Select 15 of the following inquiries. Partial credit will not be granted for incomplete responses in absence of shown work.

1. Deductive reasoning is the process of reasoning logically from given facts to a conclusion whereas with inductive reasoning we simply utilize patterns to make predictions. Design and solve three algebraic equations, which models situations as described in the passage provided. Using deductive reasoning, meticulously justify each step with specific reasons such as properties, definitions, and rules not limited to but to include the distributive, associative, and communicative properties of real numbers. **(MA.912.A.10.1; MA.912.A.2.13; MA.912.A.3.5; MA.912.A.3.2)**

2. In light of the recent implementation of President Obama's 23 executive actions regarding gun control, a private educational institution administrator is actively engaged in acquiring a school resource officer to ensure safety of all students, faculty, and staff presently enrolled. Multiple bids were submitted; however, two armed private security organizations have presented appealing offers. The officer contracted will work 8 hours daily for 180 school days. Arsenal Security Forces charges an initial $15000 retainer coupled with $23.50/hour whereas their competitor, Red Dawn Investigations, LLC charges $2500 monthly and an additional $20/hour. Define a variable. Write and solve an equation for each situation. Create a table and determine specifically from which organization would you recommend contracting security services? When is the cost of both organizations the same? Explain your reasoning to determine the reasonableness of the solution. **(MA.912.A.10.1; MA.912.A.2.13; MA.912.A.3.5; MA.912.A.3.2)**

3. An industrial strength High Mobility Multipurpose Wheeled Vehicle (HMMWV) departs a forward operating base (FOB) at 1300 at an average rate of 35 miles per hour. Once it became evident that they neglected inadvertently to secure their essential Night Vision Goggles, a secondary vehicle was dispatched to provide support. An hour later an IAV Stryker departs base at 50 miles per hour along the same route on a path parallel to the first. How long before the Stryker catches the HMMWV? **(MA.912.A.10.1;MA.912.A.2.13;MA.912.A.3.5)**

4. Colossal winds clearly impeded upon an already challenging endeavor and created insurmountable challenges not easily overcome, even for an experienced aerialist comparable to Nik Wallanda. With temperatures reportedly in excess of 25 degrees Celsius, provided the conversion formula of $C = 5/9(F - 32)$, convert the data into Fahrenheit. Ensure validity via importing the solution into the original equation. Explain your reasoning. Wallanda accomplished this miraculous achievement where he meticulously navigated approximately 600 feet or .11 mile over a duration of 11 minutes. Determine his average rate of progression. **(MA.912.A.10.1; MA.912.A.2.13; MA.912.A.3.5; MA.912.A.1.4; MA.912.A.3.2)**

5. In mathematics, an inequality is a statement how the relative size or order of two objects, *or* about whether they are the same or not. Define a variable and write an inequality to model the following: More than 1.2 million students drop out of school every year or more than 6,000 students every school day and one every 26 seconds; The national high school graduation rate is only 70 percent, with states ranging from a high of 84 percent in Utah to a low of 54 percent in South Carolina; Over a lifetime, dropouts earn $260,000 less than high school graduates; The health of an 18-year-old high school dropout is similar to that of a more educated person over two decades older. Explain your mathematical reasoning in selecting either an open or closed dot as you graph your inequality. Explain how one might interpret phrases like *"at least"* and *"at most"* in an inequality in a real-world situation. Combine your responses into two unique compound inequalities and graph the solutions. **(MA.912.A.3.12; MA.912.A.3.4; MA.912.A.3.5)**

6. Ed Smith Stadium located merely blocks away from our Sarasota Military Academy recently underwent at $31.2 million renovation under a 30-year Spring Training agreement with the Baltimore Orioles beginning in 2010. A HD LED video board in the outfield measures 17 ft and casts a shadow of 7.5 ft. 27-year-old Baltimore Orioles outfielder, Adam Jones, is 75 inches tall. Use proportions to determine the dimensions of Jones' shadow. Explain your reasoning. **(MA.912.A.10.1; MA.912.A.5.4; MA.912.A.2.13; MA.912.A.5.1)**

