

Name _____ Date _____

Solve the equation.

1) $(y - 4) - (y + 5) = 5y$

2) $13(8c - 7) = 8c - 9$

3) $3(2z - 4) = 5(z + 5)$

4) $2x + 3(-2x - 5) = -16 - 3x$

5) $\frac{2x}{5} - \frac{x}{3} = 2$

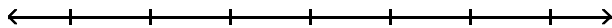
6) $\frac{17}{14}x + \frac{2}{7} = \frac{8}{7}x$

7) $\frac{4(7 - x)}{3} = x$

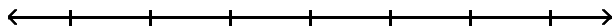
8) $\frac{3(y - 2)}{5} = 1 - 3y$

Solve the inequality. Graph the solution set and write it in interval notation.

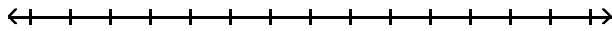
9) $-24x + 8 \leq -4(5x - 11)$



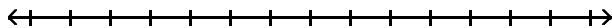
10) $25x + 5 \leq 5(4x + 5)$



11) $-32 \leq -5x + 3 \leq -12$



12) $4 \leq 2(x - 5) \leq 8$

**Solve.**

- 13) The owners of a candy store want to sell, for \$6 per pound, a mixture of chocolate-covered raisins, which usually sells for \$3 per pound, and chocolate-covered macadamia nuts, which usually sells for \$8 per pound. They have a 40-pound barrel of the raisins. How many pounds of the nuts should they mix with the barrel of raisins so that they hit their target value of \$6 per pound for the mixture?

- 14) A chemist needs 100 milliliters of a 67% solution but has only 55% and 85% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.
- 15) How can \$56,000 be invested, part at 4% annual simple interest and the remainder at 10% annual simple interest, so that the interest earned by the two accounts is equal at the end of the year?
- 16) Melissa invested a sum of money at 3% annual simple interest. She invested three times that sum at 5% annual simple interest. If her total yearly interest from both investments was \$3600, how much was invested at 3%?
- 17) Linda and Dave leave simultaneously from the same starting point biking in opposite directions. Linda bikes at 5 miles per hour and Dave bikes at 9 miles per hour. How long will it be until they are 23 miles apart from each other?
- 18) Jeff starts driving at 55 miles per hour from the same point that Lauren starts driving at 50 miles per hour. They drive in opposite directions, and Lauren has a half-hour head start. How long will they be able to talk on their cell phones that have a 400-mile range?
- 19) Eight less than three times a number is less than ten. Find all such numbers.
- 20) Three-fourths a number decreased by one is between negative five and sixteen. Find all such numbers.

Determine whether the equation is a linear equation in two variables.

21) $x = 3$

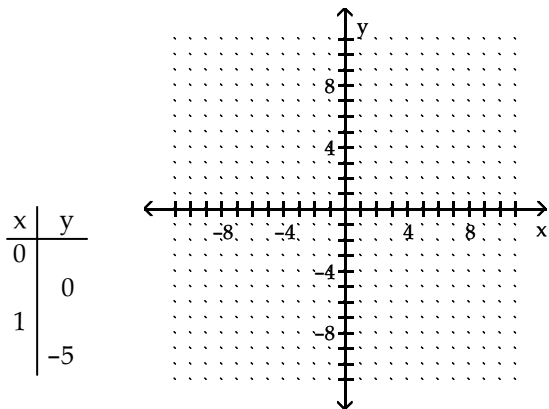
22) $3x^2 = 7y - 6$

Complete the ordered pair so that it is a solution of the given linear equation.

