

**Algebra 1**

**Semester 2 Final Review Answers**

1. Given  $y = mx + b$  what does  $m$  represent? What does  $b$  represent?

$m$  is the slope,  $b$  is the  $y$ -intercept

2. What axis is generally used for  $x$ ?

Horizontal axis

3. What axis is generally used for  $y$ ?

Vertical axis

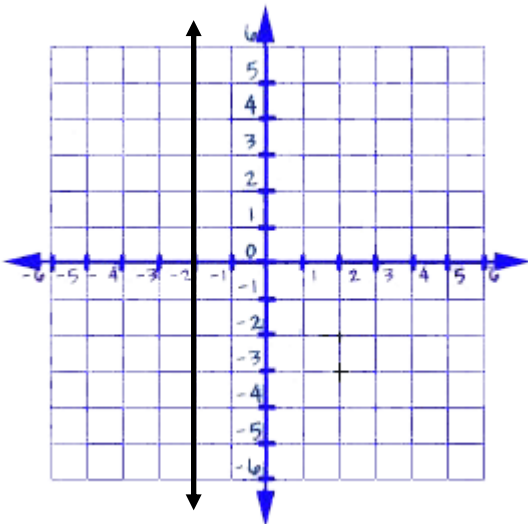
4. Given the equation  $y = \frac{5}{8}x - 4$  what is the slope? What is the  $y$ -intercept?

Slope =  $\frac{5}{8}$ ,  $y$ -intercept =  $(0, -4)$

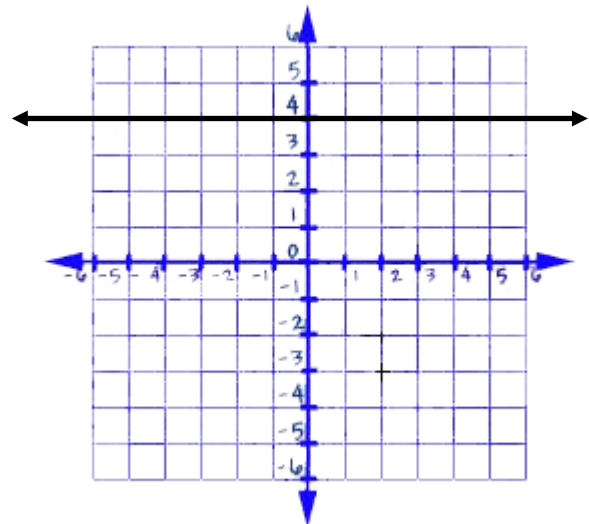
5. Given the equation  $y = -\frac{2}{3}x + 7$  what is the slope of the line parallel to this line? What is the slope of the line perpendicular to this line?

Parallel slope =  $-\frac{2}{3}$ , Perpendicular slope =  $\frac{3}{2}$

6. Graph the function  $x = -2$



7. Graph the function  $y = 4$



8. Find the slope of the line that passes through the points  $(6, 2)$  and  $(-3, 7)$ .

Slope =  $-\frac{5}{9}$

What is the  $x$ -intercept of the given function?

9.  $4x - y = 8$   
 $(2, 0)$

10.  $3x - 2y = 24$   
 $(8, 0)$

11.  $5x + 2y = 10$   
 $(2, 0)$

12.  $-2x + 4y = 8$   
 $(-4, 0)$

What is the  $y$ -intercept of the given function?

13.  $4x - y = 8$   
 $(0, -8)$

14.  $3x - 2y = 24$   
 $(0, -12)$

15.  $5x + 2y = 10$   
 (0, 5)

What is the slope of the given function?

17.  $4x - y = 8$   
 slope = 4

Convert the given function into slope-intercept form.

19.  $4x - y = 8$   
 $y = 4x - 8$

16.  $-2x + 4y = 8$   
 (0, 2)

18.  $3x - 2y = 24$   
 slope =  $\frac{3}{2}$

20.  $3x - 2y = 24$   
 $y = \frac{3}{2}x - 12$

21. Which point is on the line  $y = \frac{2}{3}x + 1$ ?  
 a) (-3, 1)      b) (2, 1)  
 c) (3, 3)      d) (-2, 3)  
 C

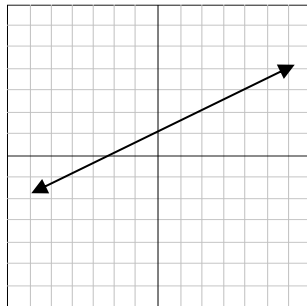
22. Which point is on the line  $y = \frac{1}{4}x - 2$ ?  
 a) (0, 2)      b) (4, -1)  
 c) (4, -2)      d) (2, 0)  
 B

23. Which point is on the line  $3x - y = 9$ ?  
 a) (6, 2)      b) (4, -2)  
 c) (3, 0)      d) (-3, 0)  
 C

24. Which point is on the line  $5x + y = 10$ ?  
 a) (2, 0)      b) (2, -5)  
 c) (5, -10)      d) (0, -5)  
 A

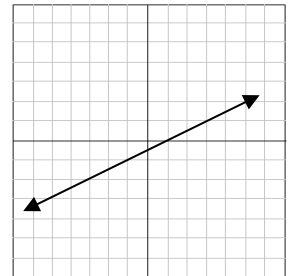
25. Which point is on the line shown on the graph?

