

$$\frac{3x + 6}{(x - 1)^2} - \frac{3}{x - 1}$$

1. The expression above is equivalent to $\frac{a}{(x-1)^2}$, where a is a positive constant and $x \neq 1$. What is the value of a ? [NO CALC]

$$\frac{2x + 7}{(x + 3)^2} - \frac{2}{x + 3}$$

2. The expression above is equivalent to $\frac{a}{(x+3)^2}$, where a is a positive constant and $x \neq -3$. What is the value of a ? [NO CALC]

3. In the xy -plane, the point $(3, 4)$ lies on the graph of the function f . If $f(x) = k - x^2$, where k is a constant, what is the value of k ?
4. In the xy -plane, the point $(1, 3)$ lies on the graph of the function f . If $f(x) = k - 2x^2$, where k is a constant, what is the value of k ?
5. In the xy -plane, the point $(2, 10)$ lies on the graph of the function f . If $f(x) = k - 3x^2$, where k is a constant, what is the value of k ?

6. Mr. Pink drives 17.9 miles to work at an average rate of 70 miles per hour. One day, however, there was traffic, and the travel time for Mr. Pink increased by 33%. Approximately how many more minutes did it take Mr. Pink to arrive at his workplace on that day?
7. Mr. Yellow drives 19.8 miles to work at an average rate of 40 miles per hour. One day, however, Mr. Yellow decided to speed, and the travel time for Mr. Yellow decreased by 20%. Approximately how many fewer minutes did it take for Mr. Yellow to arrive at his workplace on that day?
8. Mr. Blue drives 27.9 miles to work at an average rate of 35 miles per hour. One day, however, Mr. Blue decided to speed, and the travel time for Mr. Blue decreased by 15%. Approximately how many fewer minutes did it take for Mr. Blue to arrive at his workplace on that day?
9. If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $9z + 18y$?
- A) $(a + 3b)^2$
 - B) $(3a + 3b)^2$
 - C) $(9a + 9b)^2$
 - D) $(9a + 18b)^2$
10. If $b^2 + ab = z$ and $a^2 = y$, which of the following is equivalent to $4z + y$?
- A) $(a + 2b)^2$
 - B) $(2a + b)^2$
 - C) $(2a + 2b)^2$
 - D) $(2a + 4b)^2$

11. The volume of a right circular cylinder A is 44 cubic centimeters. What is the volume, in cubic centimeters, of a right circular cylinder with half the radius and twice the height of cylinder A ?

12. The volume of a right circular cylinder B is 22 cubic centimeters. What is the volume, in cubic centimeters, of a right circular cylinder with twice the radius and the same height of cylinder B ?

$$y = x^2$$

$$2y - 8 = 2(x + 2)$$

13. If (x,y) is a solution of the system of equations above and $x > 0$, what is the value of xy ?

$$y = x^2$$

$$2y - 18 = 2(x + 3)$$

14. If (x,y) is a solution of the system of equations above and $x > 0$, what is the value of xy ?

15. One morning, Mr. Green drove directly from his home to his workplace in 42 minutes. If his workplace was 19.6 miles away, what was his average speed, in miles per hour, during his drive that morning? [Round to nearest whole number]
16. One morning, Mr. Burgundy drove directly from his home to his workplace in 36 minutes. If his workplace was 18.6 miles away, what was his average speed, in miles per hour, during his drive that morning? [Round to nearest whole number]
17. At a restaurant, n cups of lemonade are made by adding L lemons to cold water. If $L = n + 4$, how many additional lemons are needed to make each additional cup of lemonade?
- A) None
 - B) One
 - C) Two
 - D) Three

Answers:

1. 9
2. 1
3. 13
4. 19
5. 22
6. 5
7. 6
8. 7
9. B
10. A
11. 22
12. 88
13. 27
14. 64
15. 28
16. 31
17. B