Unit 2A Review Answers

$$y = x^2 - 2x + 3$$

$$a = 1 \quad b = -2 \quad c = 3$$
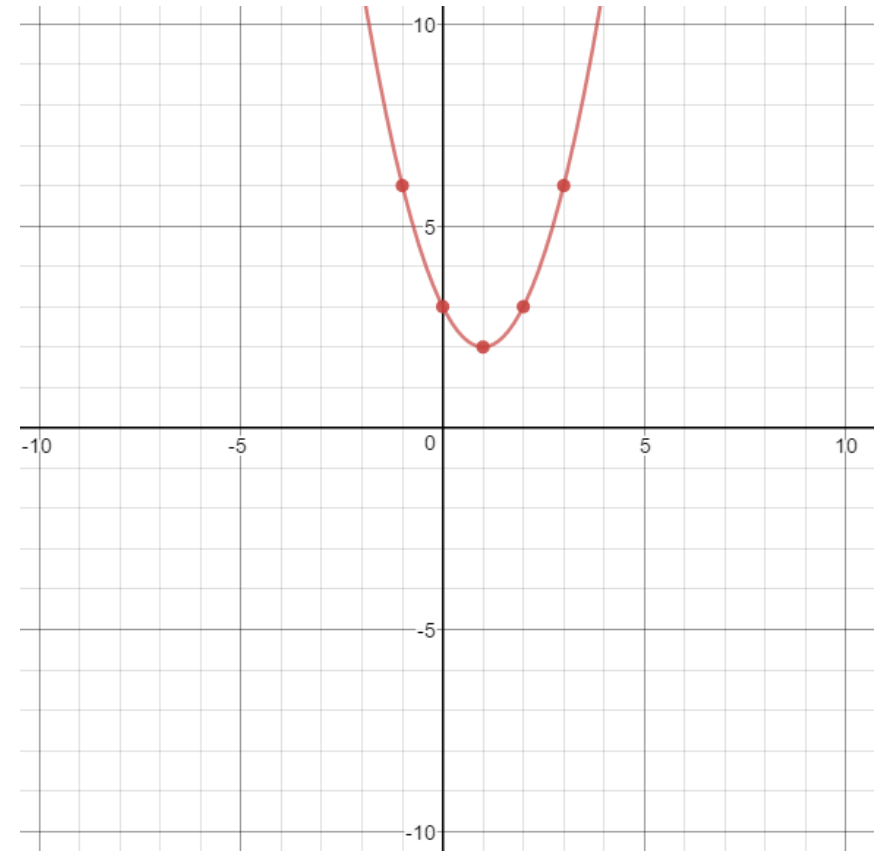
$$x = \frac{-(-2)}{2(1)} = 1$$