- a) (1, 0)
- b) (3, 4)
- c) (4, 3) ← this one
- d) (0, -2)



26. Which point is on the line shown on the graph?

- a) (2, 0)
- b) (3, 1) ← this one
- c) (3, -3)
- d) (-3, 1)



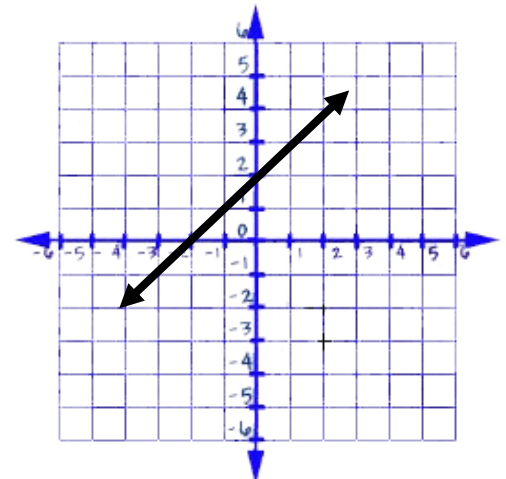
27. Is (4, 3) a solution to the equation  $y = -3x + 10$ ?  
 No

28. Is (4, 3) a solution to the equation  $y = 3x - 9$ ?  
 Yes

For problems 29 and 30 use the graph to the right.

29. Is the point (3, 1) a solution to the equation of this line?  
 No

30. Is the point (-2, 0) a solution to the equation of this line?  
 Yes



Convert the following equations to standard form with integer coefficients.

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$$31. y = \frac{1}{2}x - 4$$
$$x - 2y = 8$$

$$32. y = -\frac{2}{3}x + 1$$
$$2x + 3y = 3$$

Given the following slope, what is the slope of a parallel line?

$$33. \text{ Given slope} = -\frac{3}{4}$$
$$\text{Parallel slope} = -\frac{3}{4}$$

$$34. \text{ Given slope} = 5$$
$$\text{Parallel slope} = 5$$

Given the following slope, what is the slope of a perpendicular line?

$$35. \text{ Given slope} = -\frac{3}{4}$$
$$\text{Perpendicular slope} = \frac{4}{3}$$

$$36. \text{ Given slope} = 5$$
$$\text{Perpendicular slope} = -\frac{1}{5}$$

Write an equation of a line in *point-slope form* that goes through the given point and has the given slope.

$$37. (3, 5); m = 2$$
$$y - 5 = 2(x - 3)$$

$$38. (6, 1); m = \frac{1}{2}$$
$$y - 1 = \frac{1}{2}(x - 6)$$

$$39. (-1, 2); m = -3$$

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

$$40. (2, -2); m = -\frac{3}{4}$$

$$y + 2 = -\frac{3}{4}(x - 2)$$

Write an equation of a line in *slope-intercept form* that has the given y-intercept and the given slope.

$$41. \text{ y-intercept is } -2 \text{ and the slope is } \frac{5}{8}$$

$$y = \frac{5}{8}x - 2$$

$$42. \text{ y-intercept is } 13 \text{ and the slope is } 4$$

$$y = 4x + 13$$

Write an equation of a line in *slope-intercept form* that goes through the given point and has the given slope.

$$43. (0, 2); -2$$

$$y = -2x + 2$$

$$44. (0, -5); \frac{4}{3}$$

$$y = \frac{4}{3}x - 5$$

Write an equation of a line in *slope-intercept form* that goes through the given point and has the given slope.

$$45. (-3, 4) \text{ and has a slope of } 0$$

$$y = 4$$

$$46. (-3, 4) \text{ and has an undefined slope}$$

$$x = -3$$

Write the equation of the line in *slope intercept form* that goes through the given points.

$$47. (-3, 4) \text{ and } (1, 12)$$

$$y = 2x + 10$$

$$48. (2, 4) \text{ and } (-2, 0)$$

$$y = x + 2$$

Write in equation of the line in *slope-intercept form* that goes through the given points and has the given slope.

$$49. (-3, 4) \text{ and has a slope of } -2$$

$$y = -2x - 2$$

$$50. (-3, 4) \text{ and } m = 3$$

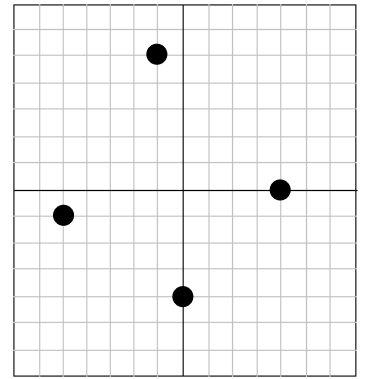
$$y = 3x + 13$$

51. Write the equation of the line that goes through  $(0,0)$  and  $m = 3$ .

$$y = 3x$$

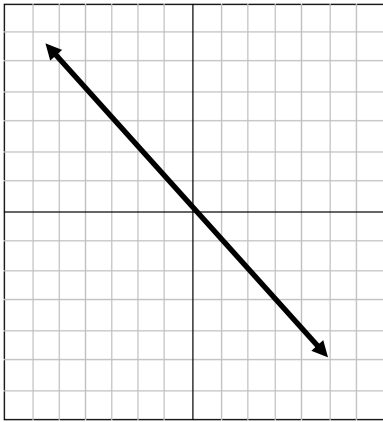
52. Plot the following points on the given plane.

