**VHSL Regionals 2016-2017 - Round 05 - First Period, Fifteen Tossups**

1. The amount of these numbers up to a given x is approximately x divided by the natural log of x. In 2013, Yitang Zhang proved that there are infinitely many of these numbers differing by 70 million or less. Those equal to one less than a power of two are the Mersenne type of these numbers. These numbers can be found using the sieve of Eratosthenes, and Euclid used proof by contradiction to prove that there are infinitely many of these numbers. For 10 points, what integers are only divisible by one and themselves?
ANSWER: **prime**s

2. In quantum electrodynamics, this particle is represented by a wavy line on a Feynman diagram, where this particle appears a result of electron-positron annihilation. The energy of this particle is equal to Planck's constant times its wave frequency. This spin-1 particle is the gauge boson for electromagnetism and has no mass. Nothing can travel faster than this particle, which travels at approximately three times ten to the eight meters per second. For 10 points, what particle is the quantum of light?
ANSWER: **photon**s

3. This poet asked, "How can we know the dancer from the dance?" at the end of his poem "Among School Children." A "shape with lion body and the head of a man" appears in the desert in a poem by this man that describes "turning and turning in the widening gyre." In another of his poems, he described "sages standing in God's holy fire" while imagining an ideal city in contrast to a place that is "no country for old men." For 10 points, name this modernist Irish poet who wrote "Sailing to Byzantium" and "The Second Coming."
ANSWER: William Butler **Yeats**

4. This author was a medical reformer who coined the term "anesthesia." He named a magazine edited by his friend, James Russell Lowell, calling it *The Atlantic Monthly*. This man wrote a series of essays that are set at a New England boarding house and feature people conversing over a morning meal. This author of *The Autocrat of the Breakfast Table* wrote an 1830 poetic tribute to the USS *Constitution*. For 10 points, name this poet of "Old Ironsides," the father of a Supreme Court justice.
ANSWER: Oliver Wendell **Holmes** Sr. [do not accept "Oliver Wendell Holmes Jr."]

5. The United States' oldest effective friendship treaty was signed with this country in 1777. This country originated a cylindrical, tasseled cap that became part of traditional Ottoman attire. France, Spain, and Britain jointly administered an "international zone" in this country's city of Tangier (tan-JEER). This country, which lent its Arabic name to the Maghreb (MAH-greb) region, is the only remaining monarchy in north Africa. For 10 points, name this country whose cities include Rabat and Casablanca.
ANSWER: **Morocco** [or Kingdom of **Morocco**; or al-Mamlakah al-**Maghrib**iyah until "Maghreb" is mentioned]

6. Possibly up to 300 people died in this city during a 1961 attack by the police on FLN demonstrators. A publication in this city ran a cover featuring a weeping man and the caption "All is forgiven." Taxis from this city carried 6,000 soldiers to the front during the First Battle of the Marne. Twelve people were killed in this city during an attack on the offices of a satirical newspaper noted for cartoons mocking Muhammad. For 10 points, the *Charlie Hebdo* massacre took place in what French city?
ANSWER: **Paris**

7. This country was once called the "happiest barrack," and it is currently led by the Fidesz (feh-DEZZ) party. This country was considered one of the most livable Communist countries under leader Janos (YAH-noes) Kadar. In 1956, a failed revolution in this country was one of the first threats to Soviet domination of Eastern Europe. Its current Prime Minister is the conservative Viktor Orban. For 10 points, name this European country once part of a union with Austria.
ANSWER: People's Republic of **Hungary** [or Republic of **Hungary**; or **Hungarian** People's Republic]

8. A song with this noun in its title changes a line from Snoop Dogg's "Gin and Juice" by replacing the phrase "my money" with "your body." A song whose title ends with this word references the song "Ain't No Sunshine" when the phrase "I know" is repeated seven times each by Camila Cabello and Shawn Mendes. In a 2015 song, this word is rhymed with the lines "don't tell your mother," "kiss one another," and "die for each other." For 10 points, name this word that follows "Cool for the" in the title of a Demi Lovato song.
ANSWER: **summer**

9. An artist from this country painted a broken column in place of her spine, recalling a crippling bus accident from her teenage years. A painting by another artist from this country was demolished by Nelson Rockefeller for including an image of Vladimir Lenin. Artists from this country painted *Man at the Crossroads* and self-portraits featuring unibrows. for 10 points, the series *The Epic of American Civilization* depicts Hernán Cortés arriving in what homeland of husband-wife artists Diego Rivera and Frida Kahlo?
ANSWER: **Mexico** [or **United Mexican States**; or **Estados Unidos Mexicanos**]