23) $8x + y = -52$; $(-7, \quad), (0, \quad), (1, \quad)$

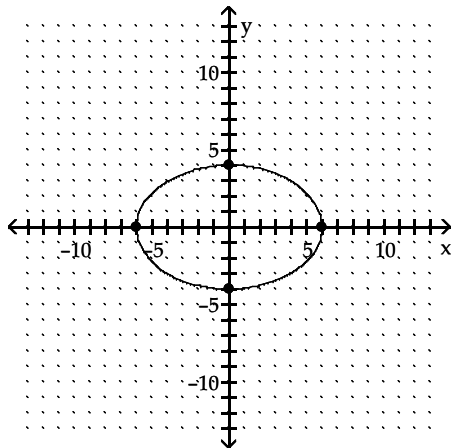
Complete the table of ordered pairs for the given linear equation; then plot the solution.

24) $5x + 2y = 10$

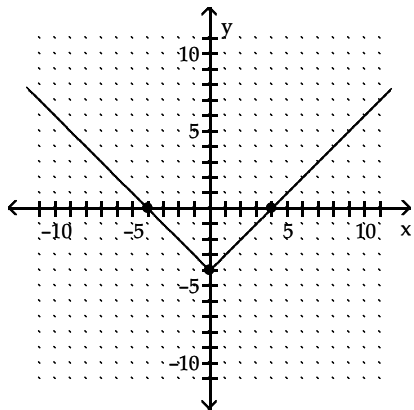


Identify the intercepts.

25)

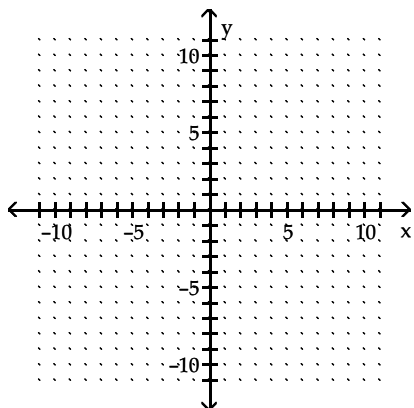


26)

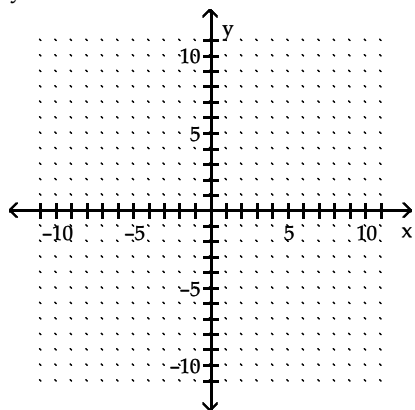


Graph the linear equation by finding x- and y- intercepts.

27) $15y - 5x = -10$

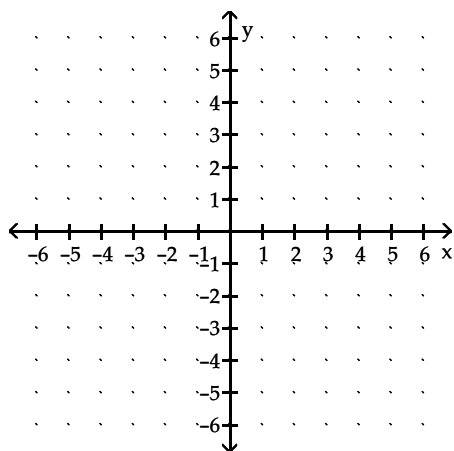


28) $y = 5x$

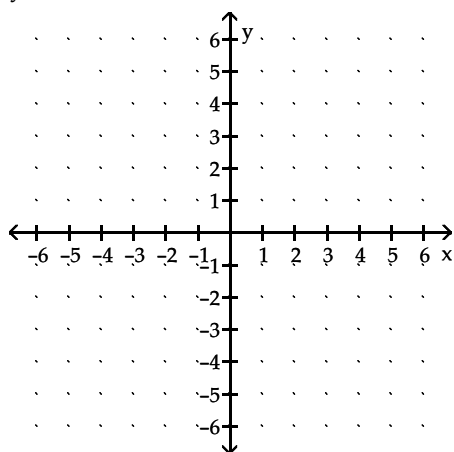


Graph the linear equation.