- $(4,0)$        $(0,-4)$        $(-1,5)$        $(-5,-1)$

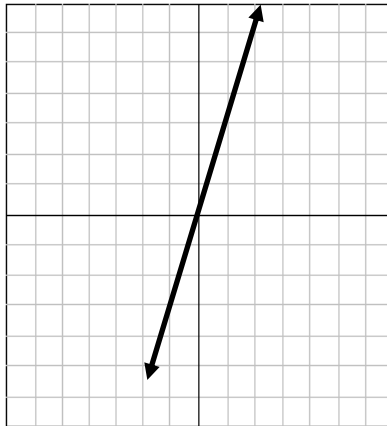


Graph each of the following equations.

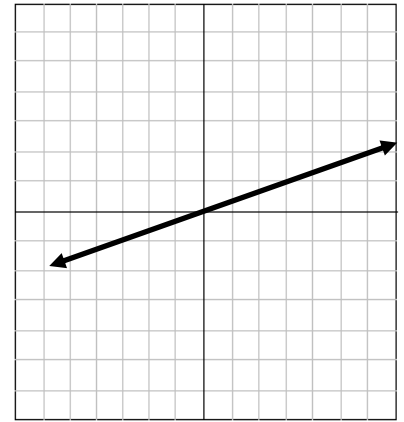
53.  $y = -x$



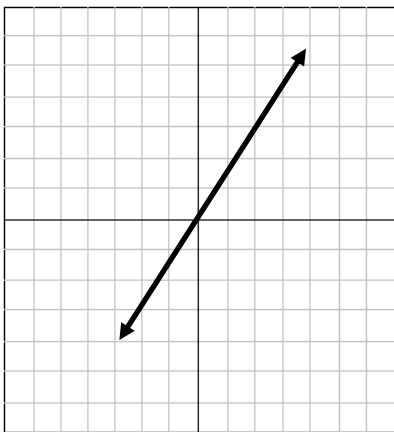
54.  $y = 3x$



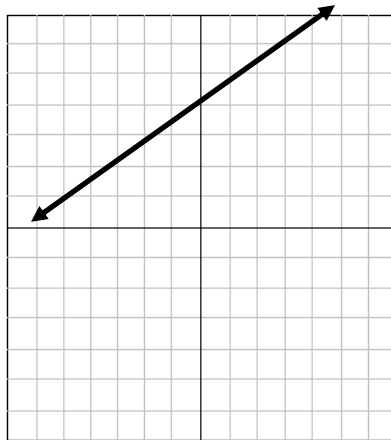
55.  $y = \frac{1}{3}x$



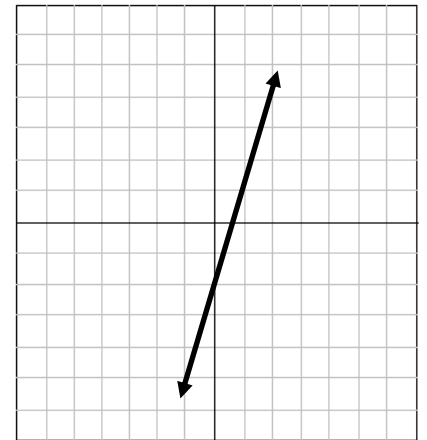
56.  $y = \frac{3}{2}x$



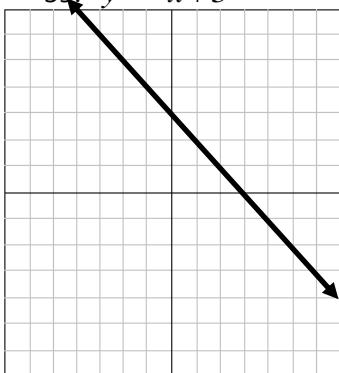
57.  $y = \frac{2}{3}x + 4$



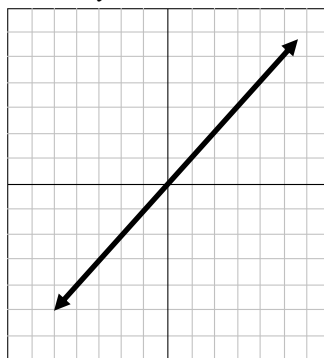
58.  $3y = 9x - 6$



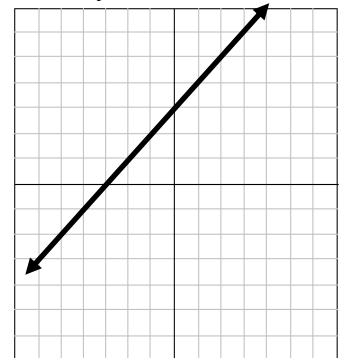
59.  $y = -x + 3$



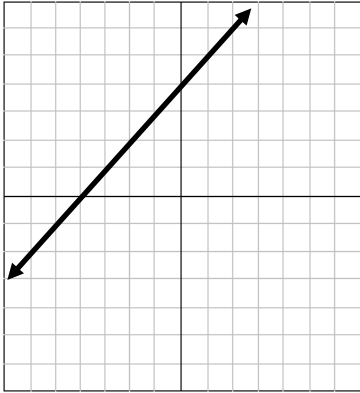
60.  $y = x$



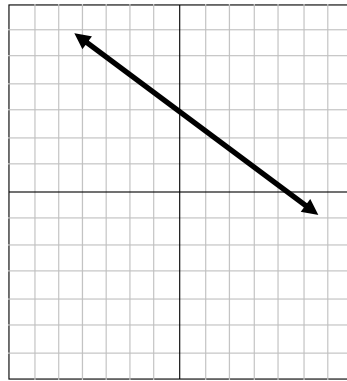
61.  $y = x + 3$



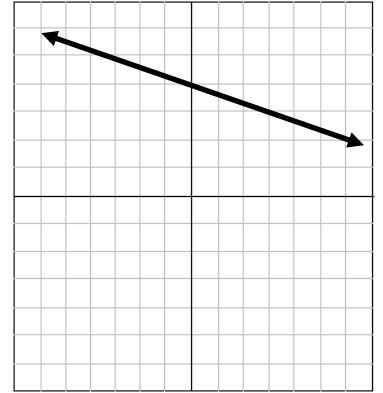
62.  $y = x + 4$



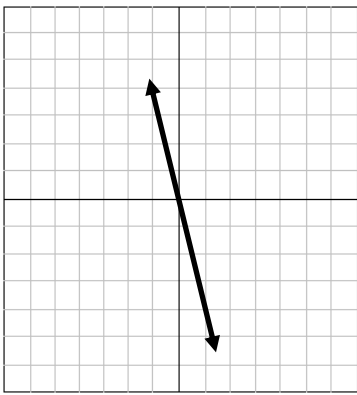
63.  $y = -\frac{2}{3}x + 3$



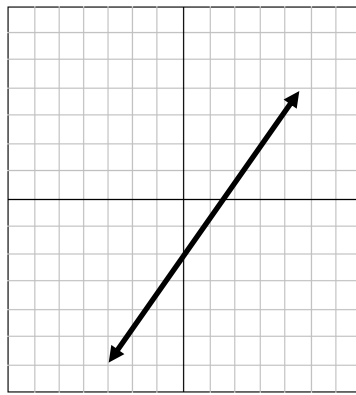
64.  $y = -\frac{1}{3}x + 4$



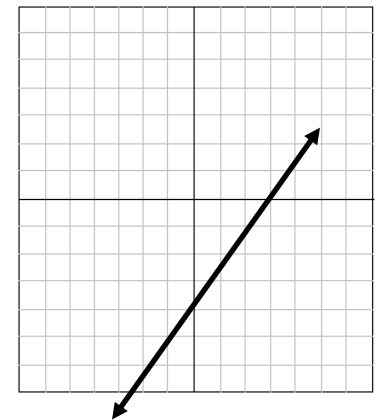
65.  $y = -3x$



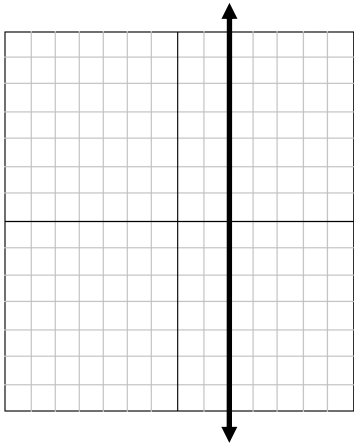
66.  $y = \frac{4}{3}x - 2$