10. This state's current governor was once accused of speaking at a pro-cockfighting rally in 2014. A cartoon showed this state's governor hiding from terrorists who were actually his adopted children from Ethiopia. This state's 2014 Senate race featured the Democrats nominating Alison Lundergan Grimes. Governed by conservative Matt Bevin, this state's junior Senator is a Tea Party favorite and son of former Texas Congressman Ron Paul. For 10 points, name this state represented by Senators Rand Paul and Mitch McConnell.
ANSWER: Commonwealth of **Kentucky**

11. In a play set in this country, the countess Diana falls in love with her poor servant rather than any of her wealthy suitors. Near the end of a play set in this country, Adela breaks her mother's cane and then hangs herself. *The Dog in the Manger* is set in this country. The *Rural Trilogy* is set here, and includes a play in which Pepe el Romano is almost killed entitled *The House of Bernalda Alba*. For 10 points, name this country home to Lope de Vega and Federico Garcia Lorca.
ANSWER: **Spain**

12. While a young man, this ruler was opposed in the Fronde uprising and was later challenged by the League of Augsburg. This monarch revoked the Edict of Nantes (NONTS), which gave freedom to Huguenots (HOOG-uh-NOTS). He ordered numerous elaborate building projects for his residence, including creating a gallery called the Hall of Mirrors. This man moved his royal court to the Palace of Versailles (ver-SIGH). For 10 points, name this longest reigning French monarch, the "Sun King."
ANSWER: **Louis XIV** [prompt on Louis the Great; prompt on Louis]

13. This leader's people fail to conquer Ai (AY) thanks to the selfish sin of Achan. He asks God to make the sun and moon to stand still during a battle with the Amorites. This man and Caleb were the only two scouts to recommend that Israel actually move into the Promised Land. His namesake Old Testament book begins with him leading people across the Jordan River, and it later describes the blowing of trumpets and the fall of Jericho. For 10 points, name this successor to Moses as leader of the Israelites.
ANSWER: **Joshua** [or **Jehoshua**]

14. This animal disguises itself as a beautiful woman in the Japanese Jorogumo legend. A grandmother in this form created the stars in Navajo myth. Another mythological character who takes this form was the son of the sky god Nyame (nee-AH-may) and once tried to hoard all the world's wisdom in a calabash. A character in Greek myth became one of these animals after depicting the affairs of the Olympians in a tapestry, angering Athena. For 10 points, identify this animal form taken by the African trickster Anansi and the unfortunate Greek weaver Arachne.
ANSWER: **spider**

15. This ion names a type of cell found in the gills of marine bony fishes. Potassium, sodium, and two of this ion are transported by the NKCC channel. Mutations in CFTR decrease movement of this ion, resulting in the GI and respiratory symptoms of cystic fibrosis. Parietal cells secrete protons and this anion into the lumen of the stomach where they form gastric acid. For 10 points, name this negative ion of the second-lightest halogen (HAL-uh-jen) that, with sodium, comprises table salt.
ANSWER: **chloride** [or **C-L-minus**; or **chlorine ion**; prompt on chlorine and C-L]

 **VHSL Regionals 2016-2017 - Round 05 - Directed Period**

1A. English follows the SVO paradigm, as in the sentence "she loves him," but most world languages follow what other word-order paradigm, exemplified by the sentence "she him loves"?
ANSWER: **SOV** word-ordering [or **subject-object-verb** word-ordering]

1B. A group of people fleeing from the plague in Florence narrate one hundred stories in what collection by Giovanni Boccaccio (boh-KAH-chee-oh)?
ANSWER: *The* ***Decameron*** [or *Il* ***Decameron****e*]

2A. What country's small 12-mile coastline separates the city of Dubrovnik from the rest of Croatia (crow-AY-shuh)?
ANSWER: **Bosnia** and Herzegovina (HURT-say-go-VEE-nuh) [or **BiH**]

2B. In Shakespeare's *The Tempest*, Antonio and Prospero both served as the Duke of which Italian city?
ANSWER: **Milan**

3A. This is a 20-second calculation question. Use the approximation log-base-ten of two equals 0.3. Rounded to one decimal place, what is log-base-ten of fifty?
ANSWER: **1.7** [since 100/2=50, log 100-log 2=log 50, so we have 2-0.3=1.7.]