7. Guido Financial Services charges fees equivalent to 515% whereas their major competitor, Tony Soprano & Associates charges 475% coupled with $50 in processing fees. Determine the difference amongst the specific amounts Guido and Soprano would collect on a $350 payday loan. Joe is gainfully employed in the used automotive sales industry, which has recently countered challenges during the national economic recession. He earns 3.25% commission plus $150 for each vehicle he sells. Determine his earning after he sold a 2006 HUMMER for $15,500. Will his earnings suffice in covering his previous payday loan? Explain. **(MA.912.A.10.1; MA.912.A.5.4; MA.912.A.2.13; MA.912.A.5.1)**

8. Identify the theoretical probability in randomly selecting the following letters from the capitalized word "SEQUESTRATION" with and without replacement: a. *P* (vowel then vowel), b. *P* (consonant then consonant), c. *P* (E then E), d. *P* (consonant then vowel), e. *P* (Q then Q), and f. *P* (letter then letter). What is meant by the complement of an event? Identify how these results may differ in the event experimental probability was employed as opposed to theoretical. When are these events dependent as opposed to independent? What percentage of government employees may involuntarily encounter reduced workdays and smaller paychecks between now and September? **(MA.912.A.1.4; MA.912.A.2.13; MA.912.A.10.1; MA.912.A.1.1)**

9. In 1930, the average annual income was approximately $1970 whereas the annual income for 2012 is approximately 2832% greater. A premier ticket in Lakeland to see a Detroit Tigers game in 1930 was about $4. Proportionately, what would that ticket equate to in 2012? On March 8, 1930 – Babe Ruth signed a two-year contract valued at $160,000. In an effort to assure posterity, Yankees General Manager

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Ed Barrow said, *"No one in baseball will ever be paid more than Ruth."* Yankees third baseman Alex Rodriguez earned $32 million in 2009 as part of a ten-year $275 million deal. Proportionately, how much more did Rodriguez earn annually than Ruth? **(MA.912.A.10.1; MA.912.A.5.4; MA.912.A.2.13; MA.912.A.5.1)**

10. According to the Government Accountability Office, if America terminates the $1 bill and replaces it with a coin, the U.S. may save $5.5 billion on printing costs over the next three decades. Printing dollar bills involves heavy reliance on a single commodity used to manufacture the notes - cotton. As cotton prices spiked in 2010, it pushed up the cost of printing a dollar bill to 9.6 cents. Write a function rule to describe this relationship and create a table of values. Is the equation a direct variation? Find the constant of the variation. Identify the domain and range of each relation. Identify the dependent and independent variables. Graph the data and label each section, create a mapping diagram, and determine whether a function exists via the Vertical-Line Test. **(MA.912.A.1.4; MA.912.A.2.13; MA.912.A.10.1; MA.912.A.2.2; MA.912.A.2.3; MA.912.A.2.4)**

11. A report issued by Challenger, Gray and Christmas estimates that in just the first two days of the tournament, distracted employees will cost firms at least $134 million in lost productivity and wages., create a fictitious scenario illustrating the inevitable loss in productivity for an organization consumed with participants in the March Madness tournament brackets. Design a table, which includes a domain, range, and function rule. Graph the results. Identify the rate of change and the type of correlation present. Is the equation a direct variation? Find the constant of the variation. Identify the domain and range of each relation. Identify the dependent and independent variables. Create a mapping diagram, and determine whether a function exists via the Vertical-Line Test. **(MA.912.A.3.7 – MA.912.A.3.12; MA.912.A.1.4; MA.912.A.2.13; MA.912.A.2.2; MA.912.A.2.3; MA.912.A.2.4)**

