

1. Perform indicated operations with fractions and decimals:

a.  $-\frac{3}{7} \cdot \frac{14}{15} =$

b.  $\frac{3}{4} - \frac{2}{5} =$

c.  $\frac{5}{18} + \frac{1}{12} =$

d.  $\frac{5}{18} \div \frac{20}{27} =$

2. What is the least common denominator of fractions:  $\frac{8}{21}$  *and*  $\frac{9}{14}$

3. The fraction  $-\frac{9}{7}$  lies between which two numbers (choose correct answer from a list below)?

- a.  $-9$  and  $-7$
- b.  $-3$  and  $-2$
- c.  $-1$  and  $0$
- d.  $-2$  and  $-1$

4. What is the meaning of  $-10^3$  (choose correct answer from a list below)?

- a.  $(-10)(-10)(-10)$
- b.  $-(10 \cdot 10 \cdot 10)$
- c.  $(-10)(3)$
- d.  $\left(\frac{1}{10}\right)(3)$

5. Simplify the algebraic expressions. Express your answer as an integer or simplified fraction:

a.  $7 - 3 \cdot 8 \div [6 \cdot (3 - 4)] =$

b.  $3^2 - 2^3 \cdot \sqrt{36} \div 4 =$

c.  $\frac{7 - 4^2}{3 \cdot 2 - 9} =$

6. Find the value of each expression when when  $x = -3$  and  $y = -1$ .

a.  $3x^2 - x^3 + 3x =$

b.  $5y^2 - 2xy + 7y =$

7. Simplify each algebraic expression.

a.  $-4x^3(5x^4 + 2) =$

b.  $8(4x^3 - 3x^2 + 2) - 5(5x^3 + 6x + 7) =$

8. Solve each of the following equations, express your answer as an integer or simplified fraction:

(a)  $-\frac{4}{9}x = \frac{8}{15}$

(b)  $8 - 4x - 10 = 7x - 15 - 9x$

(c)  $9 - 3(7 - 2x) = -8 + 5(x - 4)$

9. A 2007 Ford Taurus can travel 110 miles on 5 gallons of gas. How far can it travel on 7 gallons of gas?

10. On a map 0.5 inch represent 28 miles. What will be the length on the map that corresponds to a distance of 70 miles?

11. Translate the following statement into an algebraic expression.

**Ten less than three times a number**

12. Translate the following statement into an equation.

**Sam jogs 5 times as far as Nancy. The total distance travelled by both people is 24 miles.**

13. Solve each inequality and graph its solution on the number line:

(a)  $-6x \leq -18$

(b)  $-3x + 2 > 2x - 12$

(c)  $12x - 5(x - 3) \geq 10x - 18$

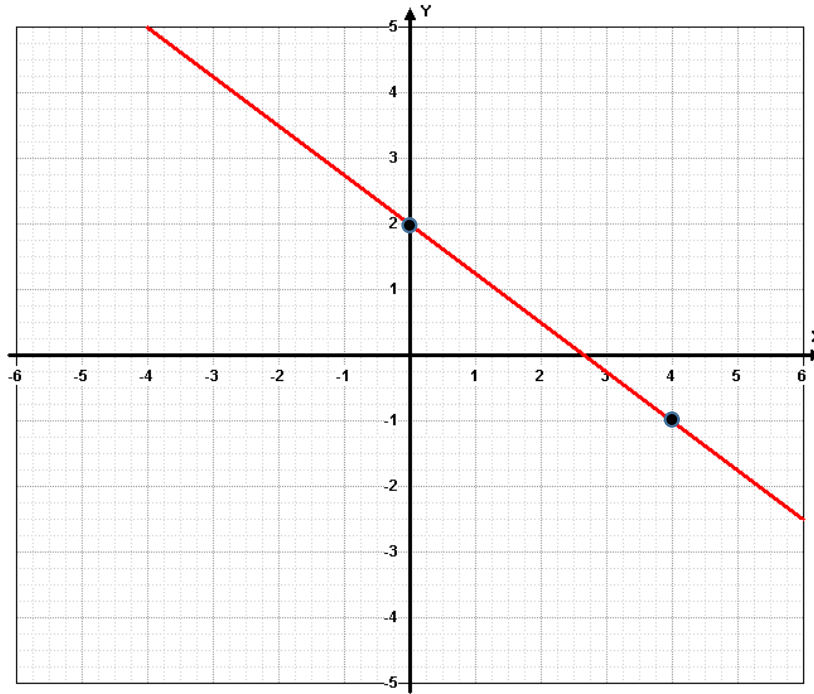
14. Simplify each exponential expression:

