Integer Exponents Sections 1.6 – 1.7

In questions 1 – 6 simplify and write your answers with positive exponents only.

_____1. $(3x^5y^2)(9xy^6)$

a) $12x^5y^{12}$

b) $27x^5y^{12}$

c) $27x^5y^8$

d) $27x^6y^8$

_____2. $\dfrac{x^6y^2}{x^2y^8}$

a) $\dfrac{x^3}{y^4}$

b) x^4y^6

c) $\dfrac{x^4}{y^6}$

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

_____3. $\dfrac{3^{-2}a^8}{a^{-2}}$

a) $-\dfrac{a^{10}}{9}$

b) $-6a^{10}$

c) $\dfrac{a^6}{9}$

d) $\dfrac{a^{10}}{9}$

_____4. $(5x^{-4}y^3)^2$

a) $\dfrac{10y^6}{x^8}$

b) $\dfrac{25y^5}{x^2}$

c) $25x^8y^6$

d) $\dfrac{25y^6}{x^8}$

_____5. $(5y)^0 - 5y^0$

a) 0

b) -4

c) 1

d) $y - 5$

_____ 6. $\dfrac{35x^6y^{-2}}{5x^{-3}y^{-9}}$

a) $\dfrac{7}{x^2y^{11}}$

b) $7x^9y^7$

c) $7x^3y^7$

d) $30x^9y^7$

7. **Simplify. Write the answer using positive exponents only:** $\left(\dfrac{6x^{-6}y^{-2}}{2x^{-4}y^5}\right)$

8. **Simplify. Write the answer using positive exponents only:** $\left(\dfrac{4a^{-6}b^7}{12a^6b^{-2}}\right)^2$

9. Write 452,000,000 in scientific notation.

a) 4.52×10^{6} **b)** 4.52×10^{8} **c)** 4.52×10^{-6} **d)** 4.52×10^{-8}

10. Multiply. Give your answer in scientific notation. $\left(2.4\times10^{-3}\right)\left(3.2\times10^{-4}\right)$

a) 7.68×10^{12} **b)** 7.68×10^{7} **c)** 7.68×10^{-7} **d)** 5.6×10^{-7}

Solving Linear Equations Sections 2.1 – 2.2

In questions 11 – 13 solve each equation.

11. $3x-4(2-x)=3(x-2)-4$ **12.** $\frac{2x-5}{8}+\frac{1}{4}=\frac{x}{8}+\frac{3}{4}$ **13.** $\frac{m+3}{7}-2=\frac{m-2}{14}$

In questions 14 – 16 write a linear equation and solve.

14. The product of four and a number decreased by six is equal to twice the sum of the same number and eight. Find the number.

15. A triangle has three interior angles. The first angle is six more than the second angle. The third angle is four times the second angle. Find the measure of each interior angle of the triangle. Hint: Let x equal the second angle.

16. The length of a rectangular road sign is one foot more than 5 times its width. Find the width and length of the sign if the perimeter is 62 feet.

Formulas Section 2.3

In questions 17– 18 solve each equation for the specified variable.

17. $A = \frac{1}{3}bc$ for **c**

18. $4a - b = 5$ for **a**

_____**19. Solve for y**: $3x - 4y = -8$

a) $y = -\frac{3}{4}x - 2$ **b)** $y = -\frac{3}{4}x + 2$ **c)** $y = \frac{3}{4}x + 2$ **d)** $y = \frac{3}{4}x - 2$

In questions 20 – 21 use the formula $F = \frac{9}{5}C + 32$ **that relates degrees Fahrenheit with degrees Celsius.**

20. If the temperature in Bristol, England is 30ºC, what is the temperature in degrees Fahrenheit?

21. If the temperature in Sarasota, Florida is 68ºF, what is the temperature in degrees Celsius?

22. A principal of $18,000 is invested in an account paying an annual rate of 3.5%. Find the amount in the account after 10 years if the interest is compounded quarterly.

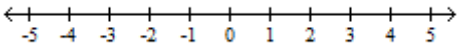
$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Solving Linear Inequalities Section 2.4

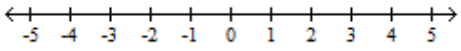
In questions 23 – 24 solve each inequality. Then, graph your solution on the number-line, and write your solution using interval notation.

23. $4x - 2 \le 14$

24. $5x - 2 < 7x - 4$



Interval notation: _____



Interval notation: _____

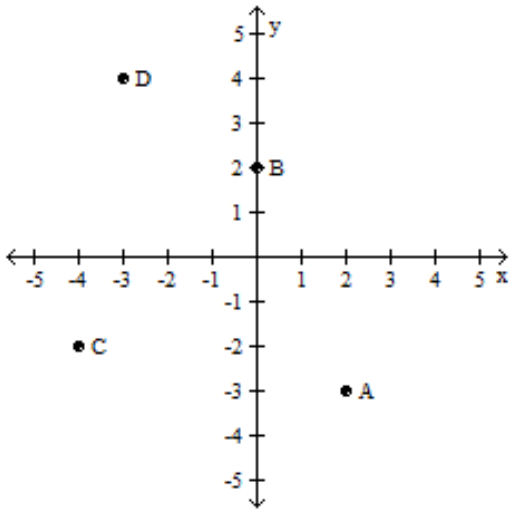
25. Solve the inequality: $3(3-2x) \geq -5x-2(3-x)$

a) $(-\infty, 5]$ **b) $(-\infty, -5]$** **c) $[-5, \infty)$** **d) $[5, \infty)$**