12. The infamous Atlanta Public Schools Testing Scandal criminal investigation lasted approximately twenty-one months whereas the initial tumultuous allegations went back as many as six years. Thirty-four educators were charged of which four high-level administrators and six principals represented the senior staff members outlined in the indictment. Define a variable for the senior administrators and another for principals. Write the equation in slope-intercept form. Identify the slope and y-intercept. Transform the equation to standard form. Design a table, which includes a domain, range, and function rule. Graph the results. Identify the rate of change and the type of correlation present. Is the equation a direct variation? Find the constant of the variation. Identify the domain and range of each relation. Identify the dependent and independent variables. Create a mapping diagram, and determine whether a function exists via the Vertical-Line Test. **(MA.912.A.3.7 – MA.912.A.3.13; MA.912.A.1.4; MA.912.A.2.13; MA.912.A.2.2 - MA.912.A.2.4)**

13. It has become increasingly evident to ensure a safe and orderly evacuation, two additional intersecting tunnels must be established, one parallel to the existing tunnel and the other perpendicular. The equation of the line representing the existing tunnel is $y = 2/3x – 7/8$. Identify the equations of the lines representing the new tunnels **(MA.912.A.3.10 – MA.912.A.3.11)**

14. Despite countless warnings to the contrary, you are serving on a proactive independent peacekeeping mission, you contract a charter flight from Sarasota, Florida to Pyongyang, North Korea. It takes 15 hours 45 minutes to fly 7525 miles against a massive unforeseen headwind. Simultaneously, Kim Jong Un loyalist and former NBA athlete, Dennis Rodman, flies from Pyongyang to Sarasota at the same average airspeed; however, his flight is only 14 hours. Find the average airspeed of the planes and the average wind speed. **(MA.912.A.3.14; MA.912.A.3.15)**

15. During the aforementioned Atlanta Public Schools Testing Scandal, a senior administrator discreetly confessed fault to allegations of cheating to a trusted colleague. After one minute elapses, temptation assumes control and his confidant discreetly shares this highly confidential information with another. Every minute thereafter, every employee familiar with the confession enlightens another not limited to but to include the one who initially disseminated it. In a room of 30 people, the expression $30/1 + 29 \times 2$ -t predicts the approximate number of people who will have heard the verdict after *t* minutes. About how many people will have heard the verdict after 2 minutes, 5 minutes, and 10 minutes? **(MA.912.A.10.1; MA.912.A.10.3; MA.912.A.3.5; MA.912.A.4.1)**

16. In 1985, the average annual cost for tuition and fees at public two-year college in the United States was $584 per year and has since increased about 6.5% annually. The projected cost of a four-year degree at Florida State University has a 47% graduation rate and carries in-state tuition fees, room, board, and books of $16,237 annually or $64,948 over the course of a respective degree. Assuming the annual expenses increase at a constant rate of 6.5% annually, write an equation to model the cost of a two-year versus four-year degree for the year you graduate college. **(MA.912.A.10.1; MA.912.A.3.12; MA.912.A.3.13)**

17. In protest of the tragic unforeseeable demise of the beloved Twinkie, a disgruntled lifelong consumer of treasured Hostess products ceremoniously sacrifices the self-proclaimed final Twinkie in existence. He boldly scales the Sunshine Skyway Bridge and reaches the pinnacle of precisely 431 feet. Upon releasing the defenseless Twinkie, the force of the gravity causes the product to fall rapidly into the bay. The function *h* is equivalent to negative sixteen squared increased by 431 reveals the height of the Twinkie *h* in feet after *t* seconds. Height *h* is dependent on time *t*. Graph *t* on the x-axis and *h* on the y-axis. Use nonnegative values for *t*. Illustrate the table and graph this quadratic equation. Does the Twinkie fall as far from *t* = 1 to *t* = 2 as it does from *t* = 0 and *t* = 1? Explain. Identify the *axis of symmetry, vertex, parabola, minimum,* and *maximum*. **(MA.912.A.10.1; MA.912.A.7.1; MA.912.A.7.2; MA.912.A.7.10; MA.912.A.7.8)**

18. In compliance with longstanding Florida state law articulated above, a public school administrator has decided to employ corporal punishment upon a 10-year-old child who has blatantly elected not to adhere to policies and procedures as articulated in the student handbook. The school official passionately swings the paddle upward with a starting velocity of 2 feet per second from an initial height of 4 feet. Without taking into consideration wind resistance or related applicable factors, assuming the paddle travels uninterrupted, how long will it remain in the air? Explain your reasoning via employing the vertical motion formula h = -16t_2 + vt + c. **(MA.912.A.10.1; MA.912.A.7.2; MA.912.A.7.8)**

