

Name:

Grade 10

Answer the questions you are confident in. Guess at your own risk.

1. Suppose $\frac{2x}{3} - \frac{x}{6}$ is an integer, what is true about x ?
 - a. It is negative
 - b. It is even, but not necessarily a multiple of 3
 - c. It is a multiple of 3 but not necessarily even
 - d. It is a multiple of 6 but not necessarily a multiple of 12
 - e. It is a multiple of 12
2. In isosceles triangle ABC, $AB = BC$. D is a point on BC such that $BD = DA = AC$. What is angle ABC in degrees?
 - a. 36
 - b. 54
 - c. 12
 - d. 108
 - e. 72
3. Which of the following describes the graph of the equation $(x + y)^2 = x^2 + y^2$?
 - a. The empty set
 - b. One point
 - c. Two lines
 - d. A circle
 - e. The entire plane
4. Katherine and Zyan are playing a game using strange dice. Each die is a cube with six sides. Katherine's die has sides numbered 3, 3, 3, 3, 3, and 6. Zyan's die has sides numbered 2, 2, 2, 5, 5, and 5. To play the game, Katherine and Zyan roll their dice at the same time and whoever rolls the higher value wins. What is the probability that Katherine's roll will be higher than Zyan's?
 - a. $\frac{5}{12}$
 - b. $\frac{1}{2}$
 - c. $\frac{7}{12}$
 - d. $\frac{2}{3}$
 - e. $\frac{17}{32}$

5. In trapezoid $ABCD$ with bases AB and CD , $AB = 52$, $BC = 12$, $CD = 39$, and $DA = 5$. What is the area of the trapezoid?
- 182
 - 195
 - 210
 - 234
 - 260
6. $x^4 + \frac{1}{x^4} = 194$ what is one possible value for $x + \frac{1}{x}$?
- $\sqrt{2}$
 - 2
 - 4
 - $\sqrt{5}$
 - $\sqrt{7}$
7. What's the value of x if $|x - 1| = |x - 2|$?
- $-\frac{1}{2}$
 - $\frac{1}{2}$
 - 1
 - $\frac{3}{2}$
 - 2
8. For how many real values is $\sqrt{120 - \sqrt{x}}$ an integer?
- 3
 - 6
 - 9
 - 10
 - 11
9. Give the sum of the numbers in the set of primes p such that $p^2 + 11$ has exactly six different positive divisors (including 1 and the number itself). (Note the set may have one or more elements.)
- ∞
 - 8
 - 5
 - 3
 - 2
10. How many whole numbers between 99 and 999 contain exactly one 0?
- 72
 - 90
 - 144
 - 162
 - 180

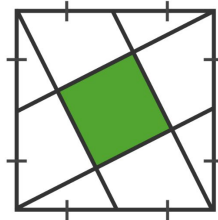
11. Six distinct integers are randomly chosen from 1 to 2019, inclusive. What is the probability that some pair of these integers has a difference that is a multiple of 5?

- a. $\frac{1}{2}$
- b. $\frac{3}{5}$
- c. $\frac{2}{3}$
- d. $\frac{4}{5}$
- e. 1

12. At a party, each man danced with exactly three women and each woman danced with exactly two men. Twelve men attended the party. How many women attended the party?

- a. 8
- b. 12
- c. 16
- d. 18
- e. 24

13. A square has line segments connecting corners to midpoints, as shown. What fraction of the larger square is shaded?



- a. $\frac{2}{5}$
- b. $\frac{1}{5}$
- c. $\frac{1}{4}$
- d. $\frac{1}{3}$
- e. $\frac{1}{2}$

14. What value of x satisfies the following equation

$$25^{-2} = \frac{5^{\frac{48}{x}}}{5^{\frac{26}{x}} * 25^{\frac{17}{x}}}$$

- a. 2
- b. 9
- c. 5
- d. 6
- e. 3

15. Coin A is flipped three times and coin B is flipped four times. What is the probability that the number of heads from flipping, the two fair coins, is the same?
- $\frac{29}{128}$
 - $\frac{23}{128}$
 - $\frac{1}{4}$
 - $\frac{35}{128}$
 - $\frac{1}{2}$
16. What is $1 + 3 + 5 + 7 + 9 + 11 + \dots + (n * 2) - 1$, in terms of n ?
- $4n$
 - $n^2 - 1$
 - n^3
 - $2n^2$
 - n^2
17. Two digits in Bob's age are the same as the digits in his brother's age, but in reverse order. In five years, Bob will be twice his brother's age will be then. What's the difference between their ages?
- 18
 - 45
 - 27
 - 36
 - 9
18. Which of the following is a perfect square?
- $99! * 100!$
 - $98! * 100!$
 - $98! * 99!$
 - $97! * 99!$
 - $97! * 98!$
19. In the eight-term sequence A, B, C, D, E, F, G, H, the value C is 5 and any three consecutive terms is 30. What is A + H?
- 17
 - 18
 - 25
 - 26
 - Cannot be determined
20. Both the roots of the quadratic equation $x^2 - 63x + k = 0$ are prime numbers. The number of possible values of k is
- 0
 - 1
 - 2
 - 4
 - More than 4