Graphing Points and Lines Section 3.1

26. Determine the coordinates of each point on the graph. Then, name the quadrant (or axis) in which the point lies in.

	Point	Quadrant or Axis
a) A	_____	_____
b) B	_____	_____
c) C	_____	_____
d) D	_____	_____



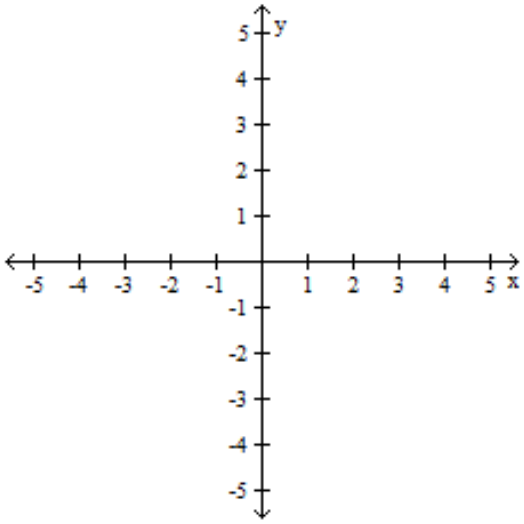
_____27. Determine which ordered pair is <u>not</u> a solution to the equation $y = 2x - 5$.

a) $(-3,-11)$ **b) $(-1,-7)$** **c) $(2,-1)$** **d) $(-4,-12)$**

28. Complete the table of ordered pairs. Then, graph the line using the points in the table.

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

x	y
0	
-3	
3	



_____ **29.** **Determine the x-intercept of the graph of $-3x-5y=30$.**

a) $(10,0)$ **b)** $(-10,0)$ **c)** $(0,-10)$ **d)** $(-6,0)$

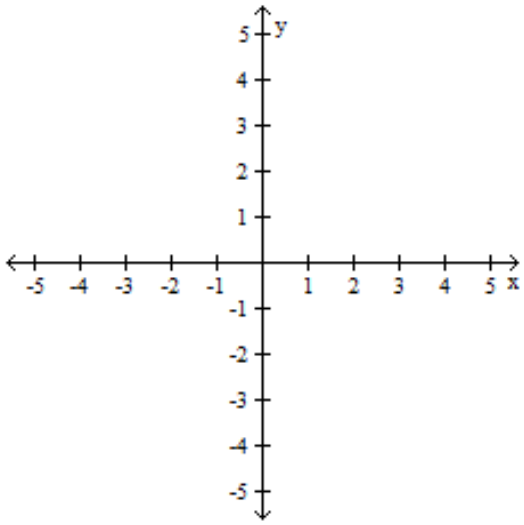
_____ **30.** **Determine the y-intercept of the graph of $-3x-5y=30$.**

a) $(0,6)$ **b)** $(-10,0)$ **c)** $(0,-6)$ **d)** $(-6,0)$

31. **Graph $2x-3y=6$ using the x-intercept and the y-intercept.**

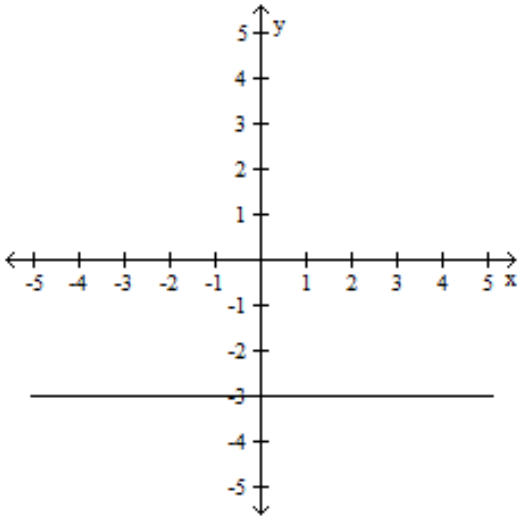
The x-intercept is _____.
Write as an ordered pair.

The y-intercept is _____.
Write as an ordered pair.



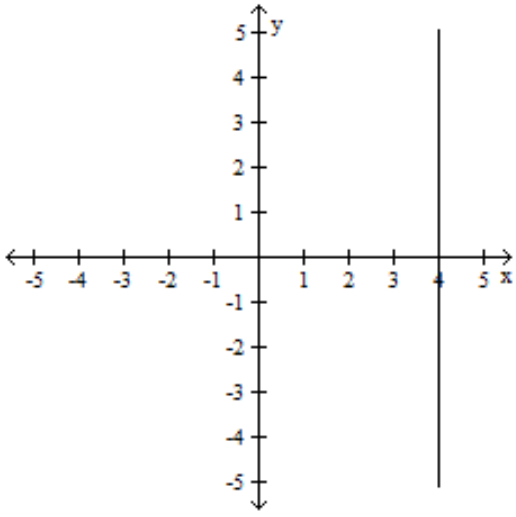
In questions 32 – 33 select the correct equation.

