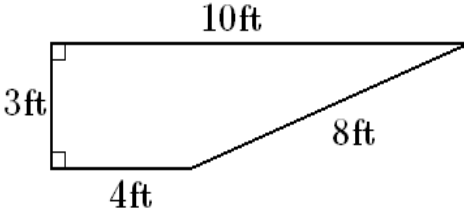


1. Perform the division with remainder: $2016 \div 17$
2. List all factors of 84.
3. Consider the following numbers: 2011, 11 060 904, 321, 3106. Select all the numbers from the list that are divisible
 - a) by 2
 - b) by 3
 - c) by 6
4. Which of the following numbers is a prime? 2007, 143, 151, 91
5. Compute the greatest common factor and least common multiple of 90 and 120.
6. Label each of the following statements as true or false.
 - a) Every integer is a rational number.
 - b) Every positive integer can be written as a product of primes.
 - c) If a is divisible by 2 and b is divisible by 3, then the product ab is divisible by 6.
 - d) If the product ab is divisible by 6, then a is divisible by 2 and b is divisible by 3 (or vica versa, i.e. a is divisible by 3 and b is divisible by 2.)
 - e) If the product ab is divisible by 7, then a is divisible by 7 or b is divisible by 7.
 - f) The sum of two consecutive integers is always an odd number.
7. Find the smallest positive integer that is divisible by 2, 3, 4, 5, and 6.
8. Consider a rectangle with sides 15 m and 12 m long.
 - a) Compute the perimeter of the rectangle. Include units in your computation and answer.
 - b) Compute the area of the rectangle. Include units in your computation and answer.
9. Consider the figure shown on the picture.
 - a) Find the perimeter and area of the figure. Include units in your computation and answer.
 - b) Suppose suddenly all sides are doubled. Compute the perimeter and area of this larger figure. Did the perimeter increase to its double? Did the area?
10. Consider a right triangle with sides 7 cm, 24 cm, and 25 cm long.
 - a) Compute the perimeter of the triangle. Include units in your computation and answer.
 - b) Compute the area of the triangle. Include units in your computation and answer.
11. Simplify each of the following.
 - a) -3^2
 - b) $-|-6|$
 - c) $12 \div 3 \cdot 2$
 - d) $15 - 3 + 2$
 - e) $12 - 2(7 - 4 \cdot 3)$
 - f) $|-8 + 5|$
 - g) $-\sqrt{49}$
 - h) $\sqrt{-49}$
 - i) -2^2
 - j) $(-2)^2$

12. Simplify each of the following.

a) $|-3^3 - 2| - 5 - 2(-4)|$

b) $\sqrt{-4^2 - (-1)^4 + 2 \cdot 3^2 \div 2 \cdot 6 - 1}$

c) $-3^2 - |-12 + 2 \cdot 5| - 2 + 1$

d) $-2^2 - 5(-2)$

e) $-3^2 - 2(4 - 5^2 + 3(10 - 7 + 2))$

f) $\sqrt{6^2 - 5\sqrt{16}}$

g) $\frac{1}{2} - \frac{3}{5} \cdot \left(-\frac{4}{7}\right)$

h) $\left(-\frac{1}{2}\right)^2 - \left(-\frac{1}{2}\right)^3 - \left(-\frac{1}{2}\right)^4$

i) $\frac{24 - (-2)^2 + 12 - 3 + 1}{-3^2 - 12 \div 3(-2)}$

j) $|3 - 2 - |8 - 10||$

k) $|3 - |2 - 8| - 10|$

l) $|3 - 2| - 8 - 10||$

13. Add the algebraic expressions as indicated.

a) $(2a + 3b) + (-2a + 7b)$

b) $(3x - y + 2) + (-x + 6y - 2)$

c) $(3m - 4n) + (5m)$

14. Subtract the algebraic expressions as indicated.

a) $(2a + 3b) - (-2a + 7b)$

b) $(3x - y + 2) - (-x + 6y - 2)$

c) $(3m - 4n) - (5m)$

15. Multiply the algebraic expressions as indicated.

a) $(2a + 3b)(-2a + 7b)$

b) $(3x - y)(-x + 6y)$

c) $(3m - 4n)(5m)$

16. Simplify the algebraic expressions as indicated.

a) $-3(2a + 3b) + 5(-2a + 7b)$

d) $5x - 3(2x - y)$

b) $2(3x - y + 2) - 6(-x + 6y - 2)$

e) $-3m(3m - 4n) + 4n(5m)$

c) $2x(3x - y) - 5y(-x + 4y)$

f) $-y + 2(3x - y) - (2x - y) + 2(-2x + y)$

17. Multiply the algebraic expressions as indicated.

a) $(x + 1)(3x - 5)$

d) $(3x^5 - 2)(3x^5 + 2)$

g) $(3a^3 - 1)^2$

b) $(3x - y)^2$

e) $(5x + 2)(5x - 2)$

c) $(3a - 4b)(5ab)$

f) $(5x - 2)^2$

h) $(3m - 2)(6m + 9m^2 + 4)$

18. Simplify each of the following.

a) $(2x - 1)^2 - 3x(x - 5)$

c) $(2x - 1)(x - 3) - 2(x - 4)^2$

b) $(-x + 2)^2 - (2x - 1)(x + 8)$

d) $x(2x - 5) - 3(2x + 1) - (x - 4)^2$

19. Evaluate the algebraic expression $\frac{-x + 2x^2 - 1}{x - 1}$ if

a) $x = 5$

b) $x = -5$

c) $x = 1$

d) $x = -1$

e) $x = -\frac{1}{2}$

20. Consider the equation $2x^3 - 10(x^2 - 2) + 4x = -x^2 + 5$. For each of the following numbers given, determine whether it is a solution of the equation or not.