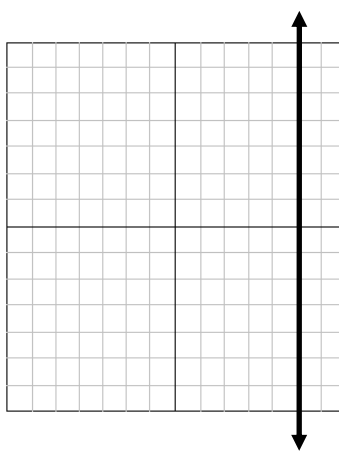
67.  $y = \frac{3}{2}x - 4$



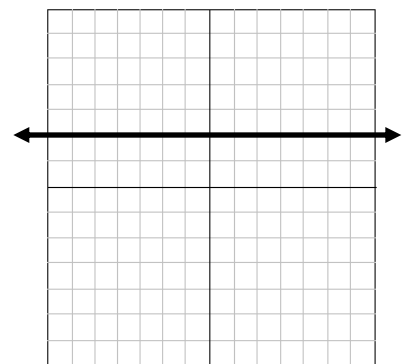
68.  $x = 2$



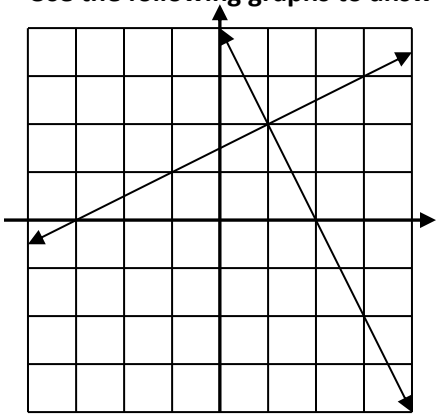
69.  $x = 5$



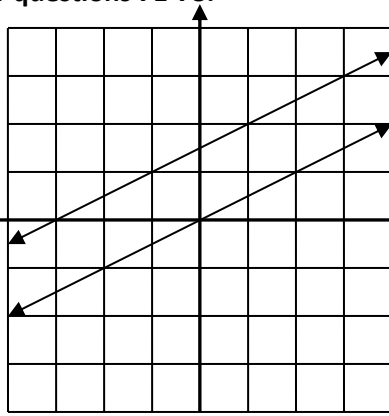
70.  $y = 2$



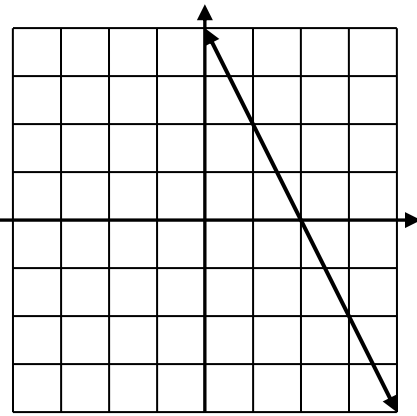
Use the following graphs to answer questions 71-73.



Graph A



Graph B



Graph C

71. Which of the graphs above suggests one solution to the system of linear equations?

A

72. Which of the graphs above suggests no solutions to the system of linear equations?

B

73. Which of the graphs above suggests an infinite number of solutions to the system of linear equations?

C

74. When algebraically solving the system of linear equations represented in Graph A, one might get

- a.  $x = 1, y = 2$       b.  $2 = 2$       c.  $2 = 3$       d. none of these

A

75. When algebraically solving the system of linear equations represented in Graph B, one might get

- a.  $x = 1, y = 2$       b.  $2 = 2$       c.  $2 = 3$       d. none of these