_____ **32.**



$x=-3$ or $y=-3$

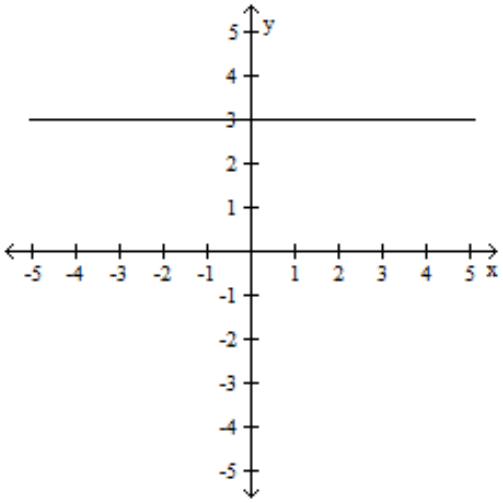
_____ **33.**



$x=4$ or $y=4$

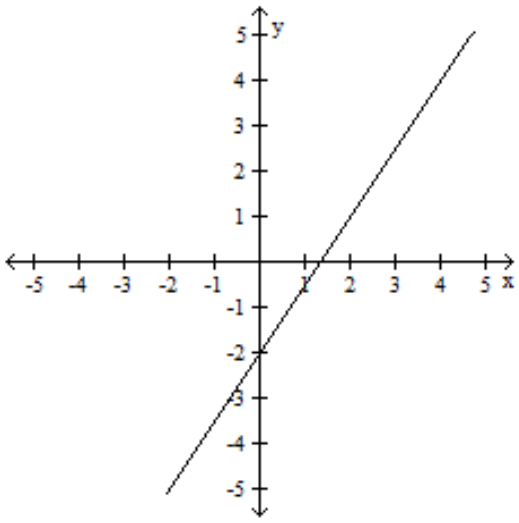
_____ **34. Is the slope of each line positive, negative, zero or undefined?**

Graph A



positive, negative, zero or undefined

Graph B



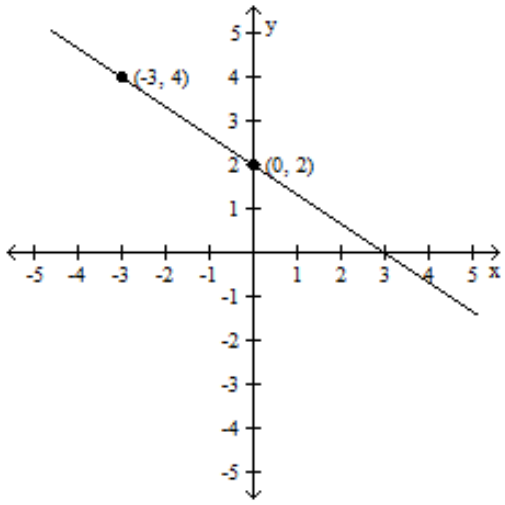
positive, negative, zero or undefined

35. Find the slope of the line determined by the points (–1, 3) and (2, 4).

_____ **36. Find the slope of the line through the points (–2, –4) and (–1, 8).**

a) $\frac{1}{12}$ **b)** 12 **c)** 2 **d)** $-\frac{4}{3}$

_____ **37. Find the slope of the line containing the pair of points.**



a) $m = \frac{2}{3}$

b) $m = -\frac{2}{3}$

c) $m = \frac{3}{2}$

d) $m = -\frac{3}{2}$

The Slope-Intercept Form Section 3.2

38. Given the equation $y = -4x - 3$

a) What is the slope? _____ b) What is the y-intercept? _____
Write as an ordered pair.

_____ 39. Given $-3x - 2y = -8$ determine the slope and y-intercept.

a) $m = -\frac{3}{2}; b = (0,-4)$ **b)** $m = -\frac{3}{2}; b = (4,0)$

c) $m = \frac{3}{2}; b = (0,4)$ **d)** $m = -\frac{3}{2}; b = (0,4)$

Parallel and Perpendicular Lines Section 3.2

40. Find the slope of a line parallel to the given line: $y = 4x - 10$ m = _____

41. Find the slope of a line perpendicular to the given line: $y = 4x - 10$ m = _____

42. Give the slope of a line

a) parallel to the line $2x + 5y = 10$ m = _____

b) perpendicular to the line $2x + 5y = 10$ m = _____

in questions 43 – 44 determine whether each pair of lines is parallel, perpendicular or neither.

_____ 43. $y = -2x + 6$, $2x + y = 5$ **a) parallel b) perpendicular c) neither**

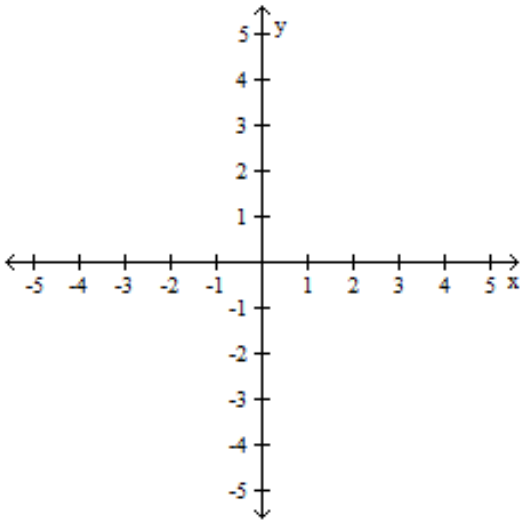
_____ 44. $2y = 5x + 2$, $5y - 2x = -20$ **a) parallel b) perpendicular c) neither**