a) $x = -2$

b) $x = -1$

c) $x = 3$

d) $\frac{1}{2}$

e) $\frac{5}{2}$

21. Solve each of the following equations. Make sure to check your solutions.

a) $-3x + 5 = 20$

d) $\frac{x}{3} - 8 = -2$

h) $2x^2 + 6x = 0$

b) $\frac{3}{8}y + \frac{1}{2} = \frac{1}{4}$

e) $5a - 3 = -3a + 21$

i) $(x - 4)(x + 7) = 0$

c) $\frac{x - 8}{3} = -2$

f) $\frac{1}{3}x - \frac{4}{5} = \frac{1}{2}x - \frac{9}{5}$

j) $x(x - 2)(x + 1) = 0$

g) $x^3 = 8x^2$

k) $5(x - 2)(x + 1) = 0$

l) $3(y - 1) - 5(3y + 2) = -13(y + 1)$

p) $\frac{2x - 1}{5} - \frac{x - 1}{4} = x - 11$

m) $4(x - 3) - 2(x - 1) = x - 2(4 - x)$

n) $(2x + 1)(2x - 5) = (x - 2)(4x - 1)$

o) $(3x - 1)^2 - (5 - 2x)^2 = 5(x - 3)^2 - 25$

q) $\frac{2x - 5}{3} - \frac{3x - 1}{4} = 2x + 9$

22. Solve each of the following problems.

a) Roger got an 8% raise at work. Now he makes \$2376 a month. How much was he making before the raise?

b) Express two consecutive increases of a 15% and 20% as a single increase.

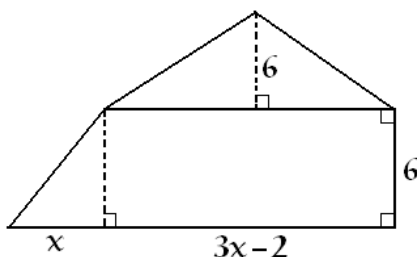
c) Express an increase by 20% and then a decrease by 20% as a single change. Is it an increase or a decrease?

d) Revisit part c) but this time we decrease first by 20% and then we increase by 20%. Does this change the answer? Why or why not?

e) Our favorite desk went on a 16% sale! The sale price was \$352.8. What was the original price of the desk?

f) We place \$1000 in a bank account, with an annual compound interest rate of 8%. How much money will be there in the account after 25 years if we never deposit or withdraw any amount until then?

23. Find the value of x based on the picture, given that the object shown has an area of 72 unit².



24. What is the last digit of the number 2^{99} ?

Answers

1. 118 R 10
2. 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
3. a) 11 060 904, 3106 b) 11 060 904, 321 c) 11 060 904
4. 151
5. 360
6. a) true b) false (1 is the only exception, though) c) true d) false e) true f) true
7. 60
8. a) $P = 54 \text{ m}$ b) $A = 180 \text{ m}^2$
9. a) $P = 25 \text{ ft}$ $A = 21 \text{ ft}^2$ b) $P_{\text{new}} = 50 \text{ ft}$ - doubled $A_{\text{new}} = 84 \text{ ft}^2$ - quadrupled
10. a) $P = 56 \text{ cm}$ b) $A = 84 \text{ cm}^2$
11. a) -9 b) -6 c) 8 d) 14 e) 22 f) 3 g) -7 h) undefined i) -4 j) 4
12. a) 33 b) 6 c) -12 d) 6 e) 3 f) 4 g) $\frac{59}{70}$ h) $\frac{5}{16}$ i) -30 j) 1
k) 13 l) 33
13. a) $10b$ b) $2x + 5y$ c) $8m - 4n$
14. a) $4a - 4b$ b) $4x - 7y + 4$ c) $-2m - 4n$
15. a) $-4a^2 + 8ab + 21b^2$ b) $-3x^2 + 19xy - 6y^2$ c) $-20mn + 15m^2$
16. a) $-16a + 26b$ b) $12x - 38y + 16$ c) $6x^2 + 3xy - 20y^2$ d) $-x + 3y$ e) $-9m^2 + 32mn$ f) 0
17. a) $3x^2 - 2x - 5$ b) $9x^2 - 6xy + y^2$ c) $15a^2b - 20ab^2$ d) $9x^{10} - 4$
e) $25x^2 - 4$ f) $25x^2 - 20x + 4$ g) $9a^6 - 6a^3 + 1$ h) $27m^3 - 8$
18. a) $x^2 + 11x + 1$ b) $-x^2 - 19x + 12$ c) $9x - 29$ d) $x^2 - 3x - 19$
19. a) 11 b) -9 c) undefined d) -1 e) 0
20. a) no, $-44 \neq -2$ b) yes, $4 = 4$ c) yes, $-4 = -4$ d) no, $\frac{79}{4} \neq \frac{19}{4}$ e) yes, $-\frac{5}{4} = -\frac{5}{4}$
21. a) -5 b) $-\frac{2}{3}$ c) 2 d) 18 e) 3 f) 6 g) $0,8$ h) $-3,0$ i) $-7,4$
j) $-1,0,2$ k) $-1,2$ l) 0 m) -2 n) 7 o) 1 p) 13 q) -5
22. a) $\$2200$ b) 38% increase c) 4% decrease d) same 4% decrease e) $\$420$ f) $\$6848.48$
23. 3
24. 8

Last revised: September 22, 2016