29) $x = -4$

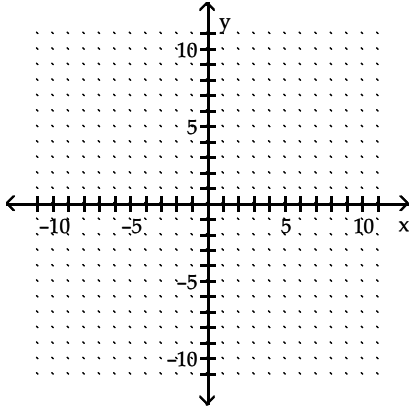


30) $y - 2 = 0$

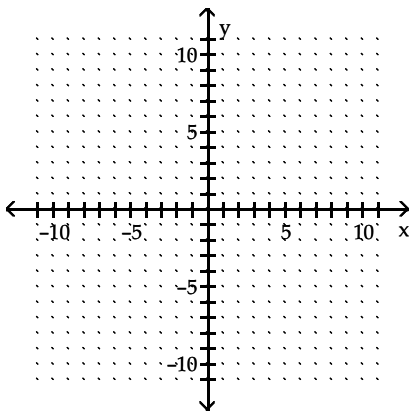


Use the slope-intercept form to graph the equation.

31) $6x + y = 0$



32) $2x + 5y = 10$



Evaluate the expression with the given replacement values.

33) $-3x^3y$; $x = 2$ and $y = -5$

34) $\frac{8}{3x^2}$; $x = -3$

Use the product rule to simplify. Write the results using exponents.

35) $g^9 \cdot g^5 \cdot g^8$

36) $(7x)(4x^5)(x^3)$

Use the quotient rule to simplify the expression.

37) $\frac{40m^{16}n^9}{5m^{15}n^7}$

Simplify the following.

38) $-8y^0$

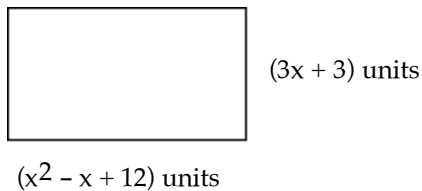
Simplify the expression. Write the result using positive exponents only.

39) $\frac{(4x^2)^3}{x^{15}}$

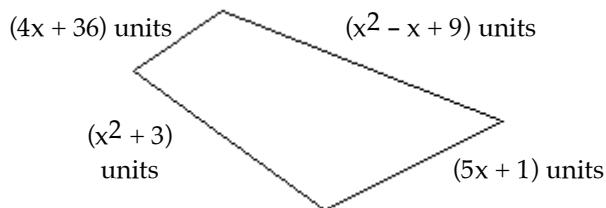
40) $(-5x^3y^{-4})(3x^{-1}y)$

Find the perimeter.

41)



42)



Perform the indicated operations.

43) $(6x^5 + 2x^4 - 7x^3 + 6) - (4x^5 - 4x^4 - 5x^3 - 5)$

44) $(-7x^4 + 9x^6 - 8 + 9x^5) - (-5 + 5x^5 + 2x^6 + 9x^4)$

Find the following product.

45) $(3z + 11)^2$

46) $(x + 1)(x^2 - x + 1)$

Perform the division.

47) $\frac{x^2 + 7x + 3}{x + 5}$

48) $\frac{8x^3 - 28x^2 + 14x + 19}{2x - 5}$

Factor out the GCF from the polynomial.

49) $48x - 8$

50) $21x^3y + 15xy^6$

Factor by grouping.

51) $xy + 11x - 5y - 55$

52) $4xy - 16x + 7y - 28$

Factor the polynomial completely. If the polynomial cannot be factored, write prime.