3B. This is a 20-second calculation question. What is the median of the squares of the first six positive integers?
ANSWER: **12.5** [or **25/2**] [with six numbers, the median is between the third and the fourth number; in this case, that is 3²=9 and 4²=16]

4A. What Socialist was the longest-serving French President, serving from 1981 to 1995?
ANSWER: Francois **Mitterrand** (MEE-terr-RON)

4B. For the proposition "p implies q", what is the name of the proposition "not q implies not p", which is logically equivalent to the original?
ANSWER: **contrapositive**

5A. Gustav Kirchhoff's (GOO-stahf KEER-chahf's) junction and loop rules deal with what structures, the electrical interconnection of elements such as batteries and resistors?
ANSWER: electrical **circuit**s [or electrical **network**s]

5B. Flying buttresses are a distinctive feature of what medieval architectural style, exemplified by the Notre Dame (NO-truh dahm) at Chartres (SHAH-urt)?
ANSWER: **Gothic**

6A. Which word was invented by Edmund Spenser in *The Faerie Queene* to describe a thousand-headed beast and is an adjective that describes something extremely obvious and transparent?
ANSWER: **blatant**

6B. What non-Oklahoma building was the target of a 1993 truck bombing that killed six people?
ANSWER: **World Trade Center** [or **WTC**; prompt on North Tower]

7A. What Egyptian pharaoh, the father of King Tut, introduced a monotheistic like worship of a solar deity?
ANSWER: **Akhenaten** [or **Amenhotep IV**]

7B. The case *R v. Penguin Books Ltd* centered on the publication of what author's novel *Lady Chatterley's Lover*?
ANSWER: D. H. **Lawrence** [or David Herbert **Lawrence**]

8A. This is a 30-second calculation question. What is the range of the function y equals two times the sine of the quantity four x minus three pi, end quantity, all plus five?
ANSWER: y equals **three to seven, inclusive** [or **[3,7]**; prompt on answers that do not indicate whether or not the end points should be included] [the sine function by itself would travel from -2 to 2; the +5 raises everything five units.]

8B. This is a 30-second calculation question. Let ABCDEF be a regular hexagon with perimeter twenty-four. Find the area of triangle ABD.
ANSWER: **8** times the square **root** of **3** [or **radical** in place of "square root"] [ABD is a 30-60-90 triangle with shorter leg 24/6=4 and longer leg 4\*sqrt(3). The area is (1/2)\*4\*4sqrt(3)=8sqrt(3).]

9A. In 2016, the president of what Texas university resigned following numerous scandals involving football players accused of committing sexual assaults?
ANSWER: **Baylor** University [prompt on BU]

9B. What recently deceased actor played the leads in both *Young Frankenstein* and *Willie Wonka and the Chocolate Factory*?
ANSWER: Gene **Wilder** [or Jerome **Silberman**]

10A. "What seven-day festival in Judaism is also known as the "Feast of Booths?"
ANSWER: **Sukkot** [prompt on Feast of Tabernacles]

10B. What abstract data structure in computer science processes elements in a first-in, first-out order?
ANSWER: **queue**

 **VHSL Regionals 2016-2017 - Round 05 - Third Period, Fifteen Tossups**

1. This country's northern Cibao valley was where merengue (meh-REN-gay) music first flourished. This country's city of San Pedro de Macoris was the birthplace of over 70 Major League Baseball players. This country harbors thousands of refugees from a neighbor affected by a 2010 earthquake. This country's highest point, Pico Duarte, was once named after its strong-arm president Rafael Trujillo (troo-HEE-yo). For 10 points, name this country that shares the island of Hispaniola with Haiti.
ANSWER: **Dominican Republic** [or **República Dominicana**; do not accept just "Dominica"]

2. The "Berkeley Mafia" in this country was a group of American economists who advised the President. The longest-serving President of this country seized power in the wake of the 30 September Movement in 1965. The Bandung Conference, which helped to pave the way for the Non-Aligned Movement, took place in this country. In 1975, it invaded the newly independent country of East Timor. For 10 points, what island country in Asia was led by both Sukarno and Suharto?
ANSWER: Republic of **Indonesia**

3. The corpora allata secretes high levels of JH during this life stage. All four chordate (CORE-date) characters are seen in this life stage in tunicates (TU-nuh-kits). Axolotls (ax-uh-LAW-tuls) retain features of this stage throughout their lives. This stage occurs directly before pupation (pyu-PAY-shun). Frogs in this stage are called tadpoles. For 10 points, name this juvenile stage of maggots and caterpillars that occurs after hatching and before metamorphosis.
ANSWER: **larva**e [or **larval**; prompt on juvenile before it is read; prompt on grubs]

