(30)

Can you simplify an expression using the order of operations?

1) Simplify $\dfrac{32(11-8)-18}{3^2-3}$

2) Simplify $\dfrac{|5-3^3|-3}{6+3}$

  A) $\dfrac{5}{9}$ B) $\dfrac{19}{9}$ C) $-\dfrac{25}{9}$ D) $\dfrac{25}{9}$

Can you evaluate an algebraic expression?

If $x = -4$ and $y = -2$, evaluate each expression.

3) $\dfrac{10-5x}{y-2}$

4) $\dfrac{8-x^2}{|y|}$

Can you write a phrase or sentence as an algebraic expression or equation?

Write each phrase or sentence an algebraic expression or equation. Let x represent the unknown number.

5) Three times a number decreased by 22

  A) $22-3x$ B) $3x+22$ C) $3x-22$ D) $22x-3$

6) Two subtracted from a number is 0.

Can you use the distributive property and combine like terms to simplify an algebraic expression?

Simplify each expression.

7) $\dfrac{1}{4}(12x-8)$

  A) $48x-32$ B) $3x-2$ C) $3x-8$ D) x

8) $12x-4(7y-10)$

9) $-10(7r+4)+6(7r+8)$

10) $-\dfrac{2}{7}(z-10)-\dfrac{1}{14}z$

  A) $\dfrac{5}{14}z+\dfrac{20}{7}$ B) $\dfrac{5}{14}z-\dfrac{20}{7}$ C) $-\dfrac{5}{14}z+\dfrac{20}{7}$ D) $\dfrac{3}{14}z+10$

Write the following as an algebraic expression. Simplify if possible.

11) Subtract $3x-4$ from $8x-2$.

Can you solve linear equations?

Solve each equation.

12) $-3 + x = 11$

13) $\frac{3}{5}y + \frac{1}{7} = -\frac{2}{5}y - \frac{1}{8}$

14) $-\frac{1}{7}k = \frac{2}{7}$

15) $-65.7 = -7.3c$

16) $-29 = 7x - 1$

17) $\frac{1}{7}f - 5 = 1$

18) $-2(3x + 1) - 3 = -3(x + 2) + 2x$

19) $-7z + 1.2 = -56 - 1.8z$

Can you write a phrase or sentence as an algebraic expression or linear equation?

Write each algebraic expression described. Simplify if possible.

20) A 23-centimeter piece of rope is cut into two pieces. If one piece is z centimeters long, express the other length as an algebraic expression in z.

21) The sum of the angles of a triangle is 180°. If one angle of a triangle measures x° and a second angle measures (3x + 24)°, express the measure of the third angle in terms of x.

22) If x is the first of three consecutive integers, express the sum of 23 and the third integer as an algebraic expression in terms of x.

Can you solve an application problem using a linear equation? Can you clearly define the variable and interpret the answer?

Use a linear equation to solve each of the following. Clearly define the variable and interpret the answer.

23) The sum of four times a number and 9 is equal to the difference of twice the number and 1. Find the number.

24) The code to unlock a safety deposit box is three consecutive odd integers whose sum is 99. Find the integers.

25) Two angles are complementary if their sum is 90°. If the measure of the first angle is x°, and the measure of the second angle is (3x – 2)°, find the measure of each angle.

Can you solve a formula for a specified variable?

26) Solve $A = \frac{1}{2}bh$ for h

     A) $h = \frac{Ab}{2}$ B) $h = \frac{b}{2A}$ C) $h = \frac{2A}{b}$ D) $h = \frac{A}{2b}$

27) Solve $F = \frac{9}{5}C + 32$ for C

Can you solve an application problem using a formula and interpret the answer?

28) Ted drove to his grandparents' house for a holiday weekend. The total distance (one-way) was 379 miles and it took him 8 hours. How fast was Ted driving? (Round answer to the nearest whole number)

29) Find the height of a right circular cylinder whose volume is 225π cubic feet and whose radius is 5 feet.

Can you solve an application problem involving percent, percent mark-up, discount, percent increase, or percent decrease?

30) What number is 86% of 223?

31) 95 is 70% of what number?
     A) 66.5   B) 1357   C) 13.6   D) 135.7

32) 2 is what percent of 4?

33) The population of a town is currently 44,000. This represents an increase of 20% from the population 5 years ago. Find the population of the town 5 years ago. Round to the nearest whole number if necessary.
     A) 220,000   B) 36,667   C) 35,200   D) 8800

34) The number of students enrolled at City College went from 7000 last year to 3000 this year. Find the percent decrease in enrollment.
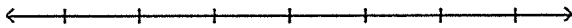   A) 133.3%   B) 57.1%   C) 42.9%   D) 233.3%

35) Ming got a 12% raise in her salary from last year. This year she is earning $120,960. How much did she make last year?
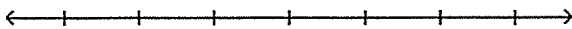
Can you solve a linear inequality using the multiplication and addition properties of inequality?