53) $x^3 - x^2 - 30x$

54) $5x^6 + 60x^5 + 175x^4$

55) $x^2 - 16xy + 64y^2$

56) $64x^2 + 80xy + 25y^2$

57) $r^{20} - a^2$

58) $x^4 - 625$

59) $t^3 + 1000$

60) $750x^3 - 162x^6$

Solve the equation.

61) $(5y + 29)(2y + 11) = 0$

62) $b(b + 18) = 0$

63) $49x^2 - 3 = 14x$

64) $(x + 8)(x + 1) = 44$

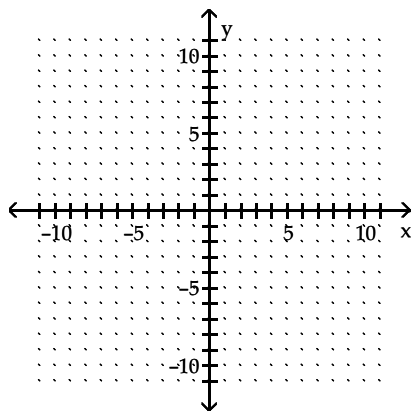
Without graphing, determine whether the system has one solution, no solution, or an infinite number of solutions.

65)
$$\begin{cases} 2x + y = 2 \\ 2x + y = 4 \end{cases}$$

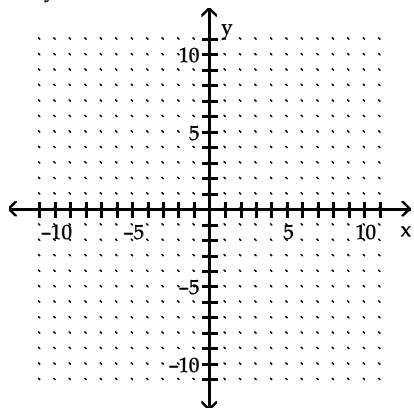
66)
$$\begin{cases} x + 6y = 24 \\ y = -\frac{1}{6}x + 4 \end{cases}$$

Solve the system of equations by graphing the equations on the same set of axes.

67)
$$\begin{cases} x + y = 1 \\ x - y = 5 \end{cases}$$



68) $\begin{cases} x + 2y = 5 \\ 3x - 2y = -9 \end{cases}$



Solve the system of equations by the substitution method.

69) $\begin{cases} 3x + y = 15 \\ 12x + 4y = 60 \end{cases}$

70) $\begin{cases} -5x - 20y = 10 \\ 6x + 24y = 0 \end{cases}$

Solve the system of equations by the addition method.

71) $\begin{cases} 3x - 5y = 7 \\ 6x - 10y = 28 \end{cases}$

72) $\begin{cases} -6x - 6y = -4 \\ 12x + 12y = 8 \end{cases}$

Simplify the rational expression.

73) $\frac{2x - 8}{12 - 3x}$

74) $\frac{4 - x}{6x - 24}$

Perform the indicated operation. Simplify if possible.

75) $\frac{2x}{x^2 - 7x + 12} - \frac{8}{x^2 - 7x + 12}$

76) $\frac{10x + 3}{x^2 + 10x + 16} - \frac{9x - 5}{x^2 + 10x + 16}$

Divide. Simplify if possible.

77) $\frac{x - 1}{-7 - x} \div \frac{x^2 - 4x - 5}{x^2 + 8x + 7}$

$$78) (x + 2) \div \frac{x^2 - 10x + 16}{8 - x}$$

Find all numbers for which the rational function is defined.