4. In a novel by this author, the protagonist unwittingly kills a dog after taking advice from Soaphead Church. In that novel by this person, the main character is impregnated after being raped by her father, Cholly. This author wrote a novel about Pecola Breedlove, who wants to be white and to possess the title feature. She also created Sethe (SETH-uh), an escaped slave who kills her daughter to prevent her from being recaptured. For 10 points, name this African American novelist of *The Bluest Eye* and *Beloved*.
ANSWER: Toni **Morrison** [or Chloe Ardelia **Wofford**]

5. Two masters of this art form were the Nicholas Brothers, who earned early fame performing at the Cotton Club. It was the primary art form of Bill "Bojangles" Robinson, who appeared in several Shirley Temple movies. This is the primary artistic medium practiced by Savion Glover, a Broadway director. This art form features so-called "hoofers" and interest in it was stimulated by the animated film *Happy Feet*. For 10 points, what kind of dancing highlights the sound of shoes striking the floor?
ANSWER: **tap** dance [or **flash** dance until "Bojangles" is read; prompt on dance]

6. This man once sent various packages to people in Omaha, Nebraska, telling these "starters" to forward the package on in an attempt to get it to Boston. While working at Yale, he used subjects assigned to be "teachers" in a fake study of memory. This man conducted that experiment as a way of seeing how Nazis like Adolf Eichmann could carry out orders. For 10 points, what psychologist conducted an obedience experiment in which people were ordered to give electric shocks to others?
ANSWER: Stanley **Milgram**

7. The existence of this quantity was experimentally determined by sending a beam of silver atoms through an inhomogeneous magnetic field in the Stern-Gerlach experiment. This quantity names the fourth quantum number, with the first through third quantum numbers being the principal, azimuthal, and magnetic. It can be plus or minus one half for an electron, which means that only two electrons, with opposite values for this quantity, can occupy a given orbital due to the Pauli exclusion principle. For 10 points, what quantity represents the intrinsic angular momentum of a particle?
ANSWER: **spin** angular momentum

8. Van Cliburn made a famous recording of this composer's Piano Concerto No. 1 in B-flat minor. To show his support for Serbia in a war against the Ottomans, this composer wrote the *Marche slave* (marsh SLAV). He wrote a ballet in which Von Rothbart's enchantment over Odette is broken by the prince Siegfried. Another of his ballets includes the Trepak and the "Dance of the Sugar Plum Fairy." For 10 points, name this composer of the ballets *Swan Lake* and *The Nutcracker*.
ANSWER: Pyotr Ilyich **Tchaikovsky**

9. This man wrote that "the latent causes of faction" are "sown in the nature of man," saying a larger republic can reduce faction's effects. During his presidency, a message reading "we have met the enemy and they are ours" was sent. The owner of a plantation called Montpelier, this man proposed the Virginia Plan at the Constitutional Convention and teamed with Hamilton and Jay to produce the Federalist Papers. For 10 points, name this Secretary of State and successor as President to Thomas Jefferson.
ANSWER: James **Madison** [or James **Madison**, Jr.]

10. The ability to engage in this type of interaction serves as the distinction between protic versus aprotic solvents. These interactions are responsible for the secondary structures of proteins. These interactions are attractive intermolecular electrostatic forces that are stronger than van der Waals forces, but weaker than ionic forces. The high boiling point of water is due to these interactions. For 10 points, what type of interaction occurs when a namesake element is bound to a highly electronegative atom, such as fluorine, nitrogen, or oxygen?
ANSWER: **hydrogen bond**s [or word forms, such as **hydrogen bonding**]

11. The Lancaster House Agreement granted this country's official independence. In 2008, this country enjoyed hyperinflation at a peak of 79.6 billion percent. Its first President, Canaan Banana, was later arrested on charges of sodomy. This country became independent following the Bush War that pitted Ian Smith against such groups as ZANU and ZAPU. As of 2016, this country is led by a 92-year-old man who has been President since 1987. For 10 points, what African country led by Robert Mugabe was once known as Rhodesia?
ANSWER: Republic of **Zimbabwe** [prompt on Rhodesia until it is read]

12. The enthalpy change during this process is measured using bomb calorimeters. Because the atmosphere is seventy-eight percent nitrogen, this process will always form NOx's (N O exes). Nikolaus Otto developed the first modern engine in which this process occurs in an internal chamber. Were this highly-exothermic process to occur perfectly, a hydrocarbon would be completely transformed into carbon dioxide and water. For 10 points, name the chemical reaction that occurs between a fuel and oxygen in the atmosphere, producing heat and sometimes fire.
ANSWER: **combustion** [prompt on rapid oxidation or burning; do not accept "pyrolysis"]

