Regional Math Bee – Round 1 (7^{th}-8^{th})

Regulation Tossups

(1) **Read Twice. Computation Basic** – *Give an exact answer, not an estimate.* What is the area of a circle with a diameter of 16?

ANSWER: **64 pi**

(2) **Non-Computation** - Two distinct points determine exactly one of these objects in Euclidean geometry. Parallel examples of these objects have the same slope, while perpendicular examples have slopes that are negative reciprocals of one another. For the point, name this straight path that extends without end in both directions.

ANSWER: **line**

(3) **Read Twice. Computation Basic** - Solve the equation 2.5x equals 27.5 for x.

ANSWER: **11**

(4) **Read Twice. Computation Pyramidal** - Matt wants to determine the total cost of 5 chocolate bars and 4 drinks if the chocolate bars are 3 dollars apiece and the drinks are 2 dollars apiece. One way to determine this is to let c equal the cost of a chocolate bar and d equal the cost of a drink, and then determine the value of the expression 2c plus 2d. Using that or any other method , for the point, determine the total cost of the chocolate bars and the drinks.

ANSWER: $**23**

(5) **Read Twice. Computation Basic** - The square of what positive number is equal to negative 21 times negative 14 plus negative 5?

ANSWER: **17**

(6) **Read Twice. Computation Basic** - What is the perimeter of a regular hexagon with a side length of 15?

ANSWER: **90**

(7) **Non-Computation** - This thinker published his laws of motion in *Principia Mathematica*. Despite being years ahead of Gottfried Leibniz, this man shares credit for developing calculus. For the point, identify this English polymath who allegedly discovered gravity after an apple fell on his head.

ANSWER: Sir Isaac **Newton**

(8) **Read Twice. Computation Basic** – What is 1,002 minus 487?

ANSWER: **515**

(9) **Read Twice. Computation Pyramidal** - Davis has five unique cars and wants to figure out how many unique ways he can order them. To do this, he can use the factorial operator, which multiplies all the numbers from 1 to the number it's given. By this definition, 5 factorial, equal to 1 times 2 times 3 times 4 times 5, yields, for the point, what number?

ANSWER: **120**

(10) **Read Twice. Computation Basic** - Simplify the expression 9x squared plus x minus 2x squared plus 3 plus 5x minus 7 to lowest terms.

ANSWER: **7x squared plus 6x minus 4**

(11) **Read Twice. Computation Basic** – What is the circumference of a circle on a coordinate graph that passes through the points (0, 4), (4,0), (0, -4) and (-4,0)? You can give either the exact answer or an approximate answer rounded to the nearest whole number.

ANSWER: **16 pi** or **50**

(12) **Non-Computation -** In advanced algebra, operations that satisfy this property are sometimes called "abelian," after the mathematician Niels Henrik Abel. When two matrices are multiplied together, this principle that holds for real numbers does not apply. For the point, name this property of operations that allows numbers to change order without changing the result, stated for addition as a plus b equals b plus a.

ANSWER: **commutative** property

(13) **Read Twice. Computation Basic** – If a shopper spent $200 at a store, and spent 18 percent of that money on lunch, how much did the shopper pay for lunch?

ANSWER: **$36**

(14) **Read Twice. Computation Pyramidal -** Michael wants to play several rounds of golf. He has $280, and each round of golf costs $40 to play. One way to figure out how many rounds of golf he can afford to play is to write an equation where x equals the amount of money he has divided by the per-round cost of golfing. Using that or any other method , for the point, how many rounds of golf can Michael play?

ANSWER: **7**

(15) **Read Twice. Computation Basic** - A treasure map has a chest at the point (negative 5, 2). If you move it 3 units to the right and 4 units down on a graph, what is the map's new coordinate?

ANSWER: **(-2, -2)** (or **(negative 2, negative 2)**)

(16) **Read Twice. Computation Basic** - Simplify the expression 4 times the quantity (3x minus 2).

ANSWER: **12x minus 8**

(17) **Non-Computation -** A correct one of these procedures always produces a solution in a finite number of steps if a solution exists. In computer science, common examples of this concept include procedures for sorting lists and searching databases. For the point, give this term for a precise, repeatable procedure or method used to solve mathematical or computational problems.

ANSWER: **algorithm**s

(18) **Read Twice. Computation Basic** – What is the area of a trapezoid whose two bases are 4 units and 6 units long, and wbose height is 2 units?

ANSWER: **10** square units

(19) **Read Twice. Computation Pyramidal -** Andrew walks 5 miles east, 12 miles north, then 13 miles directly back to where he was. He wants to figure out the area of the shape traced by his path. Since he walked in three different directions, he concludes that he traced out a triangle. He then multiplies the base and height, then divides by 2 to determine the area is, for the point, how many square miles?

ANSWER: **30** square miles

(20) **Read Twice. Computation Basic** - Give your answer in decimal form. If 32 over 5 equals x over 11, what is x?

ANSWER: **70.4**

(21) **Read Twice. Computation Basic** – David has saved $240 to buy a laptop computer that costs $960. He plans on saving $12 each week from now until he can afford the computer. In how many weeks will David have enough to buy the computer?

ANSWER: **60**

(22) **Non-Computation** - On a bar graph or histogram, the height of each bar represents this quantity. In probability experiments, experimental probability is found by dividing this number for an event by the total number of trials. If the value 7 appears three times in a data set, then its value for this is three. For the point, name this term for how often something occurs in a set of data, also used as a term in radio.

ANSWER: **frequency** (prompt on "how often something occurs" or similar)

(23) **Read Twice. Computation Basic** – Completely factor the expression 15-5x.

ANSWER: **5 (3 – x)**

(24) **Read Twice. Computation Pyramidal -** An aspiring gopher living 150 feet underground climbed 29,180 feet to reach the top of a tall mountain and wants to know how far above the ground he is. To find this out, the gopher finds the sum of the amount he climbed and where he started to determine that this mountain is, for the point, how far above the ground?

ANSWER: **29,030** feet

(25) **Read Twice. Computation Basic** - Consider the following set of numbers (read slowly): 5, 4, 2, 8, 2, 3, 9, 9. What is the median of this set of numbers?

ANSWER: **4.5** or **4 and a half**

Extra Questions

(1) **Read Twice. Computation Basic** - A two-digit number is chosen at random. What is the probability that it is a multiple of 10?

ANSWER: **0.1** (or **10%**; or **1/10**; or **one-tenth**)