$$79) f(w) = \frac{w^2 - 25w}{5w}$$

$$80) f(x) = \frac{2x}{-3 + x}$$

Answer Key

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1) $-\frac{9}{5}$

2) $\frac{41}{48}$

3) 37

4) 1

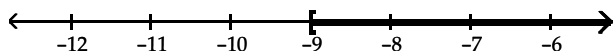
5) 30

6) -4

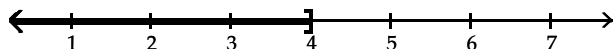
7) 4

8) $\frac{11}{18}$

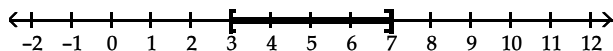
9) $[-9, \infty)$



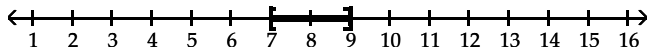
10) $(-\infty, 4]$



11) $[3, 7]$



12) $[7, 9]$



13) 60 lbs

14) 60 ml of 55%; 40 ml of 85%

15) \$40,000 invested at 4%; \$16,000 invested at 10%

16) \$20,000

17) $1\frac{9}{14}$ hrs

18) $3\frac{4}{7}$ hrs

19) $x < 6$

20) $-\frac{16}{3} < x < \frac{68}{3}$

21) yes

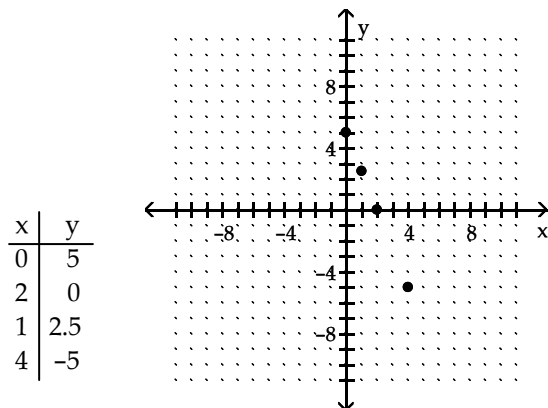
22) no

23) $(-7, 4)$ $(0, -52)$ $(1, -60)$

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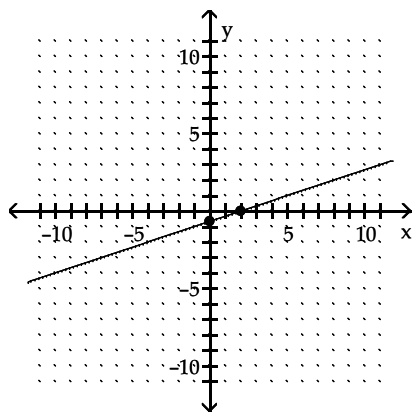
24)



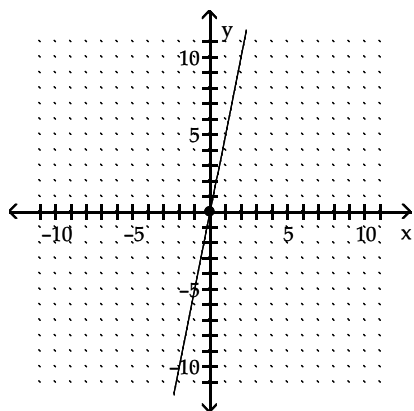
25) $(6, 0)$, $(-6, 0)$, $(0, 4)$, $(0, -4)$

