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*Part A: Quadratic Inequalities***Practice 1**

1. C

 $a = -5$ , opens downward $c = 3$ ,  $y$ -intercept:  $(0, 3)$ 

dashed

shading above  $y$ -int or  $0 > 3$  false

2. A

 $a = 4$ , opens upward $c = -3$ ,  $y$ -intercept:  $(0, -3)$ 

dashed

shading above  $y$ -int or  $0 > -3$  true

3. B

 $a = 6$ , opens upward $c = -3$ ,  $y$ -intercept:  $(0, -3)$ 

dashed

shading below  $y$ -int or  $0 < -3$  false

4. D

 $a = -4$ , opens downward $c = 3$ ,  $y$ -intercept:  $(0, 3)$ 

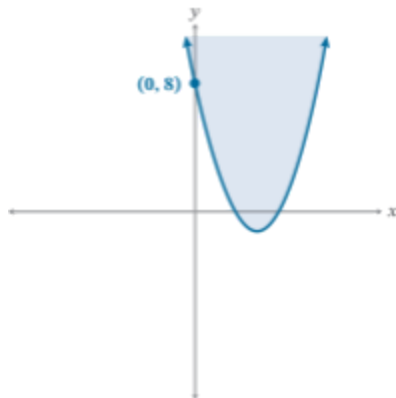
dashed

shading below  $y$ -int or  $0 < 3$  true

5.

The parabola will open upward since  $a = +1$  and will be solid because the symbol is greater than or equal to. The shading will be above the  $y$ -intercept,  $c = 8$  (inside the parabola). Using  $(0, 0)$  results in a false statement, so the shading will be where  $(0, 0)$  is not located.

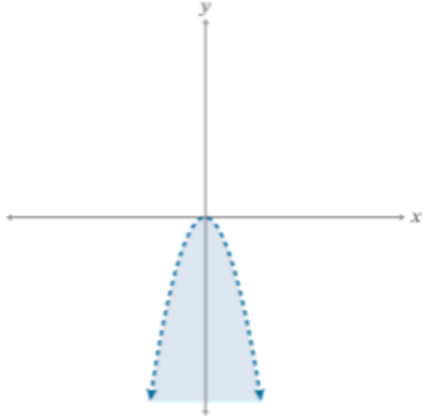
Sample sketch:



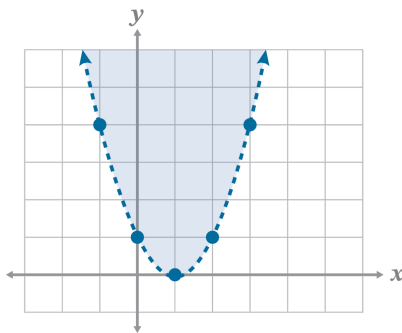
6.

The parabola will open downward because  $a = -1$ . The parabola will be dashed because the symbol is less than. The shading will be below the  $y$ -intercept,  $c = 0$  (inside the parabola). Using  $(1, 0)$  results in a true statement, so the shading will be where  $(1, 0)$  is located.

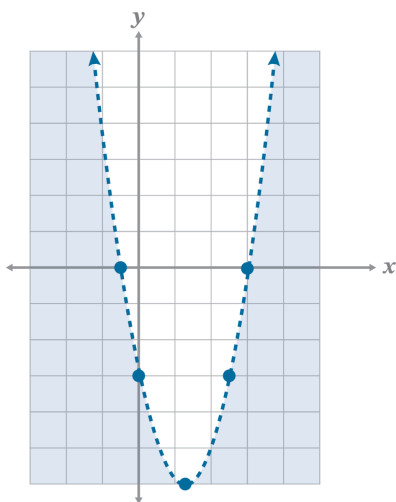
Sample sketch:



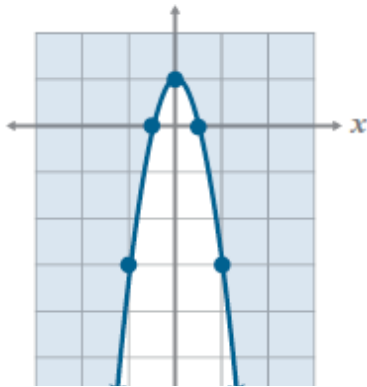
7.