_____ 45. Determine which pair of lines is perpendicular.

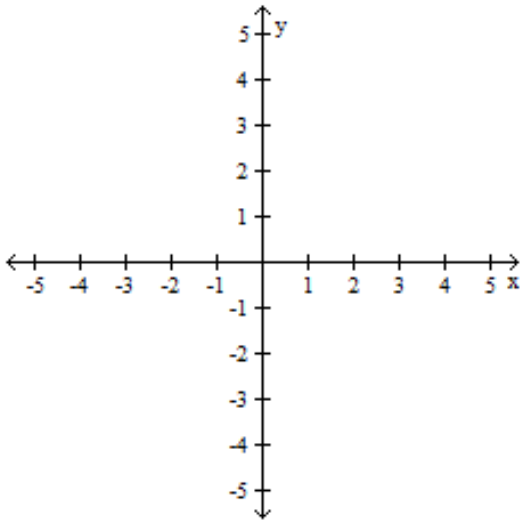
a) $y = -\frac{1}{4}x + 2$, $4x + y = -1$ **b)** $2y = 3x + 2$, $2x + 3y = -6$ **c)** $y = -4x + 2$, $4x + y = -1$ **d)** $y = \frac{3}{2}x + 2$, $-2x + 3y = -6$

Graphing Lines Using a Point and the Slope Section 3.3

46. Graph the line passing through the point $(2,1)$ with slope equal to $\frac{1}{3}$.

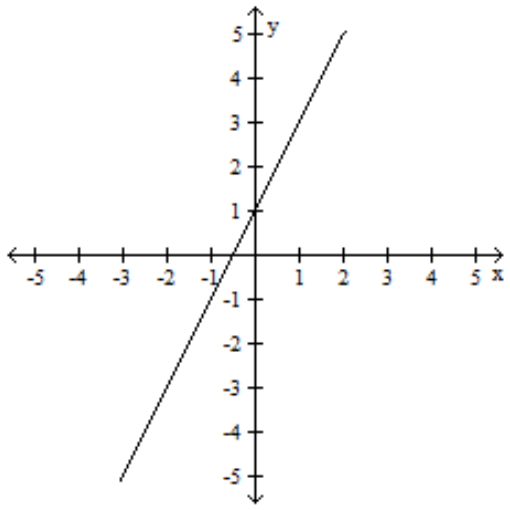


47. Graph the line passing through the point $(0,0)$ with slope equal to 3.



In questions 48 – 49 match the graph with the correct equation in slope-intercept form.

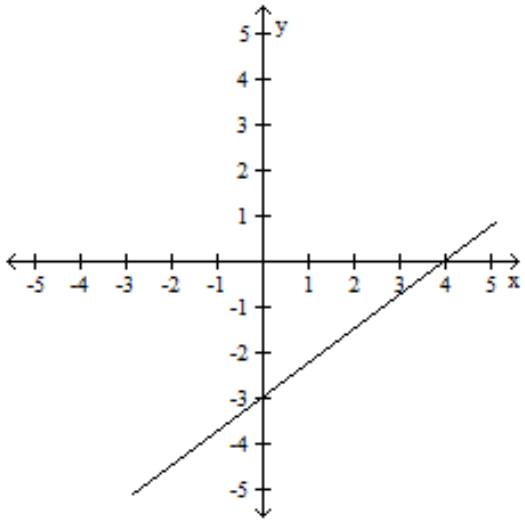
_____ 48.



a) $y = 2x - 1$ **b)** $y = 3x + 1$

c) $y = 2x + 1$ **d)** $y = -2x + 1$

_____ 49.

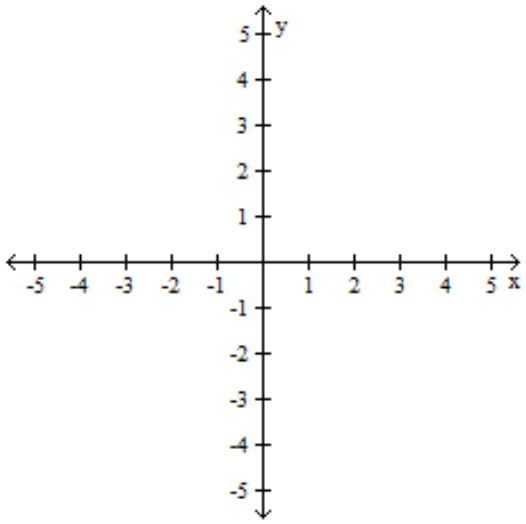


a) $y = -\frac{3}{4}x - 3$ **b)** $y = \frac{3}{4}x + 4$

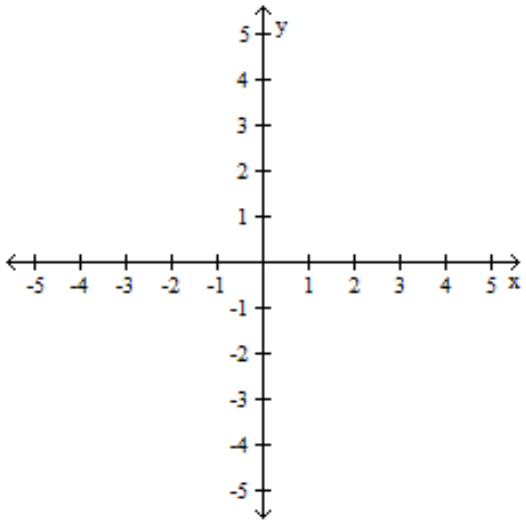
c) $y = \frac{4}{3}x - 3$ **d)** $y = \frac{3}{4}x - 3$

