

Answer each question completely. If necessary, you may provide an example to answer the question.

1. What are the properties of a 30 – 60 – 90 triangle?
2. What are the properties of a 45 – 45 – 90 triangle?
3. What are two special Pythagorean triples?
4. What are the properties of similar triangles?
5. How do you find the area of a triangle?
6. What is the Triangle Inequality theorem?
7. What are isosceles triangles?
8. What are equilateral triangles?
9. What are the characteristics of a square?
10. What are the characteristics of a rectangle?
11. What are the characteristics of a parallelogram?
12. How do you find the sum of the interior angles of a polygon?
13. How do you convert a decimal to a fraction?
14. How do you convert a fraction to a decimal?
15. How do you compare the values of two or more fractions?
16. How do you find the reciprocal of a fraction?
17. How do you convert an improper fraction to a mixed number?
18. How do you convert a mixed number to an improper fraction?
19. How do you divide fractions?
20. How do you multiply fractions?

21. How do you find an original value, that is, a value before it was increased or decreased by a certain percentage?
22. What formula is used to find a percent?
23. How do you increase or decrease a number by a certain percentage?
24. How do you find the midpoint between two points?
25. What types of angles form when two lines intersect?
26. How do you find the circumference of a circle?
27. How do you find the length of an arc in a circle?
28. How do you find the area of a circle?
29. How do you multiply binomials?
30. How do you add and subtract polynomials?
31. How do you multiply monomials?
32. How do you add and subtract monomials?
33. How do you factor the difference of two squares?
34. What does solving *in terms of* mean?
35. How do you solve a linear equation?
36. How do you evaluate an algebraic expression?
37. If given an equation of a line, how do you find its slope?
38. If given an equation of a line, how do you find its y -intercept?
39. How do you find the median of a set of numbers?
40. How do you find the mode of a set of numbers?
41. How do you count the total number of possible outcomes of more than one event?

42. How do you calculate the probability that an event will take place?
43. How do you determine the absolute value of a number?
44. How do you multiply expressions with exponents that have a common base?
45. How do you divide expressions with exponents that have a common base?
46. How do you raise a power to a power?
47. How do you multiply and divide roots?
48. How do you simplify square roots?
49. How do you add and subtract roots?
50. How do you simplify an algebraic fraction?
51. How do you know if an integer is a multiple of 3 or 9?
52. How do you find the distance between two points on a coordinate graph?
53. How do you find the slope when given two points on a line?
54. How do you find the domain of a function?
55. How do you find the range of a function?
56. Describe inverse variation.
57. Describe direct variation.
58. What is a function, and how do you evaluate one?
59. How do you solve a radical equation?
60. How do you solve an inequality?

61. How do you solve a quadratic equation?
62. What is the Pythagorean Theorem?
63. How do you add and subtract fractions?
64. How do you simplify fractions to lowest terms?
65. What is the definition of a remainder?
66. How do you know if an integer is a multiple of 5 or 10?
67. How do you know if an integer is a multiple of 2 or 4?
68. How do you know if the sum, difference, or product of several numbers will be even or odd?
69. How do you find the least common multiple (LCM) of two or more numbers?
70. How do you find the greatest common factor (GCF) of two or more numbers?
71. What are the numbers that are relatively prime?
72. What is prime factorization of a number?
73. What is the difference between a factor and a multiple?
74. How do you express the intersection of a set?
75. How do you express the union of a set?
76. How do you count consecutive integers?
77. How do you multiply and divide positive and negative numbers?

78. Explain the memory device PEMDAS.
79. How do you add a positive number to a negative number?
80. What is the definition of an irrational number?
81. What is the definition of a rational number?
82. What is the definition of an integer?
83. How do you find the missing number in a series when you are given the average?
84. If you have an average of a series of numbers, how can you find their sum?
85. How do you quickly find the average of a series of evenly spaced numbers?
86. How do you find the average rate?
87. What is the formula to used to find average?
88. How do you solve a proportion?
89. How do you solve a problem involving rates?
90. How do you convert part-to-part ratios to part-to-whole ratios?
91. How do you set up a ratio?
92. When given a series of percent increases and decreases, how do you determine the ending value?

93. How do you factor a polynomial (or perform FOIL "in reverse")?
94. How do you identify which number of a fraction is the part and which number is the whole?
95. How do you find the volume of a cylinder?
96. How do you find the volume of a cube?
97. How do you find the volume of a rectangular solid?
98. How do you find the surface area of a rectangular solid?
99. What is an important property of a line tangent to a circle?
100. How do you find the area of a sector?

Multiple Choice

1. Vito read 96 pages in 2 hours and 40 minutes. What was Vito's average rate of pages per hour?
- A. 24 B. 30 C. 36 D. 42 E. 48
2. For how many integer values of x will $\frac{7}{x}$ be greater than $\frac{1}{4}$ and less than $\frac{1}{3}$?
- A. 6 B. 7 C. 12 D. 28 E. infinitely many
3. If $x = -5$, then $2x^2 - 6x + 5$?
- A. -15 B. 15 C. 25 D. 85 E. 135

4. Which of the following is the solution statement for the inequality $-3 < 4x - 5$?

- A. $x > -2$ B. $x > \frac{1}{2}$ C. $x < -2$ D. $x < \frac{1}{2}$ E. $x < 2$

5. Martin's average score after four tests is 89. What score on the fifth test would bring Martin's average up to exactly 90?

- A. 90 B. 91 C. 92 D. 93 E. 94

6. In 1990, the population of Town A was 9,400, and the population of Town B was 7,600. Since then, the population of Town A has decreased by 100 each year, and the population of Town B has increased by 100 each year. Assuming that in each case the rate continues, in what year will the two populations be equal?