13. This person dealt Telephus a wound that refused to heal until Telephus agreed to become his army's guide in a war effort. The opening two lines of *The Iliad* describe the rage of this person, which is shown when he is ordered to transfer control of his concubine Briseis (briss-EY-iss). This son of Peleus is the leader of the Myrmidons, and he is so incensed by the killing of his friend Patroclus that he engages Hector in combat, killing him. For 10 points, name this Greek hero of the Trojan war who was vulnerable only in his heel.
ANSWER: **Achilles**

14. This author described Johann Goethe (GURR-tuh) reuniting with the woman who inspired Goethe to write *The Sorrows of Young Werther* (VAIR-tah) in his novel *Lotte in Weimar* (LOT-tuh in VIE-mar). In a novel by this author, a man visiting his cousin in Switzerland has many philosophical discussions with Settembrini (set-em-BREE-nee). Hans Castorp was created by this author, who also wrote about Gustav von Aschenbach (OSH-en-bock) dying in Italy. For 10 points, name this German author of *The Magic Mountain* and *Death in Venice*.
ANSWER: Thomas **Mann**

15. This network was once known as the "Tiffany Network." It airs two programs noted for the trademark vanity cards of their creator that resemble long essays. This network airs two sitcoms created by Chuck Lorre (LORE-ee). The president of this network feuded with Charlie Sheen, the former star of its sitcom, *Two and a Half Men*. Its logo is a large eye, and it once formed part of the "Big Three" with ABC and NBC. For 10 points, what television network airs such programs as *The Big Bang Theory* and *NCIS*?
ANSWER: **CBS** [or **Columbia Broadcasting System**]

 **VHSL Regionals 2016-2017 - Round 05 - Tiebreaker Questions**

1. This man controversially gave a *Playboy* interview where he claimed to have "committed adultery in my heart many times." He urged people to use carpools and obey the speed limit in a speech unofficially known as the "malaise" speech. This President was heavily criticized for agreeing to return the Panama Canal to Panama, and he lost support due to an ongoing situation where 52 Americans were held as hostages in Iran. For 10 points, name this Georgia peanut farmer elected President in 1976.
ANSWER: Jimmy **Carter** [or James Earl **Carter** Jr.]

2. This instrument has the solo part in Sergei Rachmaninoff's *Rhapsody on a Theme of Paganini*. Some twentieth-century composers inserted nails and screws into this instrument in order to "prepare" it. The invention of the phonograph killed the popularity of the automated "player" varieties of this instrument. Households often use the "upright" version of this instrument, whereas large concert halls prefer the full-size "grand" variety. For 10 points, name this instrument with eighty-eight black and white keys.
ANSWER: **piano**

3. Organisms in the Chelicerata (kuh-lis-uh-RAH-tuh) clade of this phylum have appendages called pedipalps (PED-uh-palps). A class in this phylum contains organisms with book lungs. This phylum sheds its chitinous (KITE-in-us) exoskeleton during molting, and two of its classes may be distinguished by having either four or three pairs of legs. For 10 points, name this diverse phylum of invertebrates with segmented bodies and joints that includes arachnids and insects.
ANSWER: **arthropod**s [or **Arthropod**a]

4. In a novel by this author, Diggory Venn earns a living by selling the red dye used to mark sheep, and Damon Wildeve drowns trying to save Eustacia Vye. This author of *The Return of the Native* also used the fictional county of Wessex as the setting for his novel about a "Pure Woman Faithfully Presented." In that novel by this man, the title character murders her rapist Alec before running away to Stonehenge with her lover Angel Clare. For 10 points, name this author of *Tess of the d'Urbervilles*.
ANSWER: Thomas **Hardy**

5. Protection for this kind of environment was the aim of the Ramsar Convention. Across northern Europe, several preserved bodies like Cashel Man were discovered in these environments. The state of Mato Grosso in Brazil includes a gigantic area of this type called the Pantanal. Peat often forms in these environments, which are found in South Carolina's Congaree National Park and another park that provides the main habitat of the Florida panther. For 10 points, name this type of environment that makes up most of the Everglades.
ANSWER: **wetland**s [or **swamp**s; or **marsh**es; or **fen**s; or **bog**s]

Find the equation of a parabola with vertex at two, comma four and passing through the point five, comma forty.
ANSWER: **y equals four x-squared minus sixteen x plus twenty** [or **y equals four times** the quantity **x minus two**, end quantity, **squared, plus four** [given the vertex, the equation takes the form y=A(x-2)^2+4; plugging in the other point shows that A=4.]

What 1637 theorem with a proof too large to fit in the margin was given finally being proved in 1994, when Andrew Wiles established the modularity theorem of Taniyama and Shimura?
ANSWER: **Fermat's last** theorem