50. Graph each linear equation using the slope and y-intercept.

a) Graph $y = \frac{2}{5}x - 4$



b) Graph $2x + y = 3$



Using the Point-Slope Formula to Find the Equation of a Line Section 3.4

_____ 51. Find the equation of the line with slope = –2 that passes through the point (–5, 3). Write your answer in slope-intercept form.

a) $y = -2x + 13$ **b) $y = -2x - 10$**

c) $y = -2x - 7$ **d) $y = -2x - 1$**

52. Find the equation of the line that passes through the point (–9, 4) and has a slope of $-\frac{2}{3}$. Write your answer in standard form (Ax + By = C).

53. **Find the equation of the line that passes through the points (4, –11) and (–2,1). Write your answer in standard form.**

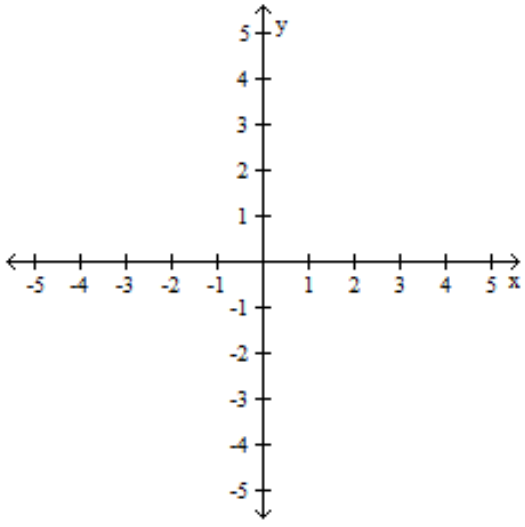
54. **Write an equation of the line containing the point (2, –4) and parallel to the line $8x + 2y = 5$. Write your answer in slope-intercept form.**

55. **Write an equation of the line containing the point (2, –4) and perpendicular to the line $8x + 2y = 5$. Write your answer in standard form.**

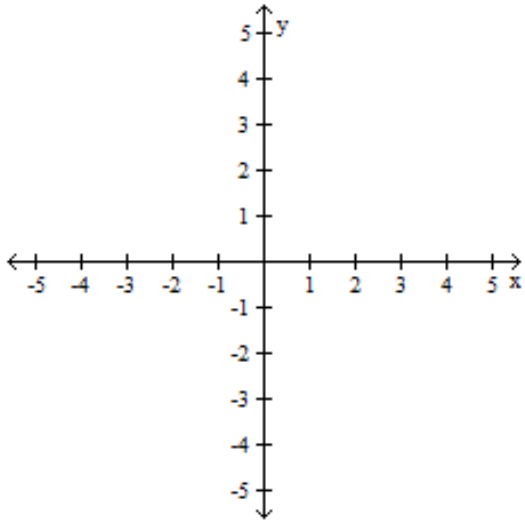
Graphing Linear Inequalities Section 3.5

In questions 56 – 57 graph each inequality.

56. $y \geq 3x - 2$



57. $4x + 3y < 12$



Functions Section 3.6

58. Determine whether each of the following relations is a function. Circle the correct answer.

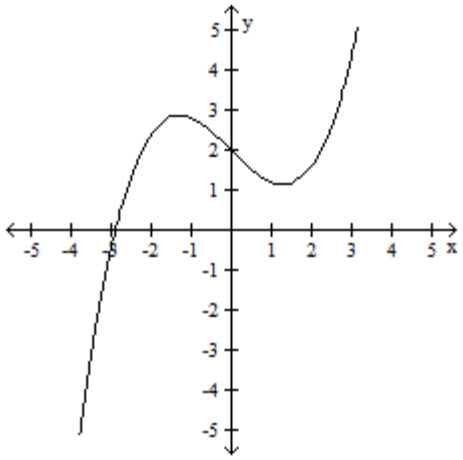
a) {(–2, 4), (0, 5), (–4, 3), (6, 3)}

Yes or No

b) {(–2, 4), (0, 5), (–4, 3), (0, 2)}

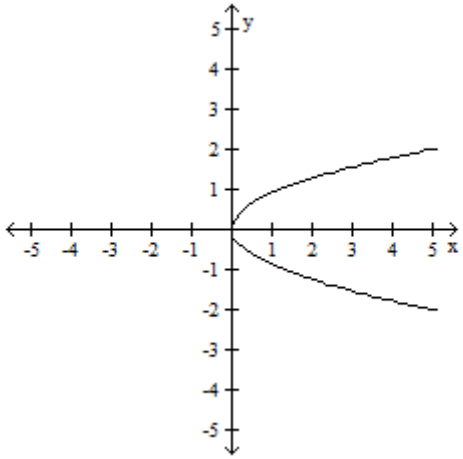
Yes or No

c)



Yes or No

d)