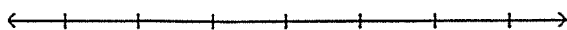Solve each inequality. Graph the solution set on a number line and write the answer using solution set notation.

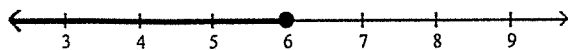36) $-10 - 3x + 4 \geq -4x - 9$

$\longleftarrow\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!\longrightarrow$

37) $-5x \geq 95$

$\longleftarrow\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!-\!\!+\!\!\longrightarrow$

38) $-5(2y - 3) < -15y + 45$
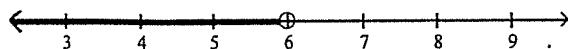

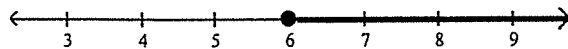A) $\{y \mid y \le 6\}$

B) $\{y \mid y < 6\}$

C) $\{y \mid y \ge 6\}$
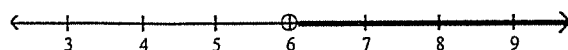

D) $\{y \mid y > 6\}$

**Can you solve an application problem using a linear inequality?**

39) The area of a rectangle must be at least 119 square feet. If the length is 7 feet, find the minimum for the rectangle's width.

40) Claire has received scores of 85, 88, 87, and 85 on her algebra tests. What is the minimum score she must receive on the fifth test to have an overall test score average of at least 88?

Can you plot an ordered pair in a rectangular coordinate system?

Plot the ordered pair. State in which quadrant or on which axis the point lies.

41) (6, –5)
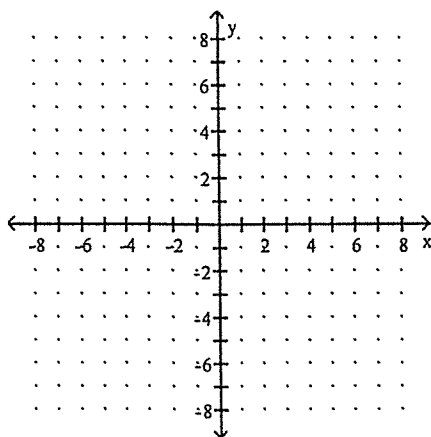
Can you determine whether an ordered pair solves an equation in two variables?

In each case, determine whether the ordered pair is a solution of the given linear equation.

42) $x - 9y = 27$; (0, 3)

43) $x = \frac{1}{8}y$; $(4, 32)$

Can you write a given data set using ordered pairs and create a scatter diagram?

44) The table shows the number of cookies sold at a bake sale according to their diameter in inches. Write the ordered pair data as an ordered pair of the form (diameter, number sold). Then create a scatter diagram of the ordered pairs..

Diameter of Cookie (inches)	Number Sold
1	150
1.5	300
2	450
2.5	250
3	350
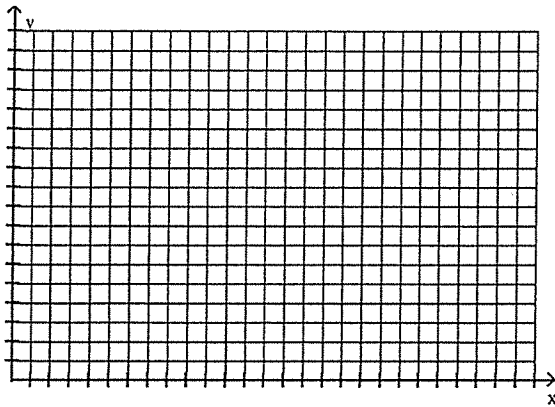
Can you create a table of solutions to a linear equation, write these solutions as ordered pairs, and graph the linear equation by plotting the ordered–pair solutions?
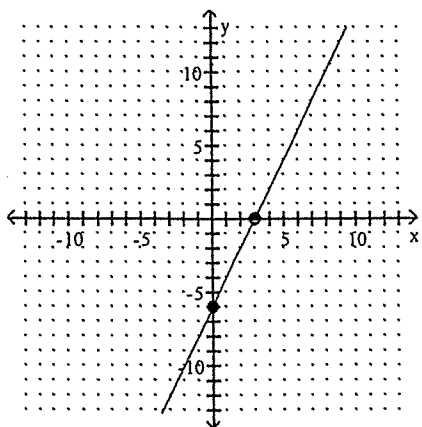
45) $6x + 2y = 12$