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

$$Vertex : (1,2)$$

$$y - \text{int} : (0,3)$$

x	Y
-1	6
0	3
1	2
2	3
3	6

$$y = -2x^2 - 6x + 5$$

$$a = -2 \quad b = -6 \quad c = 5$$

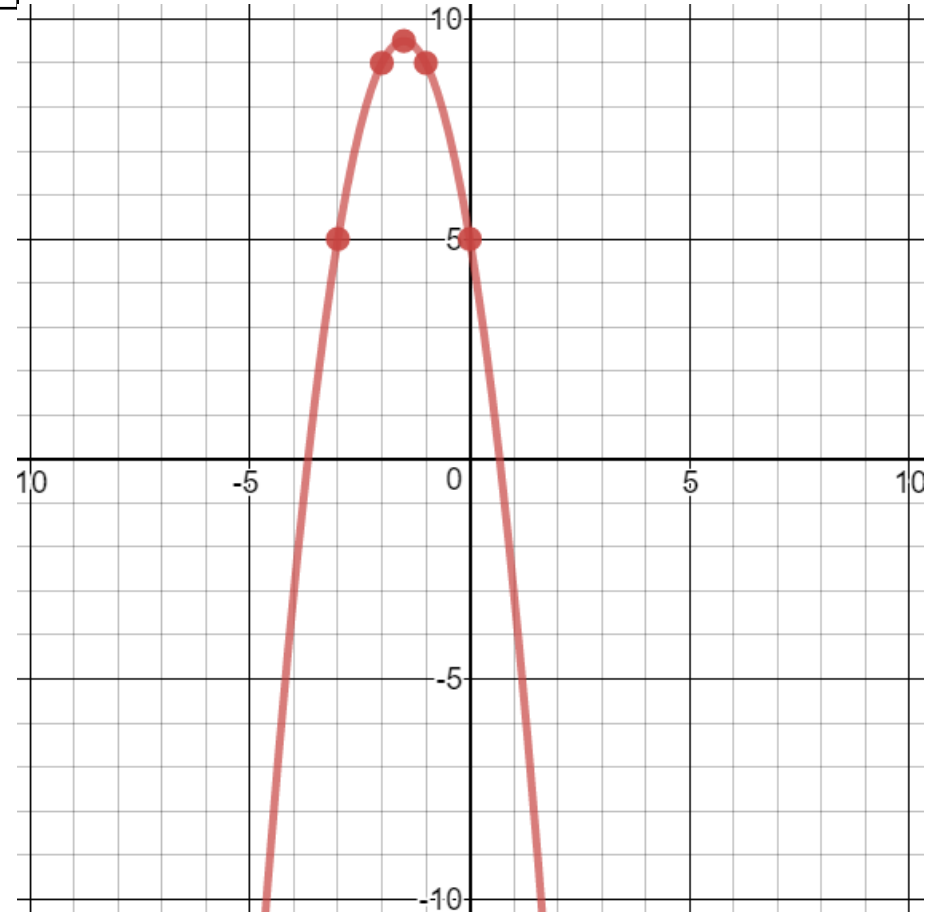| x	Y
-3	5
-2	9
-1.5	9.5
-1	9
0	5

$$x = \frac{-(-6)}{2(-2)} = -\frac{3}{2} = -1.5$$

$$y = -2(-1.5)^2 - 6(-1.5) + 5 = 9.5$$