(a)  $(-3z^4)(-2z^3) =$

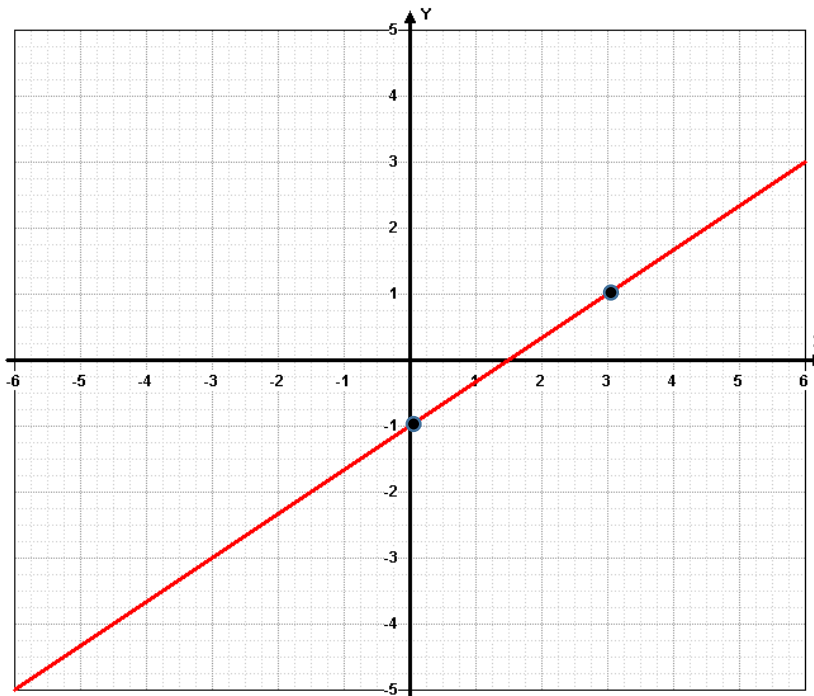
(b)  $(-2x)^4 =$

(c)  $\frac{12x^7y^3}{8x^3y^5} =$

15. Determine the slope of a given line:



16. Determine the linear equation for the graph below:



17. What is the slope of the line passing through the points  $(-2,1)$  and  $(-14,7)$ ?

(One of the following formulas may be needed)

$$y = mx + b \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad y - y_1 = m(x - x_1) \qquad Ax + By = C$$

18. What is the slope of the following line?

$$y = -\frac{2}{5}x - 6$$

19. Given the point  $(0, 2)$  and a slope of  $-\frac{4}{7}$ , write the equation of the line in slope-intercept form.

(One of the following formulas may be needed)

$$y = mx + b \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad y - y_1 = m(x - x_1) \qquad Ax + By = C$$

20. Given the following linear equation, determine which ordered pair is a solution to the equation. Choose the answer from the list below.