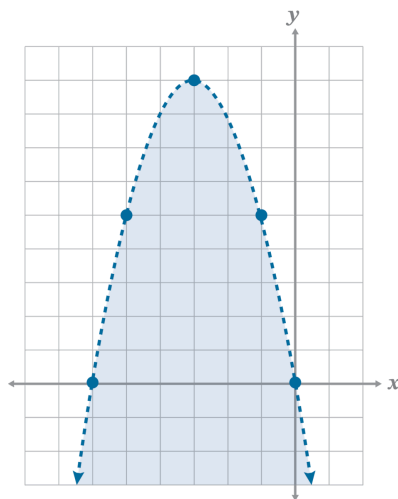
8.



9.



10.



11. always

The symbol is greater than, which does not include the points on the parabola; it only includes the shaded region.

12. sometimes

While the direction of the graph can help determine the shading, a positive leading coefficient does not always mean the graph is shaded inside. The shading is also determined by the inequality symbol.

**Practice 2**

1. D

 $a = 2$ , open up $c = -5$ ,  $y$ -intercept:  $(0, -5)$ 

dashed

shaded inside parabola

 $0 > -5$ , true

2. C

 $a = -2$ , open down $c = -5$ ,  $y$ -intercept:  $(0, -5)$ 

solid

shaded around parabola

 $0 > -5$  true

3. B

 $a = 2$ , open up $c = 0$ ,  $y$ -intercept:  $(0, 0)$ 

solid

shaded inside parabola

Using  $(1, 0)$ ,  $0 > -3$  true

4. A

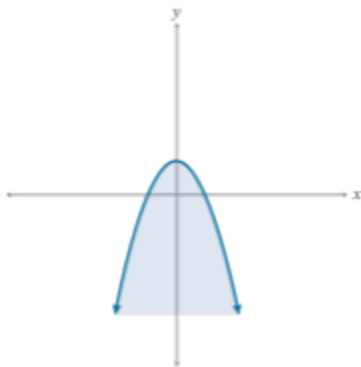
 $a = 5$ , open up $c = 2$ ,  $y$ -intercept:  $(0, 2)$ 

dashed

shaded inside parabola

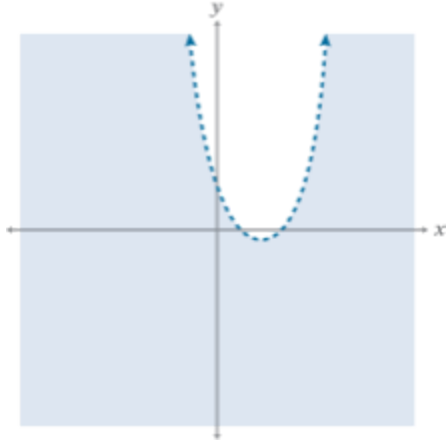
 $0 > 2$ , false

5. The leading coefficient is negative so the graph will open down. The parabola will be solid because of the less than or equal to symbol. The shading will be below the  $y$ -intercept and inside the parabola. Using  $(0, 0)$ , results in a true statement, so the shading will be  $(0, 0)$  is located. Sample sketch:

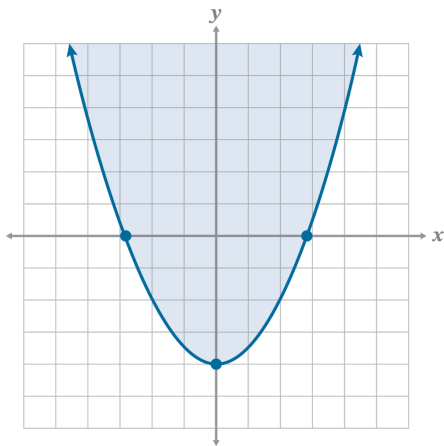


6. The leading coefficient is positive so the graph will open up. The parabola will be dashed because the symbol is greater than. The shading will be below the y-intercept and around the parabola. Using  $(1, 0)$  results in a false statement, so the shading will be opposite of where  $(1, 0)$  is located.