x	y
0	
	0
1	
	−6
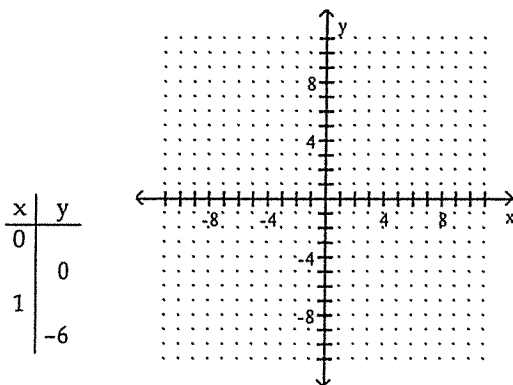
Can you find the x– and y–intercepts of a line from its equation?

46) Determine the coordinates of the intercepts of the line $8x = -y + 4$.

5

Can you identify the x– and y–intercepts of a given graph?
Identify the coordinates of the intercepts of the line.

47)

Can you solve an application problem that includes a given linear equation?

48) A small–business research project estimated that for the years 1998–2003, the total number of retail bicycle stores in a particular region would grow according to the linear equation $y = 20x + 800$, where x is the number of years after 1998. Graph the equation and use the graph to predict the total number of retail bicycle stores in 2008.
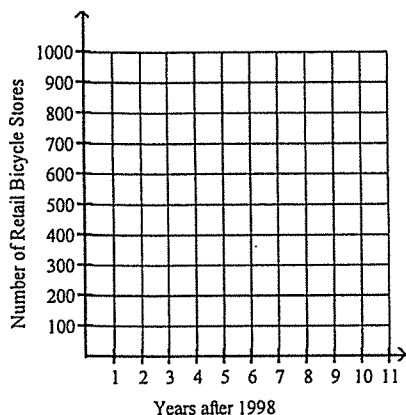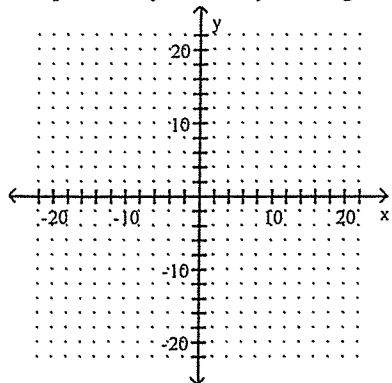

Can you graph a linear equation by finding and plotting intercepts?

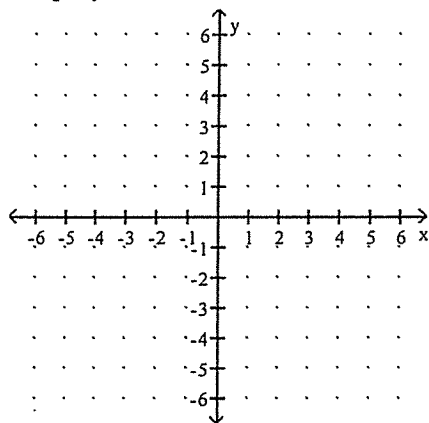49) Graph $y + \dfrac{1}{2}x = 3$ by finding and plotting its intercepts.
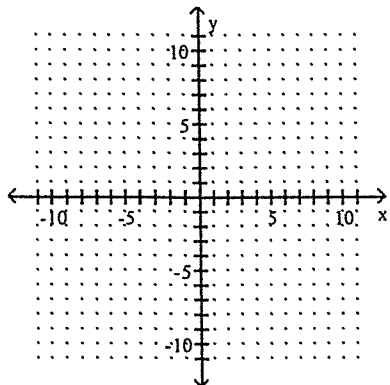
50) Graph $-4x - y = -12$ by finding and plotting its intercepts.
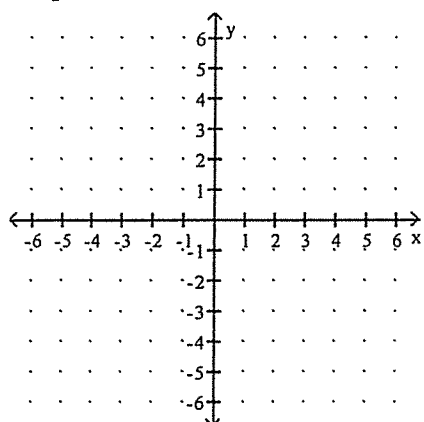

Can you identify and graph a horizontal or vertical line?

