's forgiveness after claiming that she used butter money to buy a suit. As a five-year-old, the main character of this novel tries to hide in a dietician's office but is discovered because he eats too much toothpaste and vomits. A reverend in this novel gives up his job after his wife falls off a hotel balcony in Memphis. In this novel, Lena Grove tries to locate the father of her baby, who turns out to be Joe Brown. The main character is at times given the last name McEachern, though he is better known as Joe Christmas. Name this novel by William Faulkner.

ANSWER: Light in August

11. A turning point in this war involved building several miles of road and then attacking the enemy from behind, which was called the Piquissiri maneuver and executed by Marquês de Caxias. In a naval battle during this war, the ship *Belmonte* survived despite heavy enemy fire, while Captain Meza was mortally wounded after not following the orders of his President. That fighting, near the town of Humaitá, was the Battle of Riachuelo [ree-ah-chway-lo]. This ended soon after the Battle of Cerro Corá, during which “I die with my country,” was shouted by Francisco Solano López. Name this 1860s war in which Argentina, Brazil, and Uruguay defeated Paraguay.

Answer: War of the Triple Alliance [accept Paraguayan War before “Paraguay”; accept War Against the Triple Alliance; prompt on Great War]

12. In one work by this artist, between the black legs and white head there are several shapes in blue, grey, and orange including a bird and possibly a fish. In another work, red, orange, and yellow arches appear to be walking. In addition to those works, *Diana in the Autumn Wind* and *Viaducts Break Ranks*, he painted some singing birds singing on a hand crank. Another work by this artist has a light blue square in the middle of a doorway in a work made up of small squares showing a house. Name this twentieth century artist who placed a bright fish in the center of *The Golden Fish* and also painted *Ad Parnassum* and *Twittering Machine*.

ANSWER: Paul Klee (“CLAY”)

13. An important medical application of this theory is the use of tetracycline to inhibit the apicoplast of *Plasmodium* parasites. The nucleomorph inside cryptomonad algae is taken as proof for this theory, which opposes the endogenous hypothesis. One controversial application of this theory explains the 9 plus 2 arrangement of microtubules in flagella and cilia, and the best molecular evidence for it comes from the small ribosomal subunit. This theory accounts for the double membrane and circular DNA found inside plastids and explains why certain organelles can replicate through binary fission. Largely the work of Lynn Margulis, name this evolutionary theory which states that the ancestors of mitochondria and chloroplasts were free-living prokaryotes that became engulfed by larger cells.

ANSWER: endosymbiotic theory [or serial endosymbiosis]

14. This poem’s epilogue claims that “regret is dead”, following references to “faith that comes of self-control” and “truths that never can be proved”; those phrases occur in this work’s 131st section. The prologue of this work is addressed to the “Strong Son of God, immortal Love,” and says of the subject of this work, “I trust he lives in thee, and there / I find him worthier to be loved”. This poem contains the stanza, “I hold it true, whate’er befall; / I feel it, when I sorrow most; / ’Tis better to have loved and lost / Than never to have loved at all.” Name this requiem about a recently deceased friend of Alfred, Lord Tennyson.

ANSWER: In Memoriam A.H.H.

15. This god resembles the German god Mannus and according to one story changed his name to Rig. He fathered Thrall, Carl, and Earl, whose families became the three classes of mankind. He was called the whitest god, and he had gold teeth and was associated with rams. The son of nine mothers, he lives in Himinbjörg, which is where Bifröst meets heaven. This god will blow the Gjallarhorn at the beginning of Ragnarök. Name this Norse god who during Ragnarök will take the shape of a seal and engage in a mutually destructive battle with Loki.

ANSWER: Heimdallr

16. This person found that the head sizes of Sicilians shrink when they are born in America, but the head sizes of Jews grow. Many of his essays, including “The Measurement of Differences Between Variable Quantities” were included in his book *Race, Language, and Culture*. This person invented the term “Kwakiutl” and used it to describe some Native Americans whose folklore he studied, and he also wrote about the Bella Coola tribe. He taught for many years at Columbia University and became known as the “father of modern anthropology”. Name this teacher of Margaret Mead and Ruth Benedict.

