Math Bee – Sample Packet (5th Grade)

Regulation Tossups

(1)   [Computational Pyramidal] A triangle has a base length of 13 meters and a height of 6 meters. Given that the area of a triangle can be determined by multiplying one-half times the length of the base times the height, calculate the area of the triangle. You have five seconds to answer.

ANSWER: **39** square meters

(2)   [Computational Non-Pyramidal] If the current time is 11:25 am, what time was it 2 hours and 30 minutes ago? You have 30 seconds to answer.

ANSWER: **8:55** am (accept equivalents like **5 minutes before 9**; do NOT accept "8:55 pm")

(3)   [Computational Non-Pyramidal] Convert 60 feet to yards. You have 30 seconds to answer.

ANSWER: **20** yards

(4)   [Computational Non-Pyramidal] What is the area between y equals 4, y equals 8, x equals 0, and x equals 2? You have 30 seconds to answer.

ANSWER: **8**

(5)   [Computational Pyramidal] This number is the sum of the number of legs on most cats, the number of sides on a quadrilateral, and the number of sides on a triangle. For the point, what is this number obtained by starting with 10, subtracting 3, and then adding 4? You have five seconds to answer.

ANSWER: **11**

(6)   [Computational Non-Pyramidal] You have a bag that contains 5 green marbles, 3 yellow marbles, and 2 blue marbles. What is the probability of drawing a yellow marble from the bag? You have 30 seconds to answer.

ANSWER: **3/10** (or **30%**)

(7)   [Computational Non-Pyramidal] What is 7 raised to the 3rd power? You have 30 seconds to answer.

ANSWER: **343**

(8)   [Non-Computational Pyramidal] The Green-Tao theorem shows that arbitrarily long arithmetic progressions exist within this set. One unsolved problem asks whether there are infinitely many of these numbers that differ by two, known as "twin" types. For the point, name these integers greater than 1 that have no positive divisors other than 1 and themselves. You have three seconds to answer.

ANSWER: **prime** numbers

(9)   [Computational Pyramidal] A candy jar contains 7 pieces of yellow candy, 15 pieces of blue candy, 4 pieces of red candy, and 9 pieces of green candy. You can determine the probability that a certain-colored piece ill be selected by dividing the number of those pieces by the total number of pieces in the jar. What is the probability, in fractional lowest terms, that a randomly selected piece of candy from the jar will be either green or blue? You have five seconds to answer.

ANSWER: **24 / 35**

(10)   [Computational Non-Pyramidal] Convert the fraction two-thirds to an equivalent fraction with the denominator 27. You have 30 seconds to answer.

ANSWER: **18/27** (or **eighteen twenty-sevenths**)

(11)   [Non-Computational Pyramidal] Lagrange's Four-Theorem, named for these numbers, asserts that every natural number can be expressed as the sum of four of them. These are the only non-negative integers whose prime factorizations contain only even exponents. For the point, identify these numbers, such as 1, 4, 9, and 16, which are equal to some integer multiplied by itself. You have three seconds to answer.

ANSWER: perfect **square** numbers

(12)   [Computational Non-Pyramidal] Evaluate this expression: 1+2+3+4+5+6+7+8+9+10. You have 30 seconds to answer.

ANSWER: **55**

(13)   [Computational Non-Pyramidal] Ellie is counting by eights. If the first number she says is 126, what is the sixth number she says? You have 30 seconds to answer.

ANSWER: **166**

(14)   [Computational Non-Pyramidal] What is the perimeter of an irregular pentagon with a base of 4 meters, two sides of 9 meters each, and two sides of 11 meters each? You have 30 seconds to answer.

ANSWER: **44** meters

(15)   [Computational Pyramidal] If each side of this shape is 7 centimeters long, then the perimeter of this shape is 21 centimeters. For the point, name this shape that contains 180 degrees of internal angles. You have five seconds to answer.

ANSWER: **triangle**

(16)   [Non-Computational Pyramidal] In Euclidean geometry, these entities intersect to form adjacent angles that are congruent and supplementary. The existence of one of these through a given point not on a line is guaranteed by Playfair's axiom. For the point, name this type of line pair that intersects at a right angle. You have three seconds to answer.

ANSWER: **perpendicular** lines (accept **orthogonal** lines; accept "lines that meet at **right angles**" until it is said)

(17)   [Computational Pyramidal] Isaiah bought a sandwich for $3.70, a bag of chips for $1.75, and a drink for $2.10. The tax was $0.62. He gave the cashier $10.00. By taking the amount of money Isaiah paid and subtracting the total cost of the items he purchased, determine how much change Isaiah should have received. You have five seconds to answer.

ANSWER: **$1.83**

(18)   [Non-Computational Pyramidal] When each term in these things equals the previous term plus a fixed value, they are arithmetic, but when each term is multiplied by a fixed ratio, they are geometric. Notable examples of these things include the Catalan numbers and the Fibonacci numbers. For the point, name these ordered lists of elements that are often studied for convergence. You have three seconds to answer.

ANSWER: **sequence**s

(19)   [Computational Non-Pyramidal] There are 3 black marbles and 4 white marbles in a bag. If you choose a marble at random, what is the probability that it is black? You have 30 seconds to answer.

ANSWER: **3/7** (**Three-Sevenths**)

(20)   [Computational Non-Pyramidal] You can use either the FOIL method or Pascal's triangle to help solve this problem. If the quantity open parenthesis x plus y close parenthesis cubed is expanded, what is the sum of the resulting expression's numerical coefficients? You have 30 seconds to answer.

ANSWER: **8**

(21)   [Non-Computational Pyramidal] This symbol first appeared in print in the 1557 book *The Whetstone of Witte* by the Welsh mathematician Robert Recorde, who compared it to items postulated by Euclid. This symbol appears between expressions that have the same value and is used in algebraic equations. For the point, name this mathematical symbol that consists of two parallel horizontal lines. You have three seconds to answer.

ANSWER: **equals** sign

(22)   [Computational Non-Pyramidal] If a cube has a side length of 3, what is its volume? You have 30 seconds to answer.

ANSWER: **27**

(23)   [Computational Non-Pyramidal] If 4x - 2 = 8, what is the value of 6 x squared plus 2? You have 30 seconds to answer.

ANSWER: **39.5** (or **39 and a half**)

(24)   [Computational Non-Pyramidal] Evaluate this expression for x=8: 7 x + 8. You have 30 seconds to answer.

ANSWER: **64**

(25)   [Computational Non-Pyramidal] What is 500 plus 500 plus 400? You have 30 seconds to answer.

ANSWER: **1400**