51) Graph $y = -4$

52) Graph $x - 2 = 0$

Can you find the slope of a line given two points on the line?

In each case, find the slope of the line that passes through the given points.

53) (–1, 17) and (3, 7)

A) $\dfrac{5}{2}$ B) 12   C) $-\dfrac{5}{2}$ D) $-\dfrac{2}{5}$

54) (–4, –10) and (–4, –6)

A) undefined   B) $\dfrac{1}{2}$ C) 0   D) 2

55) (–10, 1) and (6, 1)

Can you rewrite the equation of a line in slope–intercept form?

56) Write $-x + 5y = 60$ in slope–intercept form.

57) Write $x = -7y$ in slope–intercept form.

Can you find the slope of a line given its equation?

58) Find the slope of the line $y = 4.9x - 9.6$

59) Find the slope of the line $-x + 11y = 88$

A) $m = 11$ B) $m = \dfrac{1}{11}$ C) $m = -\dfrac{1}{11}$ D) $m = -1$

Can you determine whether two lines are parallel, perpendicular, or neither by comparing their slopes?

Determine whether each pair of lines is parallel, perpendicular, or neither.

60) $y = 2x + 5$
$y = -2x + 1$

61) $3x - 6y = 20$
$18x + 9y = 9$

62) $6x + 2y = 8$
$12x + 4y = 17$

Can you solve an application problem by identifying slope as a rate of change?

63) The approach ramp used by a daredevil motorcyclist for flying over a pit of venomous snakes has a rise of 52 feet for every 80 feet in horizontal distance. Find the grade of the ramp. Round to the nearest whole percent.

8

64) To the nearest dollar, the average tuition at a public four-year college was $3013 in 1998 and $3327 in 2000. Use the ordered pairs (1998, $3013) and (2000, $3327) to find and interpret the slope of the line representing the change in tuition.

    A) tuition increased $174 per year   B) tuition decreased $157 per year

    C) tuition increased $168 per year   D) Tuition increased $157 per year.

Can you write the equation of a line in slope-intercept form given its slope and y-intercept?

65) Write the equation of the line with slope $= \dfrac{4}{5}$, and y-intercept (0,0).

66) Write the equation of the line with slope $= -2$, and y-intercept $(0, \dfrac{1}{3})$

Can you write the equation of a line in slope-intercept form given information about the line?

67) Slope = -3, through (-3, -6)

    A) $y = -3x + 15$ B) $y = -3x - 15$ C) $y = 3x + 3$ D) $y = -3x - 3$

68) Through (-2, -5) and (-4, -2)

Can you write the equation of a horizontal or vertical line?

69) Write the equation of the vertical line through (9, 3)
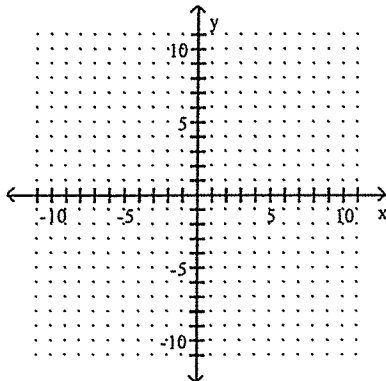
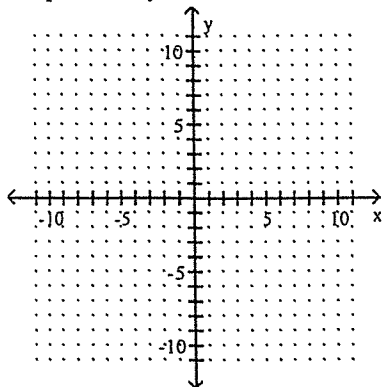   A) $y = 9$ B) $y = 3$ C) $x = 3$ D) $x = 9$

70) Write the equation of the line with slope 0, through $\left(-\dfrac{1}{8}, 6 \right)$

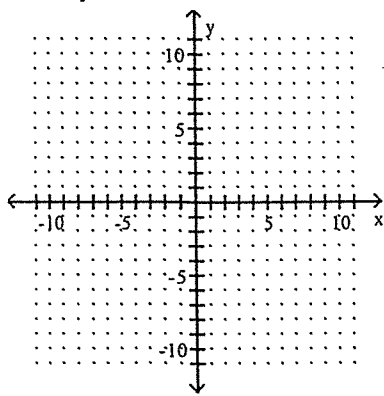**Can you graph a linear equation?**

71) Graph $y = -3x + 7$ using the slope and y-intercept.

72) Graph $5x + 4y = 20$

73) $6x - 18y = 0$

Can you determine whether an ordered pair satisfies a system of linear equations?