$$Vertex : (-1.5, 9.5)$$

$$y - \text{int} : (0,5)$$

$$y = \frac{1}{2}(x-2)^2 + 1$$

x	Y
0	3
1	1.5
2	1
3	1.5
4	3

$$a = \frac{1}{2} \quad h = 2 \quad k = 1$$

$$Vertex : (2,1)$$

$$y = \frac{1}{2}(0-2)^2 + 1 = 3$$
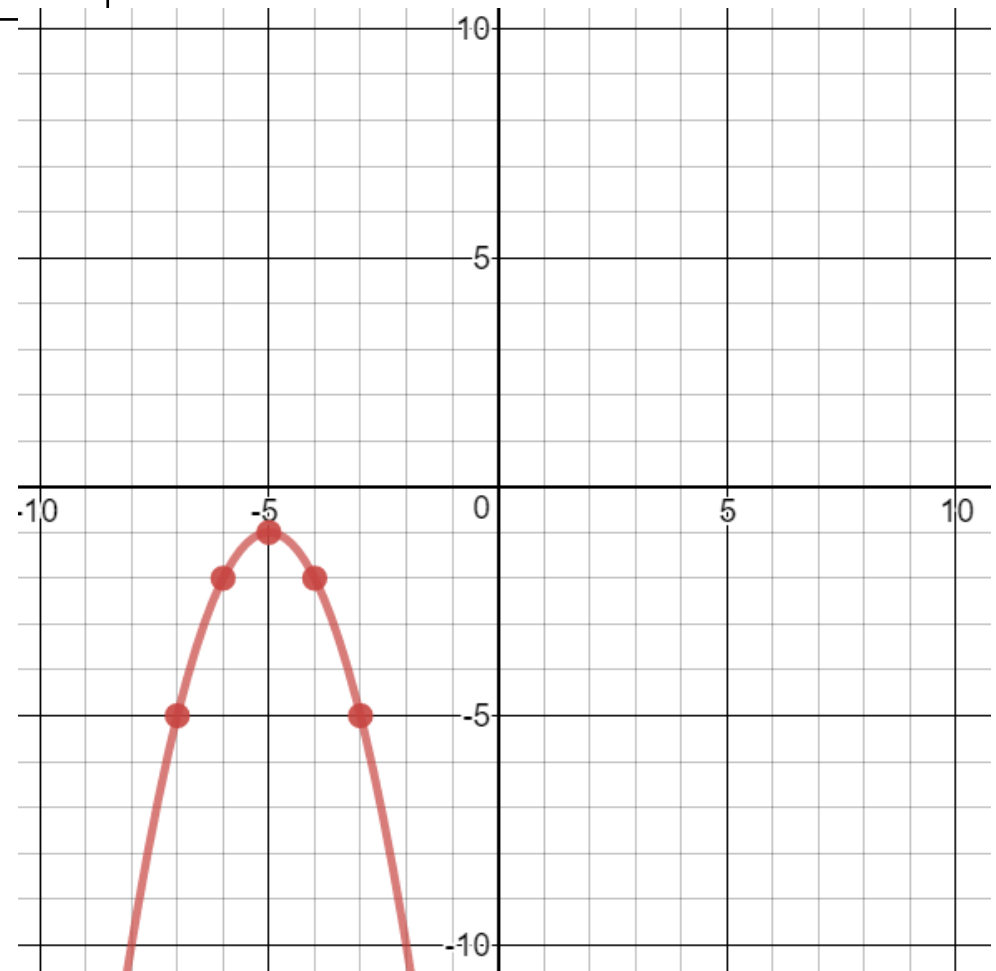
$$y - \text{int} : (0,3)$$
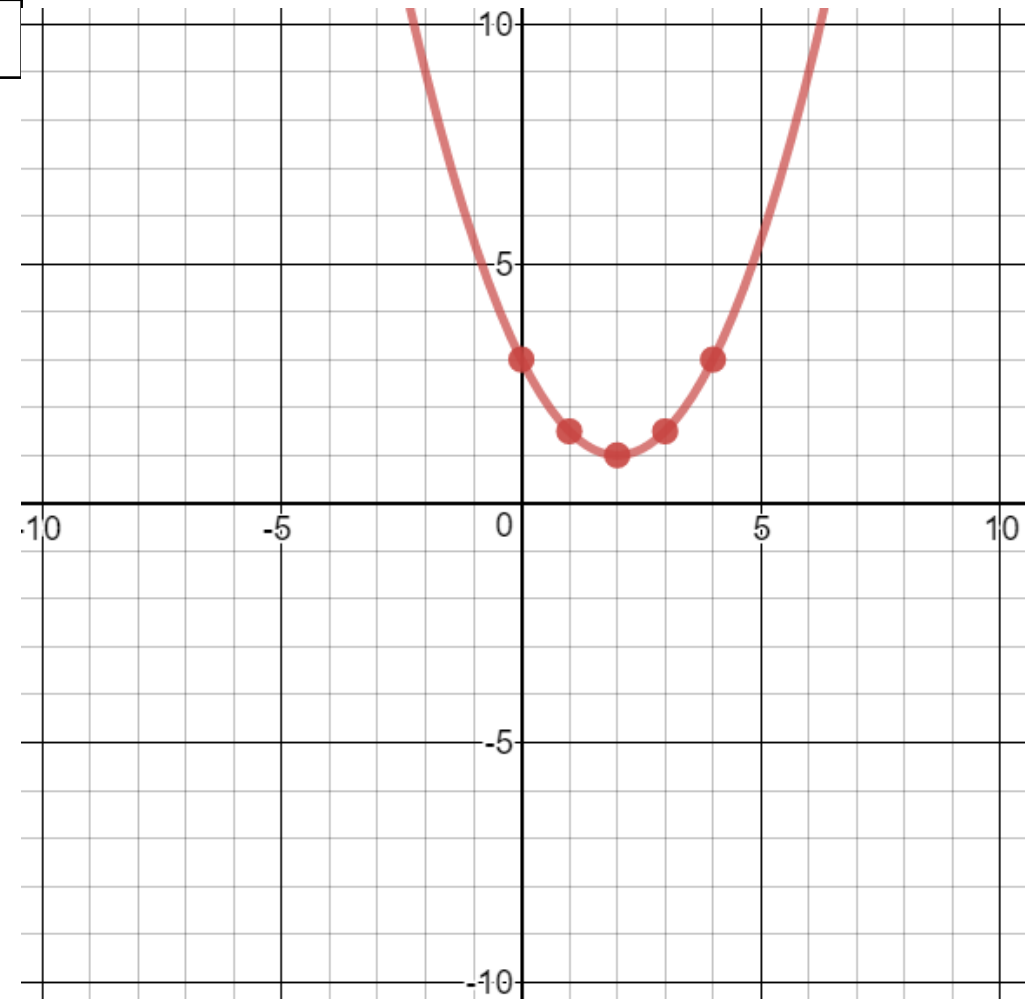
$$y = -(x+5)^2 - 1$$