Yes or No

_____ 59. Given $f(x) = -4x - 7$. Find $f(2)$.

a) –9 **b) 15** **c) –15** **d) –22**

60. If $f(x) = 3x^2 - 5x + 1$, find $f(-4)$.

Solving Systems Sections 4.1 and 4.3

61. Solve the system:

$$4x + y = 5$$
$$2x - 5y = 19$$

62. Solve the system:

$$2x - 3y = 16$$
$$3x + 4y = 7$$

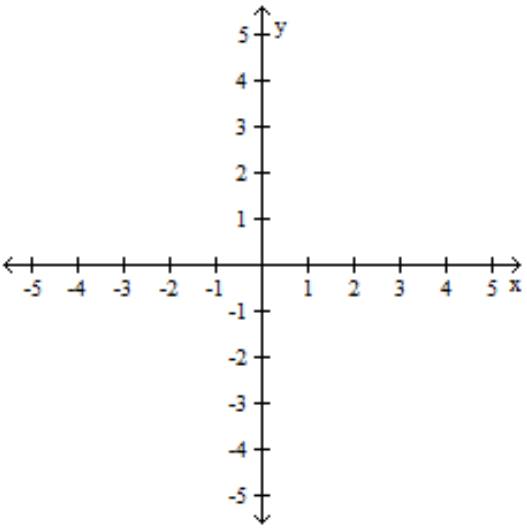
63. **The larger of two numbers is 1 more than the smaller. If the sum of the larger and twice the smaller is 7, find the two numbers.**

64. **A chemist is preparing 15 liters of a 25% saline solution. She has two other saline solutions available with strengths 40% and 10%. Find the amount of 40% solution and the amount of 10% solution she should mix to get 15 liters of a 25% solution.**

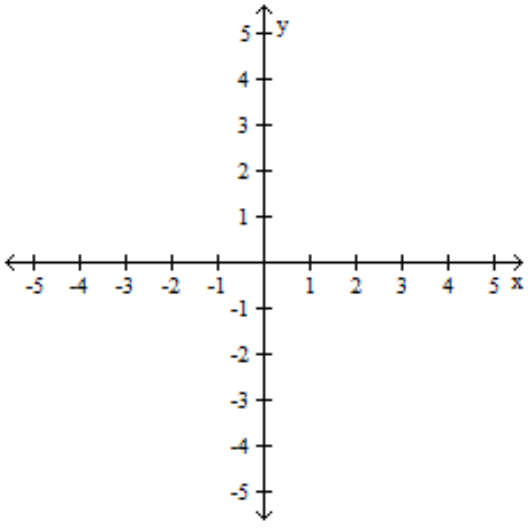
Graphing Systems of Linear Inequalities Section 4.5

In questions 65 – 66 graph the solutions of each system of linear inequalities.

65. $3x + y < 0$
$2x - y < 2$

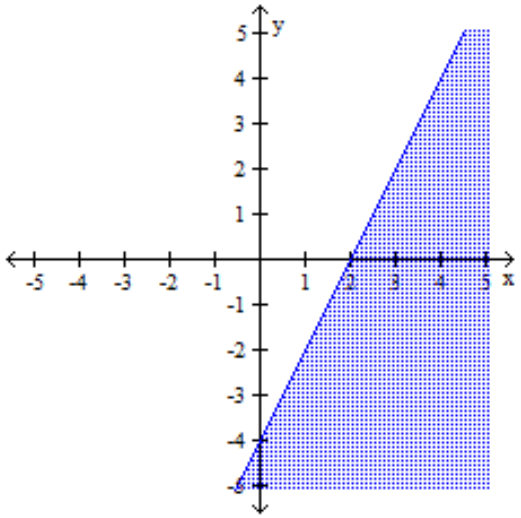


66. $y \geq x$
$x + y \geq 2$

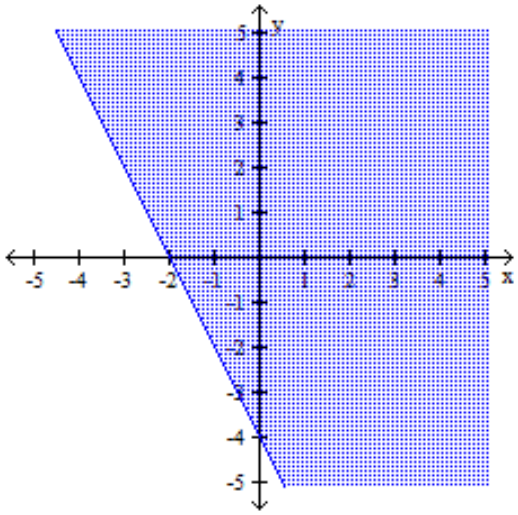


_____ **67.** **Match the inequality $y \geq 2x - 4$ with the correct graph.**

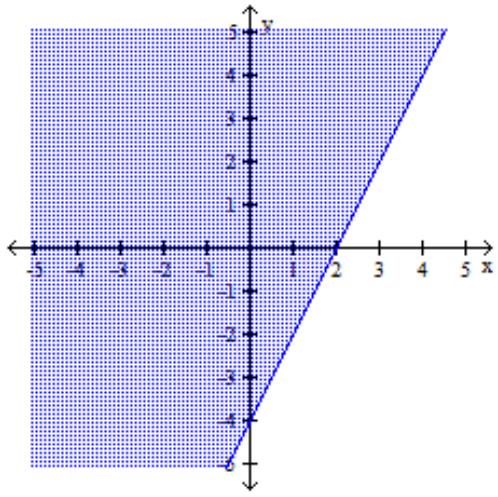
a)