74) $(5, -2)$
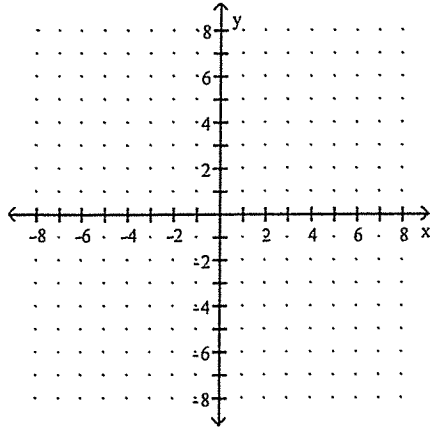 $x + y = -7$
   $x - y = -3$

75) $(3, 6)$
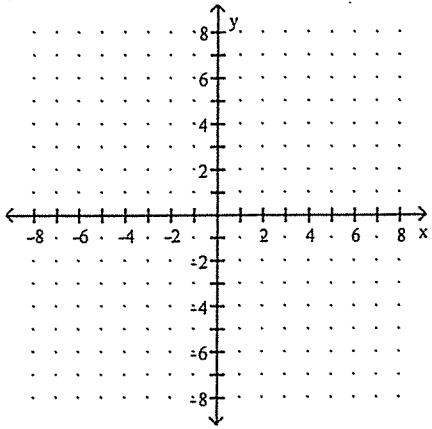 $3x = 15 - y$
   $4x = 30 - 3y$

Can you solve a system of linear equations by graphing?
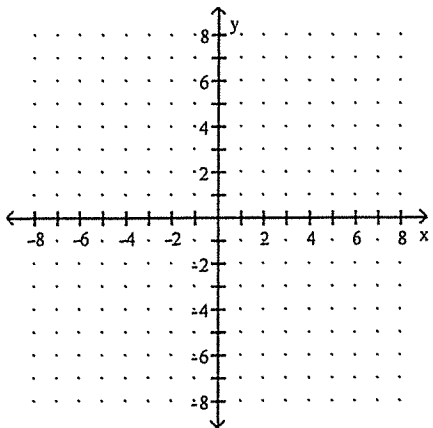
76) $2x + 3y = 24$
     $2x + 2y = 20$

77) $x = -y$
     $y + x = 6$

78)
     $y = -2x + 1$
     $x = -3$

A) (−3, 7)   B) (2, −3)   C) no solution   D) infinite solutions

Can you solve a system of equations using the substitution method?

79) x + 6y = 6
   7x − 5y = −5

80) −6x + y = 32
   −7x + 5y = 45
   A) (2, −5)   B) (−5, 2)   C) (−4, 1)   D) no solution

81) y − 4x = 3
   5y = 20x + 15

Can you solve a system of equations using the addition method?

82) x + 6y = −8
   −4x + 5y = −26

83) 9x − 3y = 4
   18x − 6y = 20

84) $5x + \frac{1}{2}y = -13$

   $2x + \frac{5}{4}y = -1$

Can you use a system of equations to solve an application problem?

85) The sum of two numbers is −2, and their difference is 4. Find the two numbers.

86) One number is 2 less than a second number. Twice the second number is 14 less than 5 times the first. Find the two numbers.

87) A flat rectangular piece of aluminum has a perimeter of 64 inches. The length is 8 inches longer than the width. Find the width.
   A) 20 in.   B) 32 in.   C) 28 in.   D) 12 in.

88) The Little Town Fine Arts Center charges $24 per adult and $14 per senior citizen for its performances. On a recent weekend evening when 484 people paid admission, the total receipts were $8486. How many who paid were senior citizens?

89) Aviva has a total of 52 coins, all of which are either dimes or nickels. The total value of the coins is $4.70. Find the number of each type of coin.

Can you evaluate an exponential expression?

Evaluate each expression.

90) -5^2

    A) 10   B) 25   C) -25 D) -10

91) $4 \cdot 5^3$

Can you use the rules of exponents to simplify an expression?