$$3x - 7y = -6$$

- a.  $(3, -7)$
- b.  $(\frac{1}{3}, 1)$
- c.  $(0, -6)$
- d.  $(0, 1)$

21. Graph the following equations:

(a)  $x = 2$

(b)  $y = -3x + 4$

22. Find the product and simplify:

(a)  $(6x - 1)(3x + 5)$

(b)  $(4x - 5)(4x + 5)$

23. Find the sum and simplify.

$$(12xy^2 + 4x^2y - 10x) + (8 - 9x^2y + 7xy^2) + (-5x - 6xy^2 + 7)$$

24. Factor each polynomial completely:

(a)  $80x^5y^3 - 36x^3y + 28x^4y^2$

(b)  $10z^3 + 25z^2 - 6z - 15$

(c)  $81y^2 - 4x^2$

(d)  $x^2 - 8x + 15$

(e)  $2x^2 - x - 6$

25. Write each rational expression in the lowest terms:

(a)  $\frac{5x^2(x-2)}{10x(x+2)(x-2)}$

(b)  $\frac{x^2+2x-15}{6x+30}$

26. Perform indicated operation and simplify if needed.

(a)  $\frac{2x-7}{x+9} \div \frac{(x-3)(2x-7)}{x+9}$

(b)  $\frac{5}{6x} - \frac{3}{2x}$

(c)  $\frac{12x-20}{5x} \cdot \frac{6}{9x-15}$

27. Write each exponential equation as a radical.

(a)  $5^{1/3}$

(b)  $z^{4/7}$

28. Find the value of the exponential expression:  $(-27)^{4/3}$

29. Which of the following statements is true (chose **one** correct statement):

(a)  $125^{-1/3} = -5$

(b)  $125^{-1/3} = \frac{1}{5}$

(c)  $125^{-1/3} = -\frac{1}{5}$

(d)  $125^{-1/3} = -\frac{125}{3}$

30. Simplify each exponential expression.

(a)  $(x^{3/7})(x^{2/7}) =$

(b)  $\frac{y^{3/4}}{y^{1/4}} =$

31. Simplify each radical expression

(a)  $\sqrt{75} =$

(b)  $\sqrt{8x^{14}y^{11}} =$

(c)  $4\sqrt[3]{5} - 8\sqrt[3]{5} =$

(d)  $3\sqrt{12} - 5\sqrt{3} =$

(e)  $\sqrt[3]{4} \cdot \sqrt[3]{2} =$

32. Rationalize the denominator and simplify if needed.

(a)  $\frac{3}{\sqrt{5}}$

(b)  $\frac{7}{2-\sqrt{10}}$

33. Solve each absolute value equation.

(a)  $|6 - 5x| = 14$

(b)  $|8x + 1| = -3$

34. Solve each given equation.

(a)  $(2x - 5)^2 = 9$

(b)  $x^2 - 40 = 0$

(c)  $x^2 + 2x - 1 = 0$

(d)  $2x^2 - 7x - 9 = 0$

(e)  $\sqrt{5x + 1} = 4$

(f)  $\sqrt{5 - x} = x + 1$

35. Solve each formula for specified variable.

(a)  $A - B = C(x + t)$  for  $x$

(b)  $5x - 3y = zy + 2$  for  $y$

36. Determine whether each relation represent a function:

(a)  $\{(3, 5), (-2, 0), (8, -4), (7, 5)\}$

(b)  $\{(-6, 1), (4, 7), (-6, 3), (4, -9)\}$

37. Find the domain and range of the function,  $f(x) = \{(7, -4), (0, 8), (12, 0), (-9, 24), (3, 10)\}$ .

38. For the functions  $f(x) = 3x$  and  $g(x) = 2x^2 + 1$ , find the following:

(a)  $g(y - 4)$

(b)  $f(z + 12)$

(c)  $g(2) + f(3)$

39. Graph the solution of each given inequality.

(a)  $x - 2y \geq 8$

(b)  $6x - 4y < 12$

40. Write the equation of the line that passes through the point  $(-2, 4)$  and has a slope of  $\frac{3}{4}$

(One of the following formulas may be needed)

$$y = mx + b \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad y - y_1 = m(x - x_1) \qquad Ax + By = C$$

41. Write the equation of the line that passes through the point  $(-5, 6)$  and has undefined slope.

42. Write the equation of the line that passes through the points  $(3, 4)$  and  $(5, 8)$ .

(Some of the following formulas may be needed)

$$y = mx + b \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad y - y_1 = m(x - x_1) \qquad Ax + By = C$$

43. Find the x-intercept and y-intercept for each of the following equations:

(a)  $3x - 8y = 12$

(b)  $x - 7 = 0$

(c)  $2x + 9y = 0$



44. Which of the following statements are TRUE about the graph of  $y = -6$ ? (There are maybe several correct statements.)

- a. It has a slope of  $-6$ .
- b. It has undefined slope.
- c. It has a zero slope
- d. It is parallel to the x-axis.
- e. It is parallel to the y-axis.
- f. It goes through the origin.
- g. It goes through the point  $(-6, 0)$
- h. It goes through the point  $(0, -6)$ .