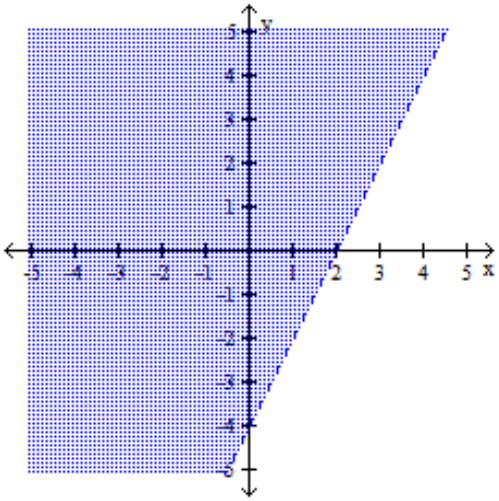
b)



c)



d)



Operations with Polynomials Sections 5.1 – 5.3

_____ **68.** **Add:** $(8x^2 + 4x - 2) + (5x^2 - 6x - 3)$

a) $40x^4 - 24x^2 + 6$ **b)** $13x^2 + 2x - 5$

c) $13x^2 - 2x - 5$ **d)** $13x^2 - 2x + 5$

_____ **69.** **Subtract:** $(7x^2 + 2x - 1) - (4x^2 - 5x - 3)$

a) $3x^2 + 7x + 2$ **b)** $-28x^4 - 10x^2 + 3$

c) $3x^2 + 7x - 2$ **d)** $3x^2 - 3x - 4$

_____ **70.** **Multiply:** $-4xy(6x^3y^2 - 5xy)$

a) $-24x^4y^2 + 20xy^2$ **b)** $-24x^4y^3 + 20x^2y^2$

c) $-24x^4y^2 + 20x^2y^2$ **d)** $-4x^6y^5$

_____ **71.** **Multiply:** $(3x - 5)(2x - 7)$

a) $6x^2 + 35$ **b)** $6x^2 - 31x - 35$

c) $6x^2 + 31x + 35$ **d)** $6x^2 - 31x + 35$

_____ **72.** **Multiply:** $(4x - 9)^2$

a) $16x^2 - 81$ **b)** $16x^2 + 72x + 81$

c) $16x^2 - 72x + 81$ **d)** $16x^2 - 72x - 81$

_____ **73.** **Multiply:** $(5x - 3y)(5x + 3y)$

a) $25x^2 - 9y^2$ **b)** $25x^2 + 30xy - 9y^2$

c) $25x^2 - 30xy - 9y^2$ **d)** $25x^2 + 9y^2$

_____ **74.** **Multiply:** $(x-2)(3x^2-8x+4)$

a) $3x^3+14x^2+20x-8$ **b)** $3x^3-2x^2-12x-8$

c) $3x^3-14x^2-12x-8$ **d)** $3x^3-14x^2+20x-8$

_____ **75.** **Divide** $9x^3-6x^2-3x$ **by** $3x$

a) $6x^2-3x$ **b)** $3x^2-2x$

c) $3x^2-2x-1$ **d)** $3x^2-3x-1$

76. **Divide using long division.**

$$x+7\overline{)x^2+2x-38}$$

77. **Divide using long division.**

$$\frac{x^3-x^2-9x+14}{x-3}$$

Factoring Sections 5.4 – 5.6

In questions 78 – 82 identify <u>one factor</u> of each polynomial.

_____ **78.** $4x^2-4xy+5x-5y$

a) $x-5$ **b)** $4x-5$ **c)** $4x+5$ **d)** $x+5$

_____ **79.** $x^2-8x+12$

a) $x-6$ **b)** $x+6$ **c)** $x+2$ **d)** $x-4$

_____ 80. $x^2 - 5x - 24$

a) $x - 3$ b) $x + 8$ c) $x - 4$ d) $x - 8$

_____ 81. $9x^2 - 16y^2$

a) $3x - y$ b) $3x + 4y$ c) $x - y$ d) $3x - 4$

_____ 82. $5x^2 - 13x - 6$

a) $5x + 2$ b) $5x - 3$ c) $x + 3$ d) $5x - 2$

83. Factor completely: $27 - m^3$

84. Factor completely: $s^3 + 125$

Solve Quadratic Equations by Factoring Section 5.7

85. Solve the equation:

$x^2 - x - 20 = 0$

86. Solve the equation:

$2x^2 + x = 6$

Operations with Rational Expression Section 6.1 – 6.2

87. Simplify: $\dfrac{x^2 - x - 6}{x - 3}$

88. Simplify: $\dfrac{x^2 - 1}{x^2 + 4x - 5}$

89. Simplify: $\dfrac{x^2 - 36}{6 - x}$

90. Simplify: $\dfrac{x^2 + 3x}{x^2 - 3x - 4} \cdot \dfrac{x^2 - 5x + 4}{x^2 + 2x - 3}$

91. **Simplify:** $\dfrac{x^2-49}{2x+10} \div \dfrac{x^2-9x+14}{x^2+3x-10}$

a) $\dfrac{x-7}{2}$ **b)** $\dfrac{(x+7)(x-7)^2}{2(x+5)^2}$ **c)** $\dfrac{(x+7)(x-5)}{2x+10}$ **d)** $\dfrac{x+7}{2}$