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

92) $(-9p^3)(3p^5)$

93) $\dfrac{40m^{19}n^{10}}{8m^{18}n^7}$

    A) $5mn^3$ B) $5n^3$ C) $5m^{37}n^{17}$ D) $32mn^3$

94) $\left(\dfrac{4x^2y^2}{z^3}\right)^4$

95) $5x^0 + \left(5x\right)^0$

96) $-7y^0$

    A) 0   B) 1   C) -7 D) -6

97) $\dfrac{y^{-9}}{y^2}$

98) $6^{-1} + 8^{-1}$

    A) $\dfrac{24}{7}$ B) $\dfrac{7}{24}$ C) $-\dfrac{1}{2}$ D) 2

13

99) $(-5x^5y^{-6})(2x^{-1}y)$

    A) $-10x^4y^7$ B) $\dfrac{-3x^4}{y^5}$ C) $\dfrac{-10x^4}{y^5}$ D) $\dfrac{-10x^6}{y^7}$

100) $(x^{-4}y^4)^{-1}$

101) $\left(\dfrac{xy^5}{x^3y}\right)^{-2}$

Can you determine the degree and coefficient of a term, and the degree of a polynomial?

Find the degree and coefficient of each term of each of the following polynomials, and then determine the degree of the polynomial.

    102) $-17y^4 + 2$

    103) $4q^2r^2 + rs^3 - qr^2s^2$

Can you evaluate a polynomial?

    104) Evaluate $-10 - x^3 - x^2$ when $x = -1$

        A) -12 B) 8   C) -10 D) -8

    105) The height of a new building in China will be 905 feet. Neglecting air resistance, the height of an object dropped from this building at time t seconds would be given by the polynomial $-16t^2 + 905$. Find the height of the object at time $t = 4$ seconds.

Can you simplify a polynomial by combining like terms?

Simplify each by combining like terms.

    106) $-10r - 9r^4 - 3r^4 + 7r$

        A) $-15r$ B) $-15r^4$
        C) $-3r - 12r^4$ D) cannot be simplified

    107) $\dfrac{2}{3}x^2 - \dfrac{2}{3}x - \dfrac{1}{3} + \dfrac{1}{4}x^2 - \dfrac{1}{5}x - \dfrac{1}{3}$

Can you write a polynomial in descending order?

    108) Write in descending order: $7 + 8x^3 - 4x - 3x^2$

Can you add and subtract polynomials?

    109) $(3x^2 - 10x + 4) - (x^2 - 5x + 2) + (7x^2 + 5)$

        A) $-5x^2 - 15x + 11$ B) $9x^2 - 5x + 11$ C) $9x^2 - 5x + 7$ D) $9x^2 + 5x + 7$

110) Subtract $(-9x^2 - 3x + 1)$ from $(-x^2 - 7x + 6)$.

Can you multiply polynomials?

111) $6x^5(-5x^6)$

    A) $-30x^{30}$ B) $-30x^{11}$ C) $30x^{11}$ D) $30x^{30}$

112) $\left(\dfrac{1}{3}x^9\right)\left(\dfrac{1}{8}x^6\right)$

113) $-4x(3x^2 - 3x - 5)$

114) $(2x + 4)(4x - 3)$

    A) $8x^2 + 10x - 12$ B) $6x^2 + 10x + 10$ C) $6x^2 + 10x - 12$ D) $8x^2 + 10x + 10$

115) $(x + 8)(x^3 + 4x - 6)$

116) $(x + 11)^2$

    A) $x^2 + 22x + 121$ B) $x + 121$ C) $121x^2 + 22x + 121$ D) $x^2 + 121$

117) $(8a - 5)^2$

118) $(a - 11)(a + 11)$

119) $(x^2 + 13y)(x^2 - 13y)$

    A) $x^4 + 26x^2y - 169y^2$ B) $x^4 - 169y^2$ C) $x^4 - 26x^2y - 169y^2$ D) $x^4 - 26y^2$

Can you divide a polynomial by a monomial?

120) $\dfrac{20x^2 + 24x - 12}{12}$

121) $\dfrac{2x^3y^3 + 10xy + x^2}{2xy}$

    A) $x^2y^2 + 5 + xy$ B) $x^2y^2 + 5 + \dfrac{x}{2y}$ C) $xy + 5 + \dfrac{x^2y^2}{2}$ D) $x^2y^2 + 5 + 2xy$

Can you convert a number from standard (decimal) notation to scientific notation and vice versa?

Write each number in scientific notation.

122) 150,000

123) 0.00007701

    A) 7.701×10^5 B) 7.701×10^4 C) 7.701×10^{-4} D) 7.701×10^{-5}

Write each number in standard notation.

124) 4.99×10^{-4}

125) 7.086×10^{4}

     A) 708,600   B) 70,860   C) 283.44   D) 7086

Can you multiply and divide numbers given in scientific notation?

Evaluate each expression using exponential rules. Write each result in standard notation.