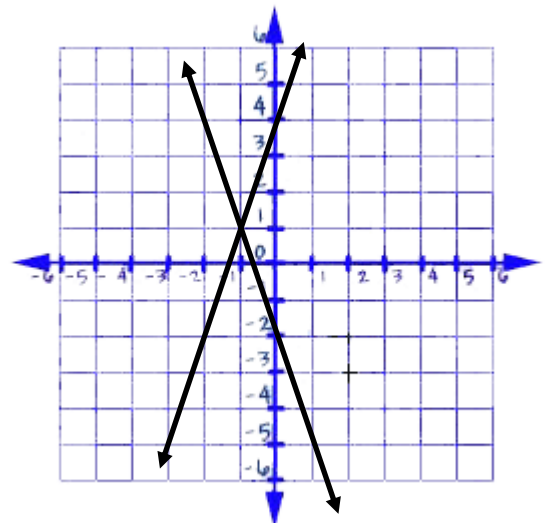
C

76. When algebraically solving the system of linear equations represented in Graph C, one might get

- a.  $x = 1, y = 2$       b.  $2 = 2$       c.  $2 = 3$       d. none of these

B

77. Graph the following equations  $y = 3x + 4$  and  $y = -3x - 2$  on the same plane.



**Simplify.****Use the quadratic formula to solve each of the following equations.**

78.  $x^2 + 3x - 2 = 0$

$$\begin{aligned} x &= \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-2)}}{2(1)} \\ &= \frac{-3 \pm \sqrt{9+8}}{2} \\ &= \frac{-3 \pm \sqrt{17}}{2} \end{aligned}$$

79.  $3x^2 + 6x - 6 = 0$

$$\begin{aligned} x &= \frac{-6 \pm \sqrt{(6)^2 - 4(3)(-6)}}{2(3)} \\ &= \frac{-6 \pm \sqrt{36+72}}{6} \\ &= \frac{-6 \pm \sqrt{108}}{6} \\ &= \frac{-6 \pm 6\sqrt{3}}{6} \\ &= -1 \pm \sqrt{3} \end{aligned}$$

80.  $2x^2 - 1 = 3x$

$$\begin{aligned} 2x^2 - 3x - 1 &= 0 \\ x &= \frac{3 \pm \sqrt{(-3)^2 - 4(2)(-1)}}{2(2)} \\ &= \frac{3 \pm \sqrt{9+8}}{4} \\ &= \frac{3 \pm \sqrt{17}}{4} \end{aligned}$$