92. **Simplify:** $\dfrac{3x}{y}+\dfrac{4y}{x}$

a) $\dfrac{3x+4y}{x+y}$ **b)** $\dfrac{3x+4y}{xy}$ **c)** $\dfrac{3x^2+4y}{xy}$ **d)** $\dfrac{3x^2+4y^2}{xy}$

93. **Simplify:** $\dfrac{5}{x-1}-\dfrac{3}{x+2}$

a) $-\dfrac{2}{3}$ **b)** $\dfrac{2x+13}{(x-1)(x+2)}$ **c)** $\dfrac{8x+7}{(x-1)(x+2)}$ **d)** $2x+13$

94. **Simplify:** $\dfrac{2}{x+2}+\dfrac{x+10}{x^2-4}$

a) $\dfrac{x+12}{x^2+x-2}$ **b)** $3x+6$ **c)** $\dfrac{3(x+4)}{(x-2)(x+2)}$ **d)** $\dfrac{3}{x-2}$

Simplifying Complex Fractions Section 6.3

95. **Simplify:**

$$\frac{2+\dfrac{3}{x}}{4x-\dfrac{9}{x}}$$

96. Simplify:

$$\frac{\frac{1}{x}+\frac{1}{2}}{\frac{1}{x^2}-\frac{1}{4}}$$

a) $\frac{2x}{2-x}$ **b)** $\frac{4+2x^2}{(2-x)(2+x)}$ **c)** $x-2$ **d)** $\frac{1}{2-x}$

Simplifying Rational Equations Section 6.4 – 6.5

97. Solve: $\frac{3}{y+4}+\frac{2}{y-4}=\frac{1}{y^2-16}$

98. Solve: $x+\frac{8}{x}=6$

99. The speed of a bicyclist is 12 mph faster than the speed of a walker. If the bicyclist travels 28 miles in the same amount of time that the walker travels 8 miles, find the speed of the walker and the bicyclist.

Variation and Problem Solving Section 6.6

100. Write each statement as an equation. Use *k* as the constant of variation.

Statement	Equation with *k* as the constant of variation
a) ***p* varies directly as *q***	
b) ***m* varies inversely as** n	
c) ***y* varies directly as *a* and inversely as *b***	
d) ***y* varies jointly as *x* and *z***	

101. **If *y varies directly as x*, find the constant of variation.**

***y* = 16 when *x* = 48**

***k* = _____**

102. **If *y varies inversely as x*, find the constant of variation.**

***y* = 40 when *x* = 4**

***k* = _____**

Simplifying Radicals and Fractional Exponents Sections 7.1 – 7.3

103. **Use the definition of rational exponents to write the expression with the appropriate root:**

a) $(3x)^{2/5}$ **b)** $3x^{2/5}$

In questions 104 – 106 use the properties of exponents to simplify each expression.

104. $a^{1/2}a^{1/3}$ **105.** $\left(a^{2/5}\right)^{10}$ **106.** $\dfrac{a^{13/3}}{a^{3/2}}$

In questions 107 – 110 assume all variables represent positive real numbers.

107. **Simplify the radical:** $\sqrt{27x^3y^4}$

108. **Simplify the radical:** $\sqrt{48a^6b^3c^4}$

109. Simplify the radical:

$$\sqrt[3]{40x^3y^5}$$

110. Simplify the radical:

$$\sqrt[3]{81a^6b^2c^{10}}$$

Adding and Subtracting with Radical Expressions Section 7.4

111. Add or subtract as indicated:

$$2\sqrt{72x}-\sqrt{18x}+\sqrt{6x}$$

112. Add or subtract as indicated:

$$\sqrt{49a^2}-\sqrt{27a^3}+\sqrt{12a^3}$$

Rationalize the Denominator Section 7.5

113. Rationalize the denominator of

a) $\dfrac{6}{\sqrt{3}}$

b) $\sqrt{\dfrac{11x}{5y}}$

114. Rationalize the denominator of

$$\frac{3}{2-\sqrt{3}}$$

Solving Radical Equations Section 7.6

Solve each equation. Remember to check your solutions.

115. Solve: $\sqrt{x-2}-7=0$

116. Solve: $\sqrt{x+3}-x=-3$

Complex Numbers Section 7.7

117. Write using *i* notation:

a) $\sqrt{-9}$ **b)** $\sqrt{-12}$

In questions 118 – 119 add or subtract as indicated. Write your answer in the form $a+bi$.

118. $(4-8i)+(9-6i)$ **119.** $(4-8i)-(9-6i)$

Multiply. Write your answer in the form $a+bi$.

120. a) $(4+i)(3+i)$ **b)** $(4-2i)^2$

121. Divide. Write your answer in the form $a+bi$.

$$\frac{4}{2-i}$$

122. Simplify each expression.

a) $\dfrac{4\pm\sqrt{20}}{2}$ **b)** $\dfrac{-3\pm\sqrt{54}}{6}$

123. Evaluate the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ for $a = 3$, $b = -13$ and $c = 4$.

124. Solve using the quadratic formula and simplify your answer: $9x^2 + 6x - 1 = 0$

125. Solve using the quadratic formula and simplify your answer: $x^2 - 4x + 13 = 0$