- A. 1998 B. 1999 C. 2000 D. 2008 E. 2009

7. What is the slope of the line determined by the equation $5x - 4y = 3$?

- A. $-\frac{4}{3}$ B. $-\frac{5}{4}$ C. $-\frac{4}{5}$ D. $\frac{4}{5}$ E. $\frac{5}{4}$

8. Jan types at an average rate of 12 pages per hour. At that rate, how long will it take Jan to type 100 pages?

- A. 8 hours and 3 minutes B. 8 hours and 15 minute
C. 8 hours and 20 minutes D. 8 hours and 30 minutes e. 8 hours and $33\frac{1}{3}$ minutes

9. If $f(x) = x^2 - x$, then $f(-10) = ?$

- A. -110 B. -90 C. -10 D. 90 E. 110

10. For all x , $(3x + 4)(4x - 3) = ?$

- A. $7x + 1$ B. $7x - 12$ C. $12x - 12$ D. $12x^2 - 12$ E. $12x^2 + 7x - 12$

11. If the equation $x^2 + kx + 36 = 0$ has exactly one real solution for x , which of the following COULD be the value of k ?

- A. -6 B. 0 C. 6 D. 12 E. 18

12. A rug that normally costs \$75 is on sale for 20 percent off the regular price. If a sales tax of 5 percent is added to the sale price, what is the total cost of the rug?

- A. \$55.00 B. \$57.50 C. \$60.50 D. \$61.50 E. \$63.00

13. For all w , $(3w-5)^2 = ?$

- A. $9w^2 - 30w + 25$ B. $9w^2 + 15w + 25$ C. $9w^2 - 2w + 25$
D. $9w^2 - 25$ E. $9w^2 + 25$

14. How many units apart are the points $P(-1, -2)$ and $Q(2, 2)$ in the standard (x, y) coordinate plane?

- A. 2 B. 3 C. 4 D. 5 E. 6

15. If the length of one side of a triangle is 5 inches and the length of another side is 8 inches, which of the following could NOT be the length, in inches, of the third side?

- A. 3 B. 5 C. 8 D. 11 E. 12

16. How many feet long is the diameter of a circle with a circumference of 36π feet?

- A. 12 B. 18 C. 6π D. 36 E. 18π

17. A triangle has sides with lengths of 6, 8, and 10 units, and a square has a perimeter of 28 units. What is the positive difference, in square units, between the area of the triangle and the area of the square?

- A. 1 B. 4 C. 25 D. 100 E. 148

18. When $\frac{4}{11}$ is written as a decimal, what is the 100th digit after the decimal point?

- a. 3 b. 4 c. 5 d. 6 e. 7

19. Which of the following numbers is the greatest: 1^{32} , 36^1 , 3^6 , 3^{12}

20. $(-2)^{-3} + (-3)^{-2}$?

21. For all x , $3x^2 \times 5x^3 = ?$

22. In the standard (x, y) coordinate plane, points P and Q have coordinates $(2, 3)$ and $(12, -15)$, respectively. What are the coordinates of the midpoint of \overline{PQ} ?

23. What is the complete factorization of $2x + 3x^2 + x^3$?

24. For all x and y , $(x + 5y)^2$

25. What is the value of x if, $\frac{x}{3} + \frac{x}{4} = 1$?

26. The line that passes through the points $(3, 4)$ and $(9, w)$ in the standard (x, y) coordinate plane has the slope 2. What is the value of w ?

27. Mary's car gets 30 miles per gallon in the city and 40 miles per gallon on the highway. Which of the following general equations determines the number of gallons, g , Mary uses to drive c miles in the city and h miles on the highway?

a. $g = 30c + 40h$ b. $g = 40c + 30h$ c. $g = \frac{30}{c} + \frac{40}{h}$ d. $g = \frac{40}{c} + \frac{30}{h}$ e. $g = \frac{c}{30} + \frac{h}{40}$

28. What is the solution for x in the system of equations:

$$3x + 4y = 31$$

$$3x - 4y = -1$$

29. Harry is a piano student who can learn two pieces in a week. If his piano teacher gives him three pieces every week for four weeks, how many weeks will Harry need to learn all these pieces?

30. In a group of 25 students, 16 are female. What percentage of the group is female?

31. June, Maria, and Billy each have a collection of marbles. June has 20 more marbles than Billy, and Maria has three times as many marbles as Billy. If all together they have 100 marbles, how many marbles does Billy have?

32. What is the greatest integer that is a factor of both 8×10^9 and 6×10^3 ?

33. John wants to make a fruit salad. He has a recipe that serves 6 people and uses 4 oranges, 5 pears, 10 apples, and 2 dozen strawberries. If he wants to serve 18 people, how many pears will John need?

34. $9^{-\frac{3}{2}} = ?$

35. In a group of 50 students, 28 speak English, and 37 speak Spanish. If everyone in the group speaks at least one of the two languages, how many speak both English and Spanish?

36. What is the average of the expressions $2x + 5$, $5x - 6$, and $-4x + 2$?

37. If the sine of an angle is -0.6 and its cosine is -0.8 , what is its tangent?

38. If the ratio of males to females in a group of students is $3:5$, which of the following COULD be the total number of students in the group?

- a. 148 b. 150 c. 152 d. 154 e. 156

39. Joan has q quarters, d dimes, n nickels, and no other coins in her pocket. Which of the following represents the total number of coins in her pocket?

- a. $q + d + n$ b. $5q + 2d + n$ c. $0.25q + 0.10d + 0.05n$ d. $(25 + 10 + 5)(q + d + n)$ e. $25q + 10d + 5n$

40. In a certain club, the average age of the male members is 35, and the average age of the female members is 25. If 20% of the members are male, what is the average age of all the club members?