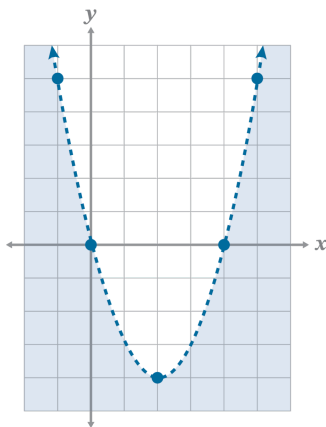
Sample sketch:



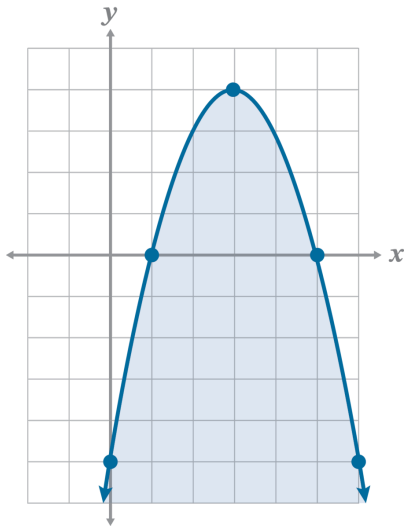
7.



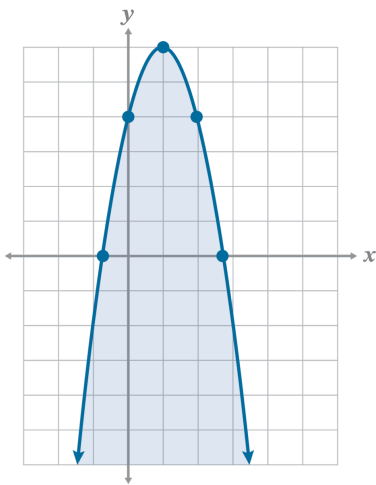
8.



9.



10.



11. sometimes

The value of the leading coefficient will also help determine direction of the graph and whether the shading is inside or surrounding the parabola.

12. always

The vertex is the minimum or maximum for quadratic inequalities just like equations.

*Part B: Quadratics in Vertex Form*

**Practice 1**

1.

$$a = 6, h = -4, k = -8$$

vertex:  $(-4, -8)$

2.

$$a = -\frac{2}{3}, h = 1, k = 14$$

vertex:  $(1, 14)$

3.

$$a = 1, h = 6, k = 0$$

vertex:  $(6, 0)$

The graph will shift 6 spaces right.

4.

$$a = 1, h = 0, k = 9$$

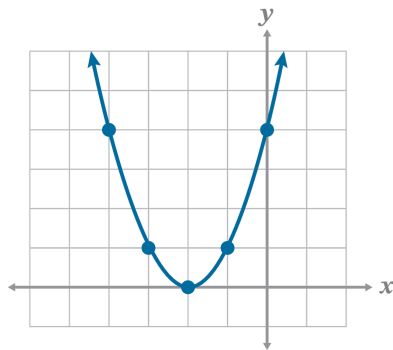
vertex:  $(0, 9)$

The graph will shift up 9 spaces.

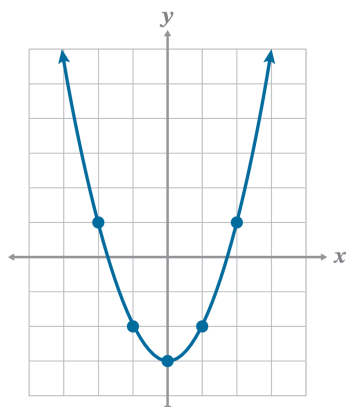
5.

$$a = 1, h = -2, k = 0$$

vertex:  $(-2, 0)$



6.  $a = 1, h = 0, k = -3$



7.

The graph will be wider by a factor of  $\frac{1}{4}$  because  $a = \frac{1}{4}$ . The graph will shift 6 units left because  $h = -6$ . The graph will shift down 12 units because  $k = -12$ . The vertex is  $(-6, -12)$ .