81.  $4x^2 + 13x - 12 = 0$

$$\begin{aligned} x &= \frac{-13 \pm \sqrt{(13)^2 - 4(4)(-12)}}{2(4)} \\ &= \frac{-13 \pm \sqrt{169+192}}{8} \\ &= \frac{-13 \pm \sqrt{361}}{8} \\ &= \frac{-13 \pm 19}{8} \\ x &= \frac{-13+19}{8} = \frac{6}{8} = \frac{3}{4} \\ \text{and } x &= \frac{-13-19}{8} = \frac{-32}{8} = -4 \end{aligned}$$

**Solve.**

82.  $-5 - a > 25$   
 $a < -30$

83.  $-7 + a < 21$   
 $a < 28$

84.  $-7a > 35$   
 $a < -5$

85.  $-3x < 15$   
 $x > -5$

86.  $25 \geq 5a$   
 $a \leq 5$

87.  $30 \leq 2x$   
 $x \geq 15$

$$88. \frac{a}{10} \leq -7$$

$$a \leq -70$$

$$89. \frac{a}{5} \geq -9$$

$$a \geq -45$$

$$90. -\frac{a}{5} \geq 3$$

$$a \leq -15$$

$$91. -\frac{a}{3} \leq 4$$

$$a \geq -12$$

$$92. -\frac{1}{7}a \leq 3$$

$$a \geq -21$$

$$93. -\frac{1}{3}a \geq 2$$

$$a \leq -6$$

$$94. 4x + 5 \geq 5$$

$$x \geq 0$$

$$95. 5x \geq 10$$

$$x \geq 2$$

$$96. x - 4 \geq 8$$

$$x \geq 12$$

$$97. x - 7 \geq 3$$

$$x \geq 10$$

$$98. a + 4 \leq 12$$

$$a \leq 8$$

$$99. a + 7 \leq 21$$

$$a \leq 14$$

$$100. 5a > 20$$

$$a > 4$$

$$101. 4a > 40$$

$$a > 10$$

$$102. -2x - 5 > 4x - 8$$

$$x < \frac{1}{2}$$

$$103. 4x - 3 > 2x + 3$$

$$2x > 6$$

$$x > 3$$

$$104. x + 5 \leq 3(x - 3)$$

$$x + 5 \leq 3x - 9$$

$$-2x \leq -14$$

$$x \geq 7$$

$$105. -2x + 5 > -(3x + 2)$$

$$-2x + 5 > -3x - 2$$

$$x > -7$$

**Simplify the following radicals.**

$$106. \frac{\sqrt{36}}{6}$$

$$107. \frac{-\sqrt{81}}{-9}$$

$$108. \frac{\sqrt{2-1}}{1}$$

$$109. \frac{\sqrt{-5+5}}{0}$$

$$110. \frac{\sqrt{48}}{\sqrt{16 \cdot 3}}$$

$$4\sqrt{3}$$

$$111. \frac{\sqrt{75}}{\sqrt{25 \cdot 3}}$$

$$5\sqrt{3}$$

$$112. \frac{\sqrt{45}}{\sqrt{9 \cdot 5}}$$

$$3\sqrt{5}$$

$$113. \frac{\sqrt{\frac{36}{81}}}{\frac{\sqrt{36}}{9}} = \frac{6}{9} = \frac{2}{3}$$

$$114. \frac{\sqrt{\frac{2}{9}}}{\frac{\sqrt{2}}{9}} = \frac{\sqrt{2}}{3}$$



115.  $\sqrt{\frac{25}{100}}$   
 $\frac{5}{10} = \frac{1}{2}$

116. When graphing  $y = x^2 - 5$ , what is the x-coordinate of the vertex?

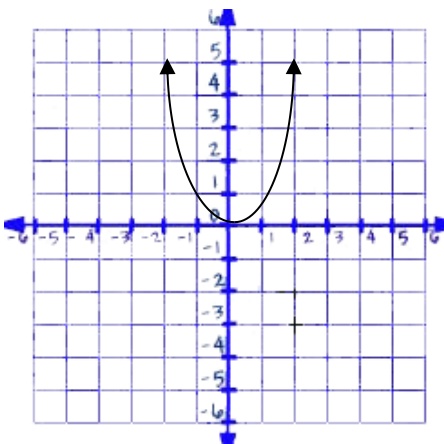
$$x = \frac{-b}{2a} = \frac{-0}{2(1)} = \frac{0}{2} = 0$$

117. When graphing  $y = x^2 + 4$ , what is the x-coordinate of the vertex?

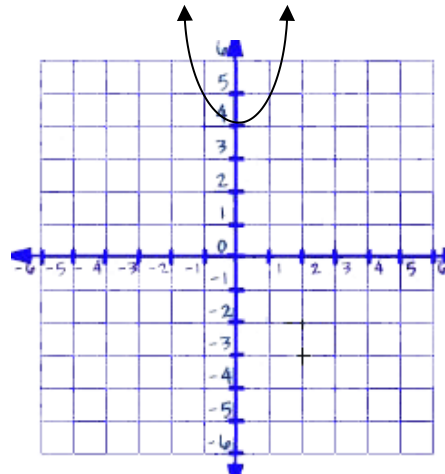
$$x = \frac{-b}{2a} = \frac{-0}{2(1)} = \frac{0}{2} = 0$$