$$a = -1 \quad h = -5 \quad k = -1$$

$$Vertex : (-5, -1)$$

$$y = -(0+5)^2 - 1 = -26$$

$$y-\text{int} : (0, -26)$$

x	Y
0	3
1	1.5
2	1
3	1.5
4	3

$$y = -2(x+2)(x-4)$$

$$a = -2 \quad p = -2 \quad q = 4$$

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

$$y = -2(1+2)(1-4) = 18$$

$$Vertex : (1,18)$$

$$y = -2(0+2)(0-4) = 16$$

$$y - \text{int} : (0,16)$$

x	Y
-1	10
0	16
1	18
2	16
3	10
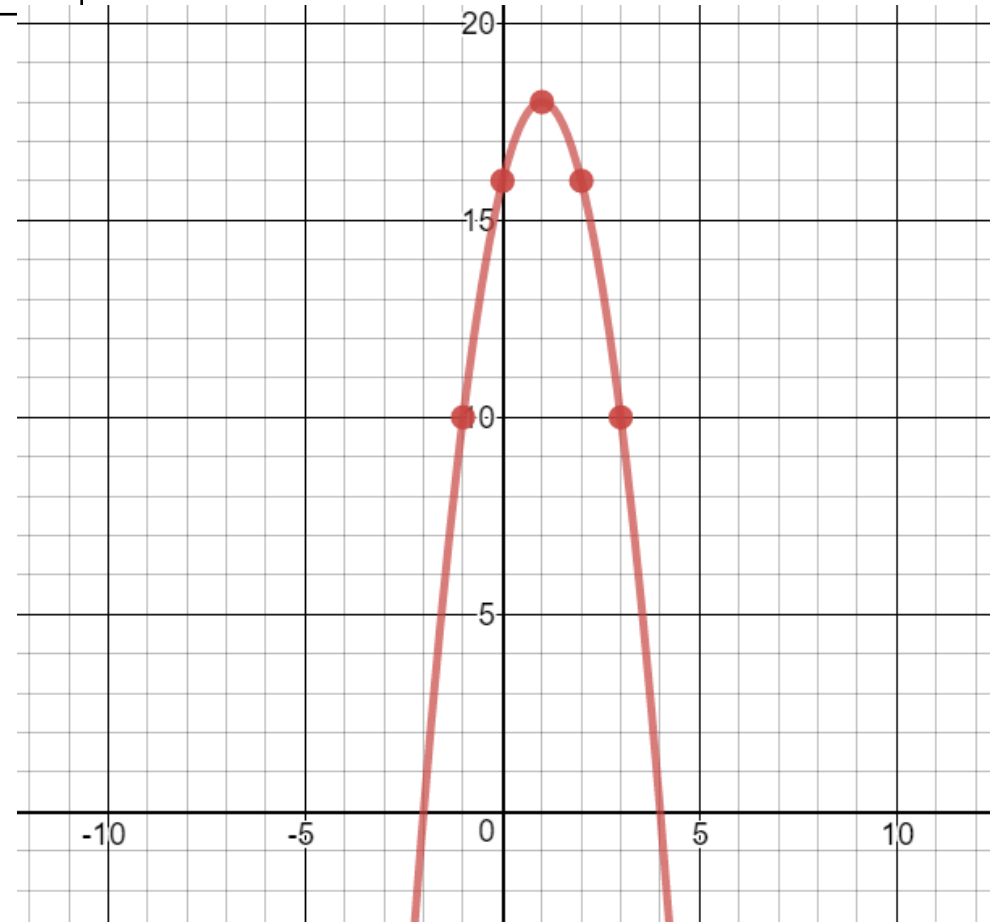
$$y = -x(x + 2)$$