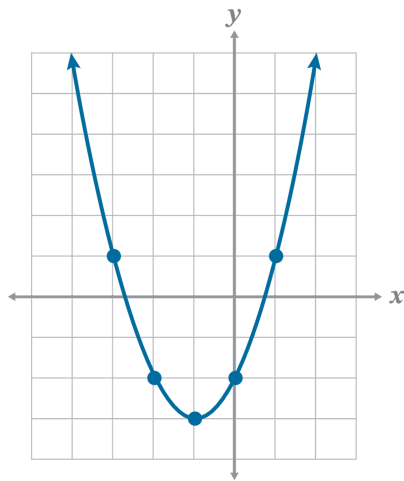
8.

The graph will be reflected and narrower by a factor of 4 because  $a = -4$ . The graph will shift 11 spaces right because  $h = 11$  and will move up one space because  $k = 1$ . The vertex is  $(11, 1)$ .

9.

$a = 1, h = -1, k = -3$

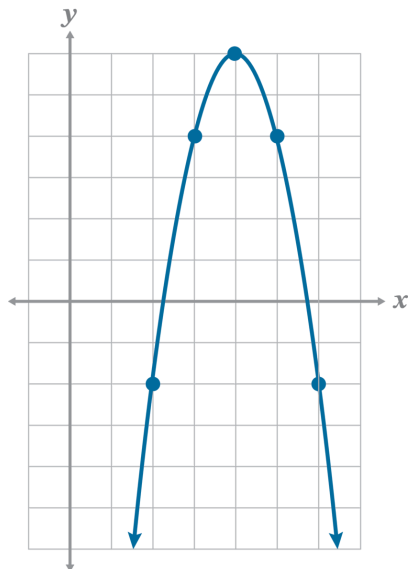
vertex:  $(-1, -3)$



10.

$a = -2, h = 4, k = 6$

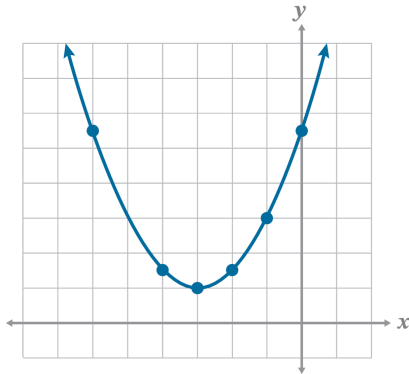
vertex:  $(4, 6)$



11.

$$a = \frac{1}{2}, h = -3, k = 1$$

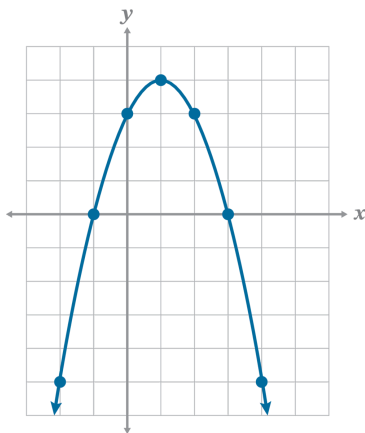
vertex:  $(-3, 1)$



12.

$$a = -1, h = 1, k = 4$$

vertex:  $(1, 4)$



### Practice 2

1.

$$a = -1, h = 11, k = -\frac{5}{2}$$

vertex:  $(11, -\frac{5}{2})$

2.

$$a = 10, h = -4, k = -6$$

vertex:  $(-4, -6)$

3.

$$a = 1, h = 0, k = -11$$

vertex:  $(0, -11)$

The graph will move down 11 spaces.

4.

$a = 1, x = -14, k = 0$

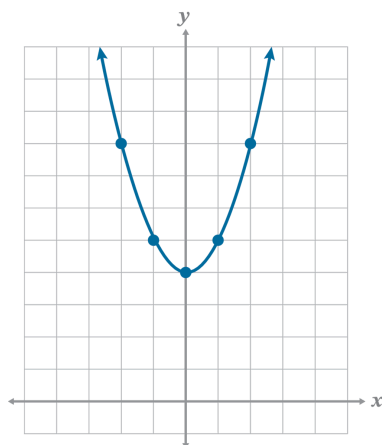
vertex:  $(-14, 0)$

The graph will shift left 14 spaces.

5.