26) $(4, 0)$, $(-4, 0)$, $(0, -4)$

27) $(0, -\frac{2}{3})$, $(2, 0)$



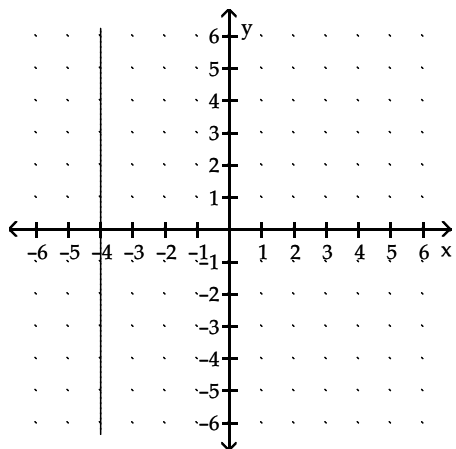
28) $(0, 0)$



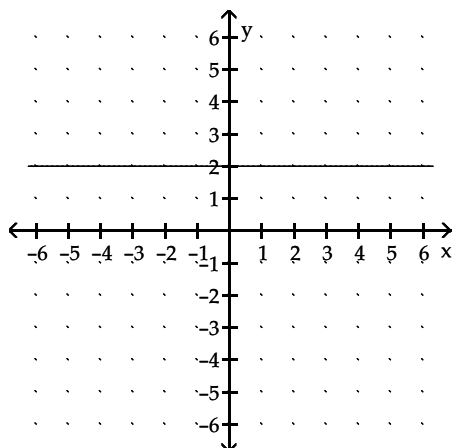
Answer Key

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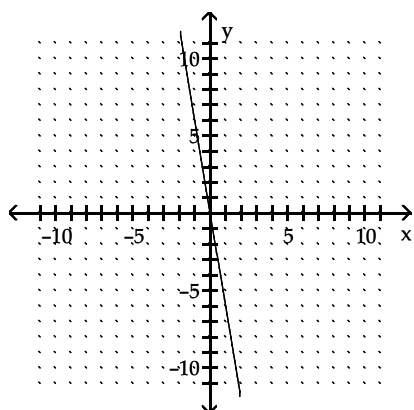
29)



30)



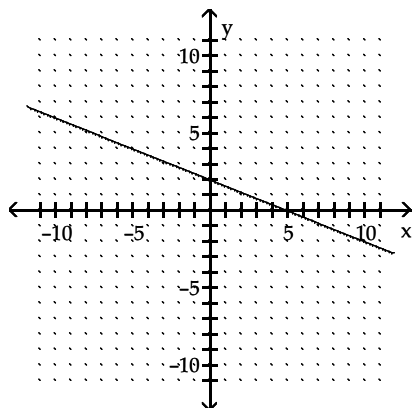
31)



Answer Key

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32)



33) 120

34) $\frac{8}{27}$

35) g^{22}

36) $28x^9$

37) $8mn^2$

38) -8

39) $\frac{64}{x^9}$

40) $\frac{-15x^2}{y^3}$

41) $(2x^2 + 4x + 30)$ units

42) $(2x^2 + 8x + 49)$ units

43) $2x^5 + 6x^4 - 2x^3 + 11$

44) $7x^6 + 4x^5 - 16x^4 - 3$

45) $9z^2 + 66z + 121$

46) $x^3 + 1$

47) $x + 2 - \frac{7}{x + 5}$

48) $4x^2 - 4x - 3 + \frac{4}{2x - 5}$

49) $8(6x - 1)$

50) $3xy(7x^2 + 5y^5)$

51) $(y + 11)(x - 5)$

52) $(4x + 7)(y - 4)$

53) $x(x + 5)(x - 6)$

54) $5x^4(x + 7)(x + 5)$

55) $(x - 8y)^2$

56) $(8x + 5y)^2$

57) $(r^{10} + a)(r^{10} - a)$

58) $(x^2 + 25)(x + 5)(x - 5)$

59) $(t + 10)(t^2 - 10t + 100)$

Answer Key

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60) $6x^3(5 - 3x)(25 + 15x + 9x^2)$

61) $y = -\frac{29}{5}, y = -\frac{11}{2}$

62) $b = -18, b = 0$

63) $x = \frac{3}{7}, x = -\frac{1}{7}$

64) $x = -12, x = 3$

65) no solution

66) infinite number of solutions

67) $(3, -2)$

68) $(-1, 3)$

69) infinite number of solutions

70) no solution

71) no solution

72) infinite number of solutions

73) $-\frac{2}{3}$

74) $-\frac{1}{6}$

75) $\frac{2}{x-3}$

76) $\frac{1}{x+2}$

77) $-\frac{x-1}{x-5}$

78) $-\frac{x+2}{x-2}$

79) $\{w \mid w \text{ is a real number and } w \neq 0\}$

80) $\{x \mid x \text{ is a real number and } x \neq 3\}$