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**Answers:**

1(a)  $-\frac{2}{5}$ ,      1(b)  $\frac{7}{20}$ ,      1(c)  $\frac{13}{36}$ ,      1(d)  $\frac{3}{8}$ ,

2. 42

3. the answer is d

4. the answer is b

5(a) 11,      5(b)  $-3$ ,      5(c) 3

6(a) 45,      6(b)  $-8$

7(a)  $-20x^7 - 8x^3$ ,      7(b)  $7x^3 - 24x^2 - 30x - 19$

8(a)  $-\frac{6}{5}$  or  $-1.2$ ,      8(b)  $\frac{13}{2}$  or  $6.5$ ,      8(c)  $-16$

9. 154 miles

10. 1.25 inch

11.  $3x - 10$

12.  $5x + x = 24$

13(a)



13(b)



13(c)



14(a)  $6z^7$ ,

14(b)  $16x^4$ ,

14(c)  $\frac{3x^4}{2y^2}$

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15.  $-\frac{3}{4}$

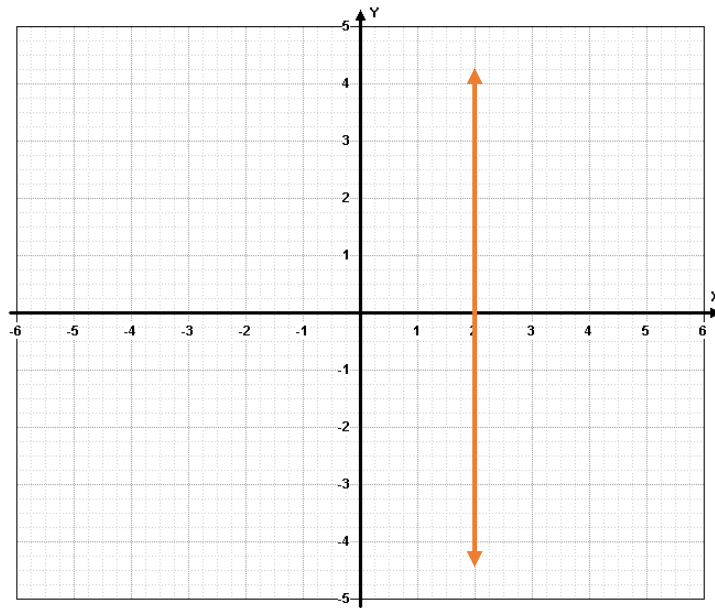
16.  $y = \frac{2}{3}x - 1$

17.  $-\frac{1}{2}$

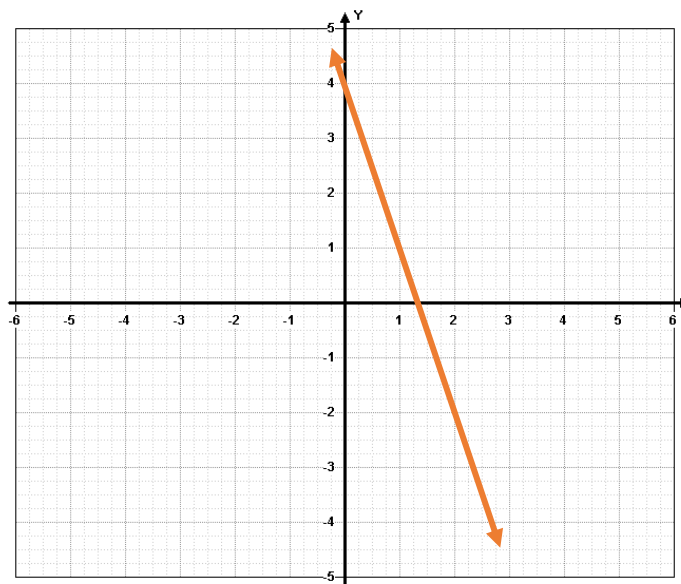
18.  $-\frac{2}{5}$

19.  $y = -\frac{4}{7}x + 2$

20. answer is b



21 (a)



21(b)

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22(a)  $18x^2 + 27x - 5$  ,      22(b)  $16x^2 - 25$

23.  $13xy^2 - 5x^2y - 15x + 15$

24(a)  $4x^3y(20x^2y^2 - 9 + 7xy)$  ,      24(b)  $(2z + 5)(5z^2 - 3)$  ,      24(c)  $(9y - 2x)(9y + 2x)$

24(d)  $(x - 5)(x - 3)$  ,      24(e)  $(x - 2)(2x + 3)$

25(a)  $\frac{x}{2(x+2)}$  ,      25(b)  $\frac{x-3}{6}$

26(a)  $\frac{1}{x-3}$  ,      26(b)  $-\frac{2}{3x}$  ,      26(c)  $\frac{8}{5x}$

27(a)  $\sqrt[3]{5}$  ,      27(b)  $\sqrt[7]{z^4}$  or  $(\sqrt[7]{z})^4$

28. 81

29. the answer is b.