$a = 1, h = 0, k = 4$

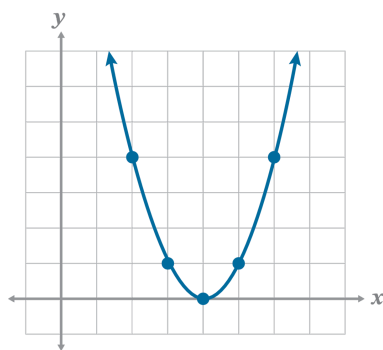
vertex:  $(0, 4)$



6.

$a = 1, h = 4, k = 0$

vertex:  $(4, 0)$



7.

The graph will be reflected and be wider by a factor of  $\frac{1}{2}$  because  $a = -\frac{1}{2}$ . The graph will shift right 6 spaces because  $h = 6$  and will move down 5 because  $k = -5$ . The vertex is  $(6, -5)$ .

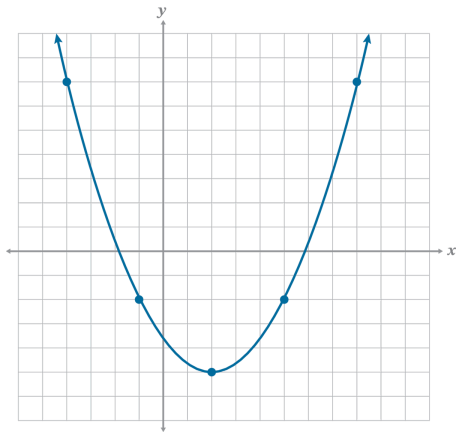
8.

The graph will be narrower by a factor of 8 because  $a = 8$ . The graph will shift left by 1 since  $h = -1$  and will shift down 14 spaces because  $k = -14$ . The vertex is  $(-1, -14)$ .

9.

$$a = \frac{1}{3}, h = 2, k = -5$$

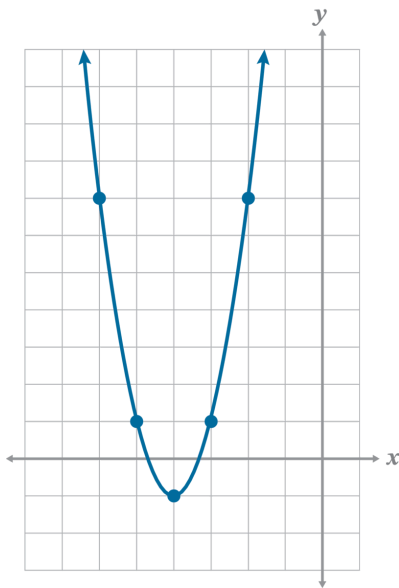
vertex:  $(2, -5)$



10.

$$a = 2, h = -4, k = -1$$

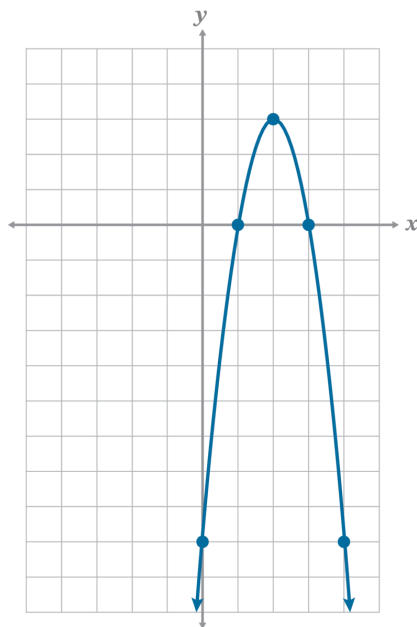
vertex:  $(-4, -1)$



11.

$$a = -3, h = 2, k = 3$$

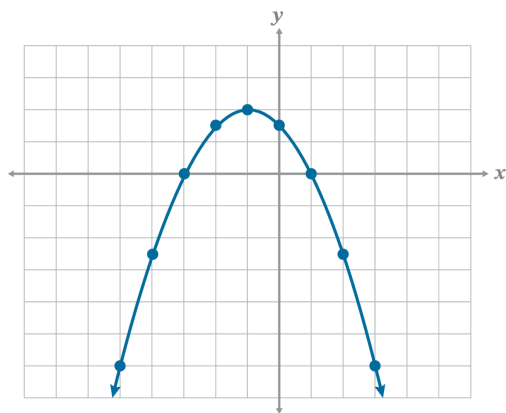
vertex:  $(2, 3)$



12.