ANSWER: Franz **Boas**

17. Along with Anders Lindstedt, this person is the namesake of a method to approximate periodic solutions to certain differential equations. This mathematician is the namesake of first recurrence maps used to trace paths in chaos theory, and he developed a disk model of hyperbolic geometry. This mathematician conjectured what became a specific case of Thurston’s geometrization conjecture: that the three-sphere is the only type of bounded three-dimensional space that contains no holes. Name this mathematician whose conjecture was proven by Grigori Perelman and was one of the Millennium Prize Problems.

ANSWER: Henri **Poincaré** (poyn-kar-ay)

18. This city’s Japanese ambassadorial residence was the site of a raid which freed several hostages in 1997. The last Spaniard to hold power in this city was José de la Serna, who abandoned it in 1821 under threat from José de San Martín. This was later captured by Chile after the Battle of Arica during the War of the Pacific, and this is where Diego de Almagro the Second killed Francisco Pizarro, who tried to give it a name meaning “City of Kings”. This city is currently threatened with violence because it is the capital of the country with Shining Path and the Túpac Amaru Revolutionary Movement. Name this city located near the port of Callao and far west of Cuzco, the capital of Peru.

ANSWER: **Lima**, Peru

19. The MAT/TOCO [MATT-TOKO] experiment located the first acoustical peak in this phenomenon, which experiences a temperature increase in the direction of motion due to dipole anisotropy. Gravitational redshift in this phenomenon is called the Sachs-Wolfe effect, and the COBE satellite precisely measured its black body spectrum. This phenomenon was predicted by George Gamow in 1948, though its interference with the Telstar satellite’s communications would lead to its accidental discovery by Arno Penzias and Robert Wilson. Having a density of about 400 photons per cubic centimeter and a temperature of about 2.7 kelvins, name this radiation that permeates the entire universe, a remnant of the Big Bang.

ANSWER: **cosmic microwave background** radiation [accept **CMBR**; accept the words or corresponding letters in other orders as long as all are still present; prompt on a partial answer]

20. In one play by this writer, Laura convinces everybody that the Captain is losing his mind so that she can gain custody of their daughter Bertha. In another play by this writer, Adolph becomes convinced that his ailments are caused by his wife when he talks to a man who turns out to be his wife’s ex-husband Gustav. In addition to *The Father* and *Creditors*, he wrote a play involving a valet named Jean (zhahn) who is engaged to Christine. When Jean starts an affair with the title character on Midsummer’s Eve, Christine seeks revenge by beheading Serena, the title character’s canary. Name this Swedish playwright who wrote *Miss Julie*.

ANSWER: August **Strindberg**

TB8. This material forms the basis of the Cherenkov counter in the BELLE experiment, and it is used to coat the electrodes of a supercapacitor. This material is also used to trap particles in NASA's Stardust collector, and ones made from metal oxides are common catalysts due to their exceptionally high surface area. Most of these materials are made by supercritical drying, and the kind made from silica still holds the record for the best thermal insulator. First made by Samuel Kistler to supposedly win a bet and nicknamed "frozen smoke", name this class of extremely low-density solids made by replacing the liquid component of a colloid with a gas.

ANSWER: aerogel

TB9. The main theme of this work's finale is based on a version of the folk song "Bonaparte's Retreat" and includes elements from "McLeod's Reel". The main character has trouble finding a dance partner during "Saturday Night Waltz", which is based on the song "Old Paint". Agnes de Mille incorporated tap dance for the first time for a ballet in this work, which begins with "Buckaroo Holiday". Subtitled *Courting at Burnt Ranch*, this is the second "Cowboy Ballet" by the composer of *Billy the Kid*, and it ends with "Hoe-Down". Name this ballet which ends with the main character realizing that she loves the Champion Roper instead of the Head Wrangler, a work by Aaron Copland.

ANSWER: Rodeo: *Courting at Burnt Ranch*

TB10. This person worked with Eliot Weinberger on the book *Nineteen Ways of Looking at Wang Wei*, and many of this poet's works about India were placed in the collection *A Tale of Two Gardens*. One work by this poet involves the town of Galta in India and the god Hanuman, and another one of his poems talks about a "course of a river that turns, moves on, doubles back, and comes full circle, forever arriving." In addition to *The Monkey Grammarian* and "Sunstone", this poet wrote a series of essays including "The Conquest and Colonialism" which examines the history of his native country. Name this Mexican poet who wrote *The Labyrinth of Solitude*.

ANSWER: Octavio Paz