$$a = -1 \quad p = 0 \quad q = -2$$

$$x = \frac{0 - 2}{2} = -1$$

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

$$Vertex : (-1, 1)$$

$$y = -(0)(0 + 2) = 0$$

$$y - \text{int} : (0, 0)$$

x	Y
-3	-3
-2	0
-1	1
0	0
1	-3
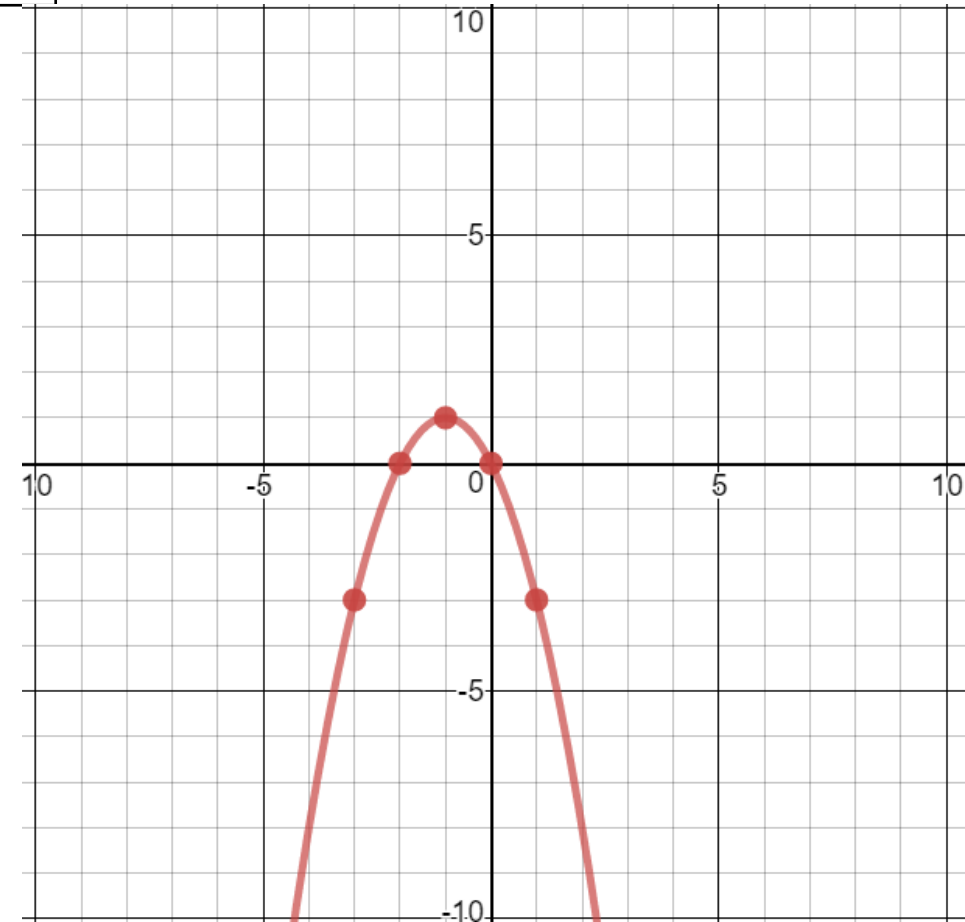
$$y = x^2 - 10x - 3 \qquad a = 1 \; b = -10 \; c = -3$$