126) $(5 \times 10^{2}) \times (6 \times 10^{4})$

127) $\dfrac{35 \times 10^{5}}{5 \times 10^{8}}$

1) 13

2) B

3) $-\dfrac{15}{2}$

4) −4

5) C

6) x − 2 = 0

7) B

8) 12x − 28y + 40

9) −28r + 8

10) C

11) 5x + 2

12) 14

13) $-\dfrac{15}{56}$

14) −2

15) 9

16) −4

17) 42

18) $\dfrac{1}{5}$

19) 11

20) (23 − z) cm

21) (156 − 4x)°

22) x + 25

23) Let x be the number.
Equation: 4x + 9 = 2x − 1
x = − 5
The number is − 5.

24) Let x be the smallest of the consecutive odd integers.
Equation: x + (x + 2) + (x + 4) = 99
x = 31
The code is 31, 33, 35.

25) Let x be the degree measure of the first angle.
Equation: x + (3x − 2) = 90
x = 23
The first angle measures 23°; the second angle measures 67°.

26) C

27) $C = \dfrac{5}{9}(F - 32)$

28) Ted was driving at a rate of 47 mph.

29) The height is 9 ft.

30) 191.8

31) D

32) 50%

33) B

34) B

35) $108,000

36) {x | x ≥ −3}

37) {x | x ≤ 19}
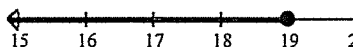
38) B

39) The minimum width is 17 ft.

40) The minimum score is 95.

41) quadrant IV
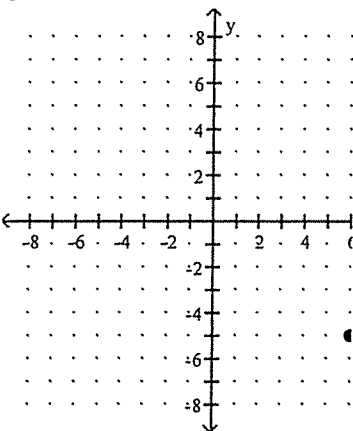
42) no

43) yes

44)
(1, 150)
(1.5, 300)
(2, 450)
(2.5, 250)
(3, 350)
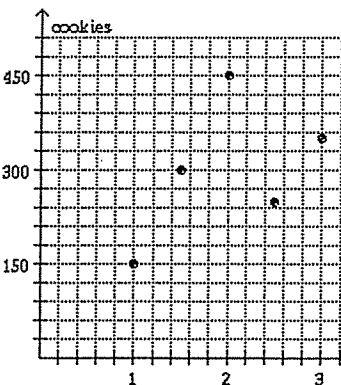
45)

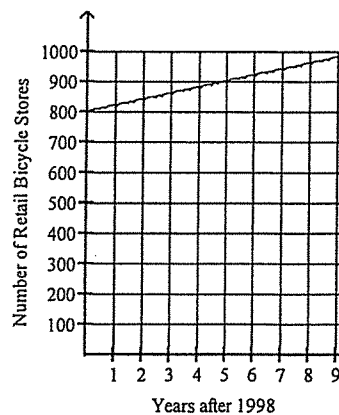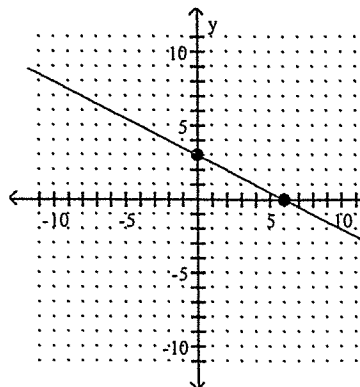| x	y
0	6
2	0
1	3
4	−6
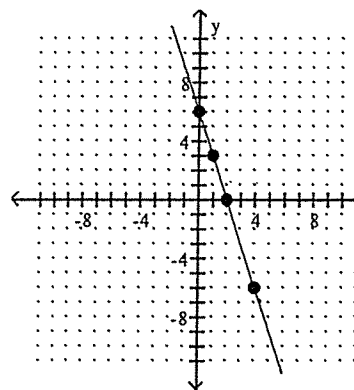
46) x−intercept $\left(\dfrac{1}{2}, 0\right)$; y−intercept (0, 4)

47) x−intercept: (3, 0); y−intercept (0, −6)