**Graph the following equations.**

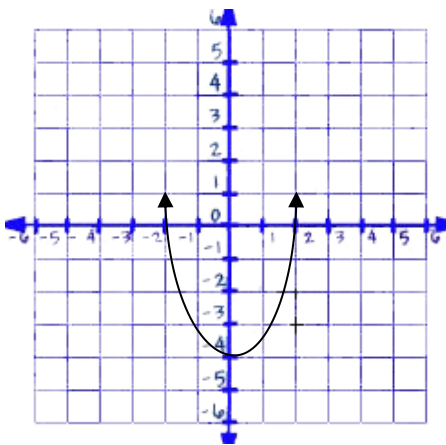
118.  $y = x^2$  Vertex (0, 0)



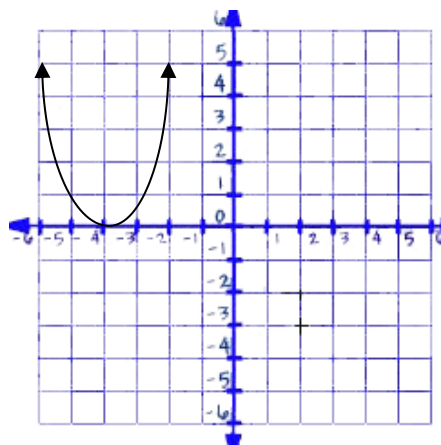
119.  $y = x^2 + 4$  Vertex (0, 4)



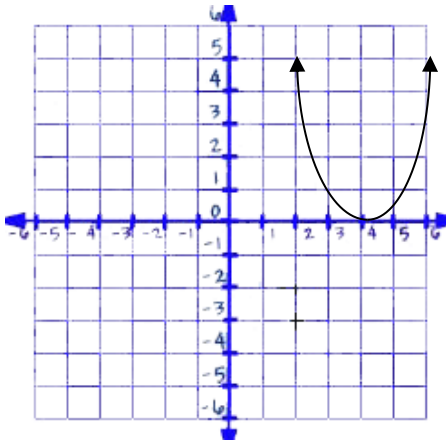
120.  $y = x^2 - 4$  Vertex (0, -4)



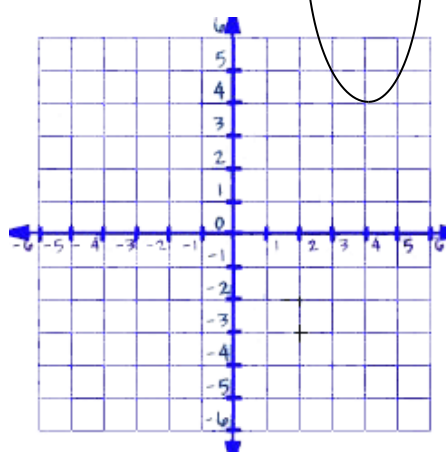
121.  $y = (x + 4)^2$  Vertex (-4, 0)



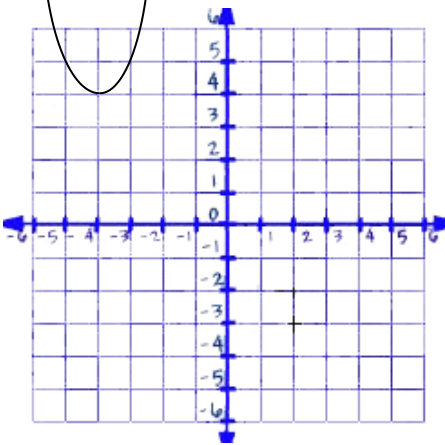
122.  $y = (x-4)^2$   
Vertex (4, 0)



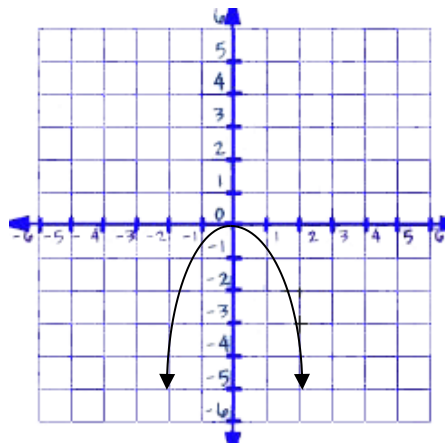
123.  $y = (x-4)^2 + 4$   
Vertex (4, 4)



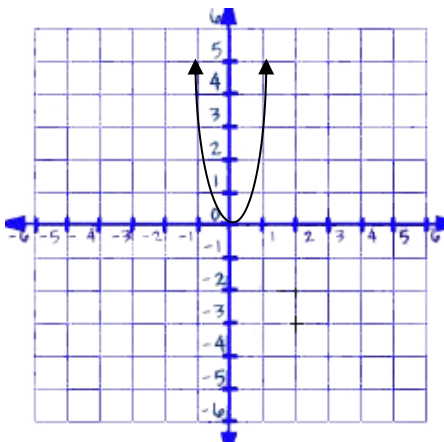
124.  $y = (x+4)^2 + 4$   
Vertex (-4, 4)



