

# Regional Math Bee – Finals (3<sup>rd</sup>-4<sup>th</sup>)

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## Regulation Tossups

(1) **Read Twice. Computation Basic** - Convert 0.28 to a fraction in lowest terms.

ANSWER: 7/25 (or seven twenty-fifths)

(2) **Read Twice. Computation Pyramidal** - After Jason walks 6 meters directly east and 8 meters directly north, he wants to figure out how far he is from his starting point. He can calculate this by adding up the squares of the two numbers and square-rooting that. By doing this (\*), he finds that he is, for the point, how far from where he started?

ANSWER: 10 meters

(3) **Read Twice. Computation Basic** - What is 1,200 divided by 4?

ANSWER: 300

(4) **Non-Computation** - In trigonometry, the sine, cosine, and tangent functions are defined using this figure in a right triangle. This geometric figure is formed when two rays (+) share a common endpoint called a vertex. This geometric figure is commonly measured in degrees or radians. (\*) For the point, right ones of which figures have a measure of exactly 90 degrees?

ANSWER: angles

(5) **Read Twice. Computation Basic** - How many cups are in 6 gallons of water?

ANSWER: 96

(6) **Read Twice. Computation Basic** - *Round your answer to the nearest ten.* What is 110 divided by 5?

ANSWER: 20

(7) **Read Twice. Computation Basic** - Consider this set of numbers: (0, 1, 2, 3, 4, 5, 6, 7, 8). If one of the numbers in that set is chosen at random, find, in simplest fractional form, the probability that the number is a solution of the equation  $3x + 1$  is less than or equal to 13.

ANSWER: 5/9 (or five-ninths)

(8) **Read Twice. Computation Basic** - What is the area of a rectangle with a perimeter of 30 units whose longer sides measure 10 units each?

ANSWER: 50 square units

(9) **Non-Computation - A value written with this symbol can be converted to a decimal by dividing by 100. Discounts in stores and interest rates at banks are often written using this concept. (+)** The symbol for this concept looks like two small circles with a diagonal slash through them. (\*) For the point, name this way of expressing a number as parts out of 100.

ANSWER: **percent** (accept **percentage**)

(10) **Read Twice. Computation Pyramidal - Jessica flips a fair coin 4 times and wants to know the probability that she flips four heads. To do this, she raises the probability of flipping one head, one-half, to the power of 4. She realizes that this is the same as one-half times one-half times one-half times one-half. (\*)** For the point, in simplest fractional form, what does Jessica calculate the probability to be?

ANSWER: **1/16** (or **one-sixteenth**)

(11) **Read Twice. Computation Basic -** If you choose a number between 1 and 100, what is the chance that it has 6 as one of its digits?

ANSWER: **0.19** (or **19%**; or **19/100**; or **nineteen-hundredths**)

(12) **Read Twice. Computation Pyramidal - *Round your answer to the nearest thousand.*** A baker, who, every month, orders 994 pounds of flour, which costs 50 cents per pound, wants to determine how much money, in dollars, he spends on flour in a year. To do this, he rounds the number of pounds and multiplies the three numbers to find that he spends, (\*) for the point, how much on flour in a year?

ANSWER: **\$6000**

(13) **Read Twice. Computation Basic -** What is 120 multiplied by one-half?

ANSWER: **60**

(14) **Non-Computation - By definition, composite numbers have more than two of these things, and finding all of these numbers for a given number determines whether it is prime or composite. (+)** The greatest common one of these numbers for 24 and 36 is 12. (\*) For the point, name these numbers that multiply together to make another number.

ANSWER: **factors**

(15) **Read Twice. Computation Basic - *Give your answer in simplified form.*** If there are 20 cars, and 4 of them are blue, what is the probability that you choose a non-blue car at random?

ANSWER: **0.8** (or **4/5**; or **four-fifths**)

(16) **Read Twice. Computation Basic -** What is half of 58?

ANSWER: **29**

(17) **Read Twice. Computation Pyramidal** - Susan walks directly west, before turning 38 degrees toward the north. She wants to know how much more she needs to turn in degrees to face directly north. She finds the complementary angle to 38 degrees to find that she needs to turn, (\*) for the point, how many degrees, which is equal to 90 degrees minus 38 degrees?

ANSWER: 52 degrees

(18) **Read Twice. Computation Basic** - Evaluate this expression: 9 times 8 plus 15.

ANSWER: 87

(19) **Non-Computation** - If a financial transaction is referred to by the word “usurious”, it means that this value for the transaction is deemed to be too high. This quantity is denoted by the letter I in the equation I equals p r t. (+) Simple examples of this quantity are calculated by multiplying the principal, the rate, and the time. (\*) For the point, what is this financial term referring to the extra money paid or earned on a loan?

ANSWER: interest

(20) **Read Twice. Computation Basic** - What is 15,530 minus 3,260?

ANSWER: 12,270

(21) **Read Twice. Computation Basic** - What is the area of a square with a side length of 19?

ANSWER: 361

(22) **Read Twice. Computation Pyramidal** - *Round your answer to the nearest hundred.* There are 453 residential homes in a region where the average family size is 5. The government wants to estimate the number of people in this region, so they round the number of homes, multiply it by the average family size, and round their answer to show that, (\*) for the point, approximately how many people live in this region?

ANSWER: 2300

(23) **Read Twice. Computation Basic** - Express the mixed number nineteen and eighty-nine hundredths as a decimal number.

ANSWER: 19.89

(24) **Non-Computation** - This man’s doubts about quantum theory caused him to remark that “God does not play dice with the universe.” (+) Field equations that were developed and named for this man show how space and time are curved. (\*) For the point, name this German-born physicist whose famous equation  $E$  equals  $mc$  squared forms the basis of his theories of relativity.

ANSWER: Albert Einstein

(25) **Read Twice. Computation Basic** - *Give your answer as a fraction.* What is one-half minus one-fourth?

ANSWER: 1/4 (or one-fourth)

**Extra Questions**

(1) **Read Twice. Computation Basic** - A jacket whose sticker price is \$80 is included in a 25% off sale. What is the price for the jacket after the sale discount is applied?

ANSWER: **\$60**