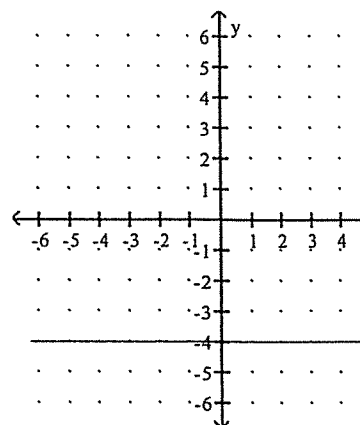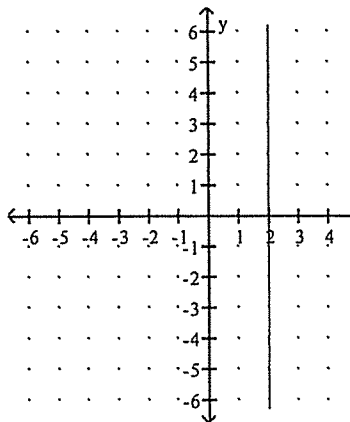48) 1000 stores

49)

52)

71)

50)
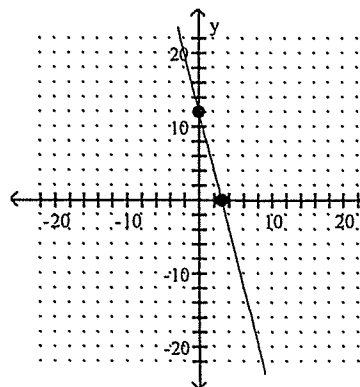
53) C

54) A

55) 0

56) $y = \frac{1}{5}x + 12$

57) $y = -\frac{1}{7}x$

58) $m = 4.9$

59) B

60) neither

61) perpendicular

62) parallel

63) 65%

64) D

65) $y = \frac{4}{5}x$
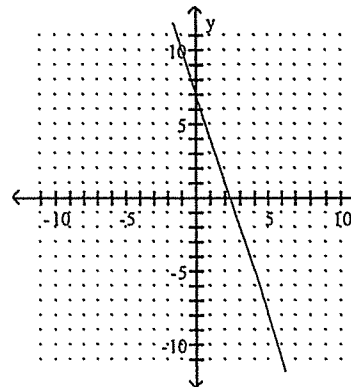
66) $y = -2x + \frac{1}{3}$
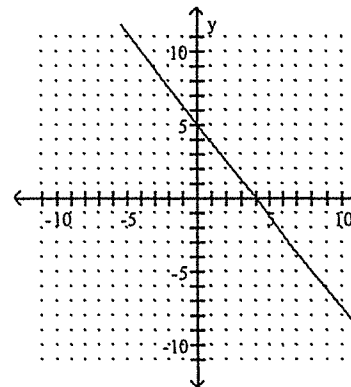
67) B

68) $y = -\frac{3}{2}x - 8$
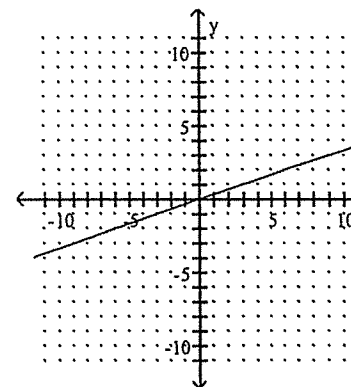
69) D

70) $y = 6$

51)

72)

73)

74) No

75) Yes

76) (6, 4)

77) inconsistent

78) A

79) (0, 1)

80) B

81) infinite number of solutions

82) (4, −2)

83) no solution

84) (−3, 4)

85) 1 and –3

86) 6 and 8

87) D

88) 313 senior citizens

89) 10 nickels; 42 dimes

90) C

91) 500

92) $-27p^8$

93) A

94) $\dfrac{256x^8y^8}{z^{12}}$

95) 6

96) C

97) $\dfrac{1}{y^{11}}$

98) B

99) C

100) $\dfrac{x^4}{y^4}$

101) $\dfrac{x^4}{y^8}$

102) $-17y^4$: degree 4; coefficient –17
2: degree 0; coefficient 2
polynomial degree: 4

103) $4q^2r^2$: degree 4; coefficient 4
rs^3: degree 4; coefficient 1
$-qr^2s^2$: degree 5; coefficient –1
polynomial degree: 5

104) C

105) 649 ft

106) C

107) $\dfrac{11}{12}x^2 - \dfrac{13}{15}x - \dfrac{2}{3}$

108) $8x^3 - 3x^2 - 4x + 7$

109) C

110) $8x^2 - 4x + 5$

111) B

112) $\dfrac{1}{24}x^{15}$

113) $-12x^3 + 12x^2 + 20x$

114) A

115) $x^4 + 8x^3 + 4x^2 + 26x - 48$

116) A

117) $64a^2 - 80a + 25$

118) $a^2 - 121$

119) B

120) $\dfrac{5}{3}x^2 + 2x - 1$

121) B

122) 1.5×10^5

123) D

124) 0.000499

125) B

126) 30,000,000

127) 0.007