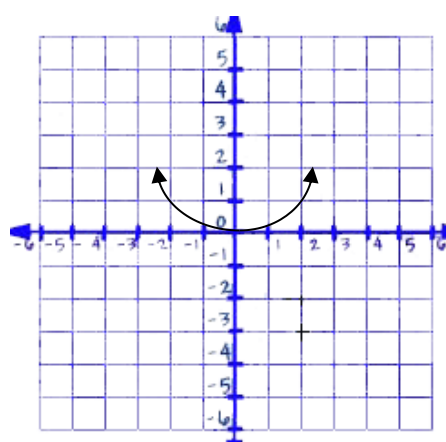
125.  $y = -x^2$   
Vertex (0, 0)



126.  $y = 4x^2$  Vertex (0, 0)



127.  $y = \frac{1}{4}x^2$  Vertex (0, 0)



128. Find the vertex for:  $y = (x-7)^2 + 5$   
(7, 5)

130. Find the vertex for:  
 $y = -2(x+5)^2 + 7$

(-5, 7)

129. Find the vertex for:  $y = (x+1)^2 - 5$   
(-1, -5)

131. Find the vertex for:  
 $y = \frac{2}{3}(x+3)^2 - 18$

(-3, -18)

**Express radicals in simplest form.**

132.  $3\sqrt{24}$   
 $3\sqrt{4 \cdot 6}$   
 $3 \cdot 2\sqrt{6}$   
 $6\sqrt{6}$

135.  $\sqrt{107} \cdot \sqrt{107}$   
 $\sqrt{107 \cdot 107}$   
107

138.  $6\sqrt{50}$

$6\sqrt{25 \cdot 2}$   
 $6 \cdot 5\sqrt{2}$   
 $30\sqrt{2}$

133.  $9\sqrt{128}$   
 $9\sqrt{64 \cdot 2}$   
 $9 \cdot 8\sqrt{2}$   
 $72\sqrt{2}$

136.  $\sqrt{6} \cdot \sqrt{12}$   
 $\sqrt{6 \cdot 12} = \sqrt{72}$   
 $\sqrt{36 \cdot 2} = 6\sqrt{2}$

139.  $\frac{1}{3}\sqrt{162}$

$\frac{1}{3}\sqrt{81 \cdot 2}$   
 $\frac{1}{3} \cdot 9\sqrt{2}$   
 $3\sqrt{2}$

134.  $\sqrt{3} \cdot \sqrt{3}$   
 $\sqrt{3 \cdot 3}$   
 $\sqrt{9}$   
3

137.  $\sqrt{2} \cdot \sqrt{26}$   
 $\sqrt{2 \cdot 26} = \sqrt{52}$   
 $\sqrt{4 \cdot 13} = 2\sqrt{13}$

140. When graphing  $y = ax^2 + bx + c$ , how do you calculate the x-coordinate of the vertex?

Use  $x = \frac{-b}{2a}$

141. After finding the x-coordinate of the vertex, how do you find the y-coordinate?  
Plug in the x value into your equation for all your x's. Solve for y.

**Find the x-coordinate of the vertex of the given equations.**

142.  $y = x^2 + 4x + 7$   
 $x = \frac{-b}{2a} = \frac{-4}{2(1)} = \frac{-4}{2} = -2$

143.  $y = x^2 - 4x + 7$   
 $x = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$

144.  $y = -x^2 - 16x + 1$   
 $x = \frac{-b}{2a} = \frac{-(-16)}{2(-1)} = \frac{16}{-2} = -8$

145.  $y = -x^2 + 16x + 1$   
 $x = \frac{-b}{2a} = \frac{-16}{2(-1)} = \frac{-16}{-2} = 8$

146.  $y = 3x^2 + 12x - 11$   
 $x = \frac{-b}{2a} = \frac{-12}{2(3)} = \frac{-12}{6} = -2$

147.  $y = -2x^2 - 14x - 9$   
 $x = \frac{-b}{2a} = \frac{-(-14)}{2(-2)} = \frac{14}{-4} = -\frac{7}{2}$

148.  $y = -2x^2 + 7x - 5$   
 $x = \frac{-b}{2a} = \frac{-7}{2(-2)} = \frac{-7}{-4} = \frac{7}{4}$

149.  $y = 15x^2 - 12x + 17$   
 $x = \frac{-b}{2a} = \frac{-(-12)}{2(15)} = \frac{12}{30} = \frac{2}{5}$

150.  $y = x^2 - 4$   
 $x = \frac{-b}{2a} = \frac{-0}{2(1)} = \frac{0}{2} = 0$

151.  $y = -7x^2$   
 $x = \frac{-b}{2a} = \frac{-0}{2(-7)} = \frac{0}{-14} = 0$