19. National Hockey Stadium or Gadaffi Hockey Stadium is a purpose build field hockey stadium in Lahore, Pakistan. It is the largest field hockey stadium in world. The stadium can hold a capacity of 45,000 spectators. Joe Lunchmeat is adamant that provided a clear line of sight from his assigned seat; he can see in excess of 19 miles whereas his associate argues it is an inconceivable estimate. Lunchmeat suggests one may accurately employ the formula d = square root of 1.5h to estimate the distance *d* in miles to a horizon when *h* is the height of the viewer's eyes above the ground in feet. Estimate the distance in miles one can observe from Lunchmeat's seat in the event he is 200 feet above ground. Explain your reasoning and decide whether the solution is reasonable in the context of the original situation. **(MA.912.A.10.2; MA.912.A.6.2)**

20.

1. Howe was naturally concerned pupils had memorized material they often did not understand. Those who could repeat lines from the poem "Thanatopis" could not define the word in the title. William Cullen Bryant's "Thanatopis" it often interpreted as a peaceful vision of death as a natural phase in returning to nature: *"Earth, that nourished thee, shall claim Thy growth, to be resolved to earth again."* Emotionally inspired by this poetic masterpiece, you elect to pay homage to the late author. Upon entry of Bryant Park in midtown Manhattan, you observe a *"seated figure with intrgral plinth on a pedestal under an archiform canopy, with a large urn and a balustrade at either side"* (City of New York Parks and Recreation). You want to approximate the height of the monument. In absence of appropriate judgment, a rope is strategically affixed to the pinnacle of Bryant's head and fully extended in a diagonal fashion approximately 10 feet. An additional rope is attached to a stake at the base of the statue, which extends 8 feet forming vertex with the diagonal. Using the Pythagorean Theorem, find the height of the monument of the right triangle and determine if a Pythagorean Triple exists. Identify the formulas as well as specifically what information one may derive from obtaining the following measurements via the following trigonometric ratios when applied to the sculpture: tangent, sine, and cosine. Explain your reasoning and determine whether the solution(s) is reasonable in the context of the original situation. (**MA.912.G.5.1; MA.912.G.5.4; MA.912.T.2.1**)

2. Gonzaga University is a private Roman Catholic university located in Spokane, Washington with a student enrollment of 7,764 or half of Wichita State, which miraculously eliminated the number one seeded team. At a pivotal moment in the game, legendary offspring David Stockton, the gargantuan 7'1" 305 pound Polish Freshman Przemek Karnowski, and the 7'0" Canadian forward Kelly Olynyk were 15 feet from the desired target. Two of the players were 24 feet from each other adjacent to the sidelines of the basketball court. Employ the Perpendicular Bisector Theorem, its converse and concurrency of Perpendicular Bisectors of a Triangle to determine how far the target was located from each student-athlete. Illustrate the diagram and identify concurrent lines and the point of concurrency **(MA.912.G.1.2; MA.912.G.4.1 - MA.912.G.4.6)**

3. The Secret Service is a federal law enforcement agency attached to the Department of Homeland Security. One of their primary objectives is to ensure the safety of current and former national leaders and their families. A critical task as an agent is to serve as a lookout. During his sequestration speech, the lookouts identify a suspicious individual, measure the angle of their perspective, and disseminate concerns electronically via a covert audio communication device. A strategically placed agent uses the angle to locate the suspect. Illustrate the diagram to determine specifically how many lookouts are required to locate the perpetrator. Classify the triangle formed by its sides, measure the angles formed, and classify the triangle by its angles. Thoroughly explain your reasoning via the applicable Congruence Postulate or Theorem. **(MA.912.G.1.2; MA.912.G.2.3; MA.912.G.4.1; MA.912.G.4.3; MA.912.G.4.4; MA.912.G.4.6)**