$$a = -\frac{1}{2}, h = -1, k = 2$$

vertex:  $(-1, 2)$

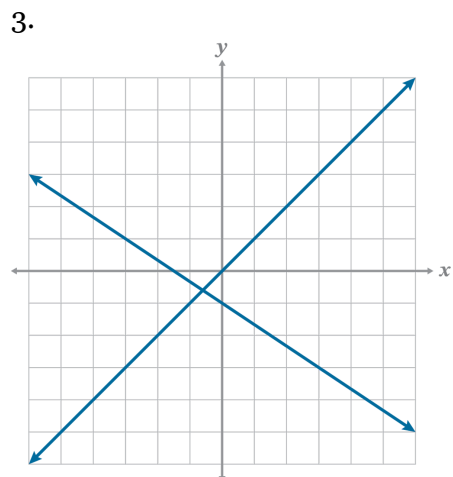


Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12
Lesson Origin	26	26	8	26	26	19	19	19	9, 10	10	25, 26	26

1.  
 domain:  $(-\infty, \infty)$   
 range:  $[-4, \infty)$

2.  
 $x = -3, 1$   
 vertex  $(-1, -4)$



4.  
 From the quadratic equation, name  $a$ ,  $b$ , and  $c$ . Then, calculate the axis of symmetry using the formula  $\left(\frac{-b}{2a}\right)$ . Use the value of the AoS and plug this into the given equation to find the value of  $y$ . The vertex will be  $\left(\frac{-b}{2a}, y\right)$ .

5.  
 Quadratic functions can be solved by factoring and by graphing and finding the  $x$ -intercepts.

6.

$$\left(p^{\frac{5}{6}} q^{\frac{6}{8}}\right)^{\frac{1}{8}}$$

$$p^{\frac{5}{48}} q^{\frac{3}{8}}$$

7.

$$(a^3 b^2 c^8)^2 \cdot bc^{-5}$$

$$a^6 b^4 c^{16} \cdot bc^{-5}$$

$$a^6 b^5 c^{11}$$

8.

$$\begin{aligned} & (2^4 x^8 y^3)^{\frac{1}{2}} \\ & 2^{4 \cdot \frac{1}{2}} x^{8 \cdot \frac{1}{2}} y^{3 \cdot \frac{1}{2}} = 2^2 x^4 y^{\frac{3}{2}} \\ & 4x^4 y^{\frac{3}{2}} \end{aligned}$$

9.

$$m = 75, b = 2,000$$

$$y = 75x + 2,000$$

Devon earns \$75 for every sale made. The minimum amount of money Devon will earn in a month, if no sales are made, is \$2,000.

10.

$$y = 75x + 2,000$$

$$3,725 = 75x + 2,000$$

$$3,725 - 2,000 = 75x + 2,000 - 2,000$$

$$1,725 = 75x$$

$$\left(\frac{1}{75}\right)(1,725) = \left(\frac{1}{75}\right)75x$$

$$23 = x$$

Devon made 23 sales if \$3,725 was earned.

11.

$$\input checked="" type="checkbox"/> x = -8$$

$$\input type="checkbox"/> x = -\frac{7}{2}$$

$$\input checked="" type="checkbox"/> x = \frac{7}{2}$$

$$\input type="checkbox"/> x = 8$$

Distractor Rationale:

The incorrect choices would be correct if the middle term was negative.

$$2x^2 + 9x = 56$$

$$2x^2 + 9x - 56 = 0$$

$$(2x - 7)(x + 8) = 0$$

$$2x - 7 = 0 \text{ or } x + 8 = 0$$

$$2x = 7$$

$$x = \frac{7}{2} \text{ or } x = -8$$

12. B

$$\text{A) } x = -21.845, 3.845$$

$$\text{B) } x = -3.845, 21.845$$

$$\text{C) } x = -2.531, 5.532$$

D) no real solution

Distractor Rationale:

A) Has the signs of the solutions switched.

- C) Would be correct if  $\frac{1}{6}$  was omitted from the equation.
- D) Would be correct if +14 was entered.