30(a)  $x^{5/7}$  ,      30(b)  $y^{1/2}$

31(a)  $5\sqrt{3}$  ,      31(b)  $2x^7y^5\sqrt{2y}$  ,      31(c)  $-4\sqrt[3]{5}$  ,

31(d)  $\sqrt{3}$  ,      31(e) 2

32(a)  $\frac{3\sqrt{5}}{5}$  ,      32(b)  $-\frac{14 + 7\sqrt{10}}{6}$

33(a)  $\{-1.6, 4\}$  ,      33(b) no solution

34(a)  $\{1, 4\}$  ,      34(b)  $\pm 2\sqrt{10}$  ,      34(c)  $-1 \pm \sqrt{2}$  ,

34(d)  $\{-1, 4.5\}$  ,      34(e)  $\{3\}$  ,      34(f)  $\{1\}$

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35(a)  $\frac{A - B - Ct}{c}$ ,

35(b)  $y = -\frac{2 - 5x}{3 + z}$

36(a) function

36(b) not function

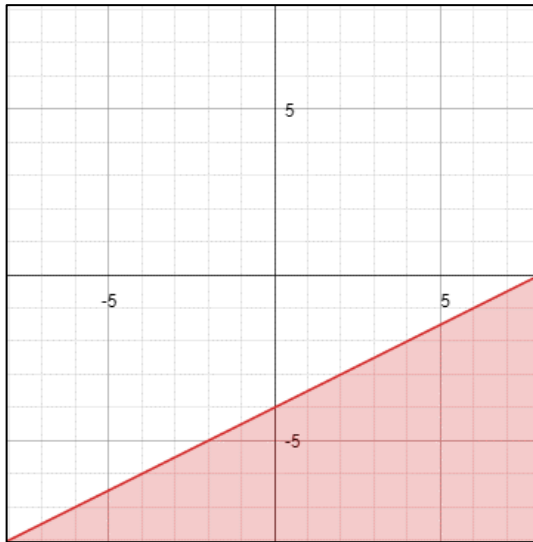
37. Domain: {7, 0, 12, -9, 3}, Range: {-4, 8, 0, 24, 10}

38(a)  $2y^2 - 16y + 33$ ,

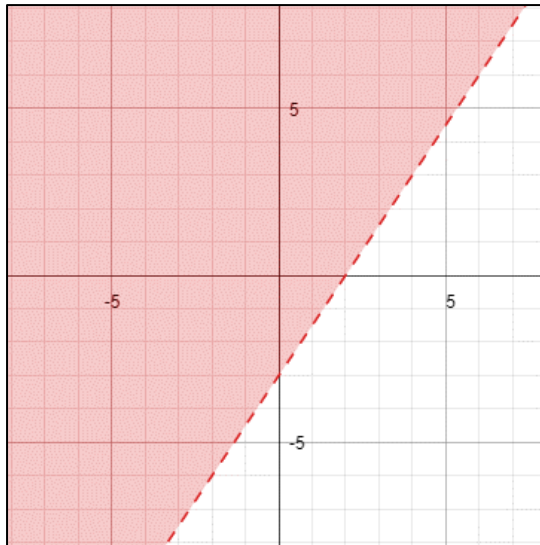
38(b)  $3z + 36$ ,

38(c) 18

39(a)



39(b)



40.  $y = \frac{3}{4}x + \frac{11}{2}$

41.  $x = -5$

42.  $y = 2x - 2$

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43(a) x-intercept:  $(4, 0)$ , y-intercept:  $(0, -1.5)$

43(b) x-intercept:  $(7, 0)$ , y-intercept: none

43(c) x-intercept:  $(0, 0)$ , y-intercept:  $(0, 0)$

44. Correct statements are c, d and h.