$$x = \frac{-(-10)}{2(1)} = 5$$

$$Vertex : \left(5, -28\right)$$

$$y = (5)^2 - 10(5) - 3 = -28$$

$$y = \left(x - 5\right)^2 - 28$$

$$y = 3x^2 + 12x + 10 \qquad a = 3 \ \ b = 12 \ \ c = 10$$

$$x = \frac{-(12)}{2(3)} = -2$$

$$Vertex : \left(-2, 46\right)$$

$$y = 3(-2)^2 - 12(-2) + 10 = 46$$

$$y = 3\left(x + 2\right)^2 + 46$$

$$y = -2x^2 + 6x - 10 \qquad a = -2 \; b = 6 \; c = -10$$

$$x = \frac{-(6)}{2(-2)} = \frac{3}{2} = 1.5$$

$$Vertex : (1.5, -5.5)$$

$$y = -2(1.5)^2 + 6(1.5) - 10 = -5.5$$

$$y = -2(x - 1.5)^2 - 5.5$$

$$y = 0.6(x-3)(x+5) \quad a = 0.6 \ p = 3 \ q = -5$$

$$x = \frac{3-5}{2} = -1$$

$$y = 0.6(-1-3)(-1+5) = -9.6$$

$$Vertex : (-1, -9.6)$$

$$y = 0.6(x+1)^2 - 9.6$$

$$y = -2(x-4)(x+12) \quad a = -2 \; p = 4 \; q = -12$$

$$x = \frac{4-12}{2} = -4$$

$$y = -2(-4-4)(-4+12) = 128$$

$$Vertex : (-4,128)$$

$$y = -2(x+4)^2 + 128$$

1. $y = -x^2 + 1$

Reflect over the x-axis
Shift Up 1

2. $y = (x+2)^2 + 3$

Shift left 2
Shift Up 3

3. $y = -x^2 - 4$

Reflect over the x-axis
Shift Down 4

4. $y = 4(x-2)^2$

Shift Right 2
Vertical Stretch

5. $y = 3(x+5)^2 - 2$

Shift Left 5

Shift Down 2

Vertical Stretch

6. $y = -\dfrac{1}{2}(x+2)^2 - 6$

Reflect over x-axis

Shift Left 2

Shift Down 6

Vertical Shrink

1. Max was doing some rock climbing at a local park. When he reached the top of the cliff he was climbing he threw a rock out into the water below the cliff. The height of the rock can be modeled by the function $h(t) = -16t^2 + 48t + 215$, where t is the time in seconds and h is the height in feet.
   a. How long did it take for the rock to reach his maximum height?

$$a = -16 \quad b = 48 \quad c = 215 \quad X = \frac{-(48)}{2(-16)} = 1.5 \text{ seconds}$$

   b. What was the highest point that the rock reached?

$$h(1.5) = -16(1.5)^2 + 48(1.5) + 215 = 251 \text{ feet}$$

   c. At what height was Max when he threw the rock?

$$t = 0 \quad h(0) = 215 \text{ feet}$$

2. The arch of the Sidney Harbor Bridge is approximately 500 meters long and 85 meters high. What quadratic function models the curve of the arch? Assume the arch starts at (0,0).

Vertex would be in the middle of the length (250).
So the vertex is at (250, 85) and goes through the point (0,0)

$$y = a(x - 250)^2 + 85$$

$$0 = a(0 - 250)^2 + 85$$

$$0 = a(-250)^2 + 85$$

$$0 = a(62500) + 85$$

$$-85 = a(62500)$$

$$a = \frac{-85}{62500} = \frac{-17}{12500}$$

85 m

500 m

$$y = \frac{-17}{12500}(x - 250)^2 + 85$$

3. A parabola has a vertex of (3, -2) and goes through the point (2, 3). Write the equation of the quadratic in vertex form.

$$y = a(x-3)^2 - 2$$

$$3 = a(2-3)^2 - 2$$

$$3 = a(-1)^2 - 2$$

$$3 = a - 2$$

$$5 = a$$

$$y = 5(x-3)^2 - 2$$

4. A small independent motion picture company determines the profit P for producing n DVD copies of a recent release is $P = -0.02n^2 + 3.40n - 16$. P is the profit in thousands of dollars and n is in thousands of units.

a. How many DVDs should the company produce to maximize the profit?

$$a = -0.02 \quad b = 3.40 \quad c = -16$$

$$X = \frac{-(3.4)}{2(-0.02)} = 85 \text{ thousands of DVDs}$$

b. What will the maximize profit be?

$$P = -0.02(85)^2 + 3.4(85) - 16 = 128.5 \text{ thousand dollars}$$