

# Warmup:

1. Given the following vertex form equation of a quadratic function, identify the vertex of the parabola.

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

2. Given the following standard form equation of a quadratic function,

$$y = x^2 - 8x - 9$$

it can be factored and written in standard form as follows.

$$y = (x - 9)(x + 1)$$

Use the roots and symmetry to find the vertex and rewrite the equation in vertex form.

3. Given the following standard form equation of a quadratic function, complete the square and rewrite in vertex form.

$$y = 3x^2 + 12x - 1$$

1. Given the following vertex form equation of a quadratic function, identify the vertex of the parabola.

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

Vertex:  $(-5, -2)$

$$y = a(x - h)^2 + k$$

vertex:  $(h, k)$

2. Given the following standard form equation of a quadratic function,

$$y = 1x^2 - 8x - 9$$

$4^2 - 8(4) - 9$



it can be factored and written in standard form as follows.

$$y = (x - 9)(x + 1)$$

$(4-9)(4+1)$

Use the roots and symmetry to find the vertex and rewrite the equation in vertex form.  $-5 \cdot 5 = -25$

$$y = (x - 9)(x + 1) \begin{cases} 0 = x - 9 \\ x = 9 \end{cases}$$

$$\begin{cases} 0 = x + 1 \\ x = -1 \end{cases}$$

$$\text{vertex} = (4, -25)$$

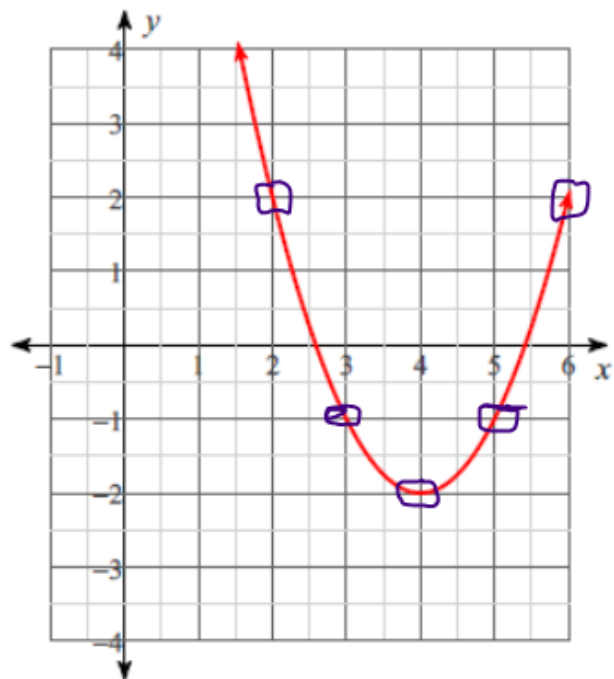
$$y = 1 \cdot (x - 4)^2 - 25$$

$$y = a(x - h)^2 + k$$

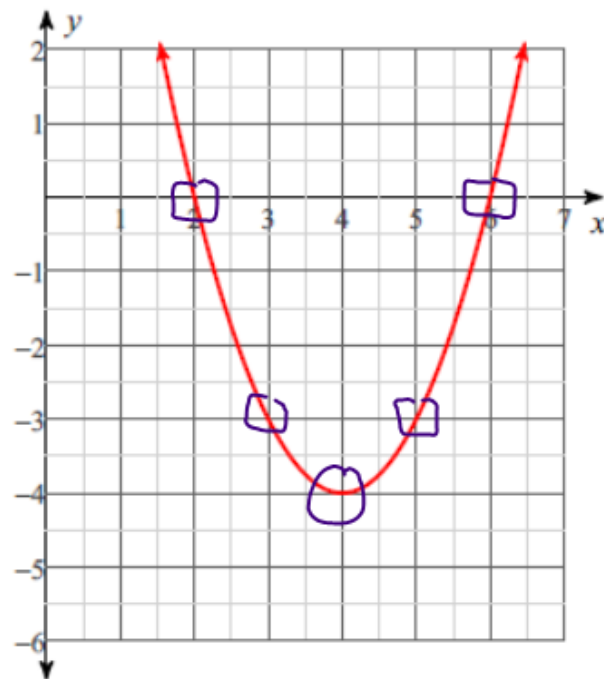
$$\frac{9 + (-1)}{2} = 4 = x$$



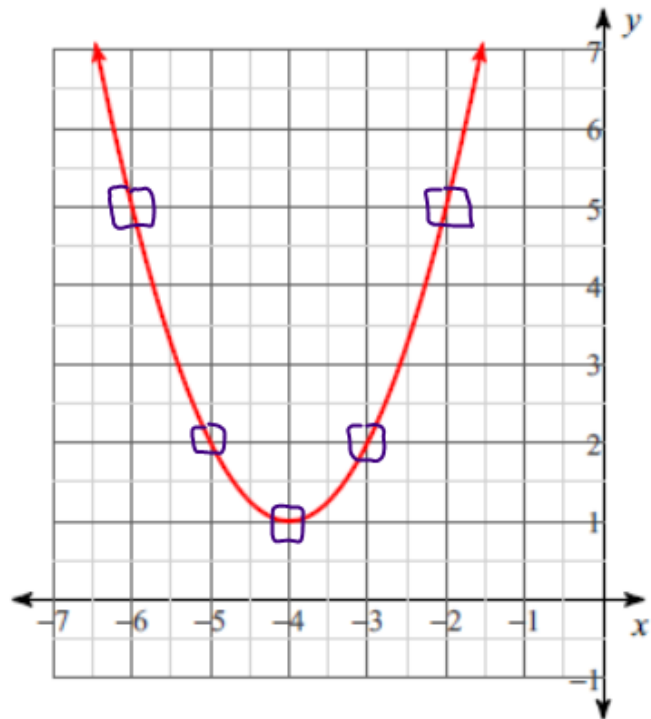
1)  $y = x^2 - 8x + 14$



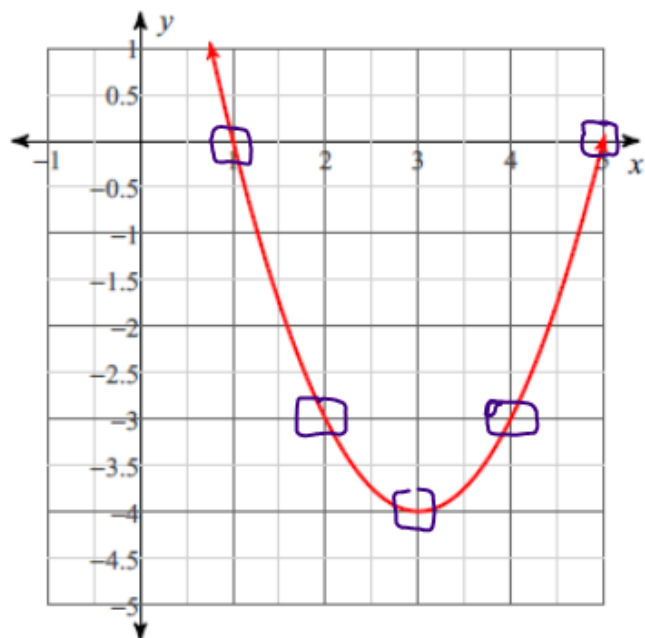
2)  $y = x^2 - 8x + 12$



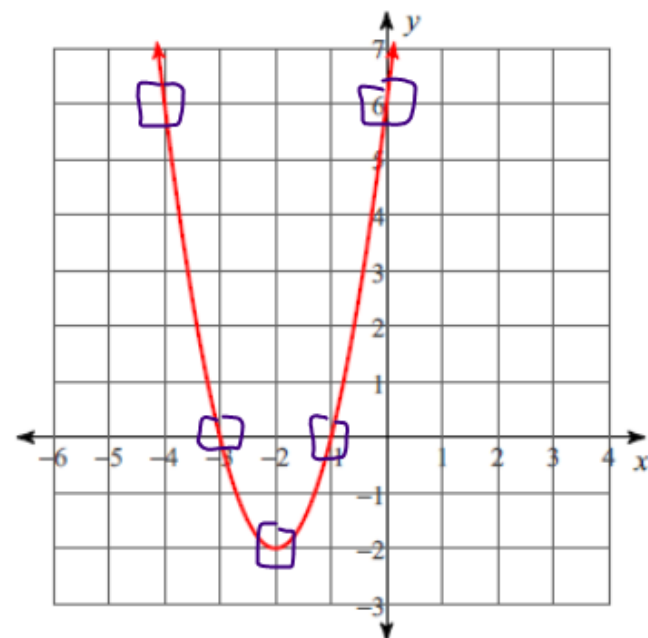
$$3) y = x^2 + 8x + 17$$



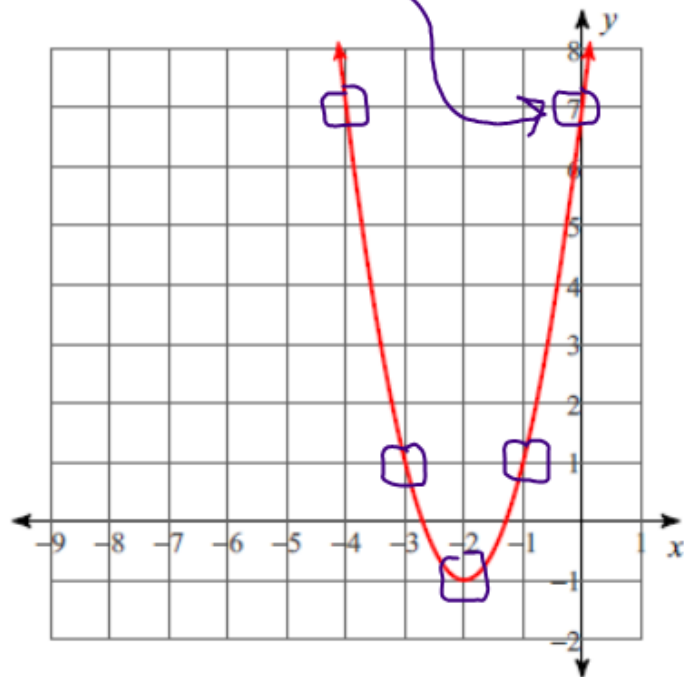
4)  $y = x^2 - 6x + 5$



5)  $y = 2x^2 + 8x + 6$



6)  $y = 2x^2 + 8x + 7$





## To Graph a Quadratic in Factored Form:

1) Use the zero product property to find the roots.

- Set each factor equal to 0 and solve for x.

2) Use the roots and symmetry to find the vertex.

- Add the roots and divide by 2 to get the x coordinate of the vertex.

- Plug the x into the equation to find the y coordinate.

3) Make a table to find two other points to graph.

$$y = (x - 9)(x + 1)$$

$$0 = x - 9$$

$$\underline{x = 9}$$

$$0 = x + 1$$

$$\underline{x = -1}$$

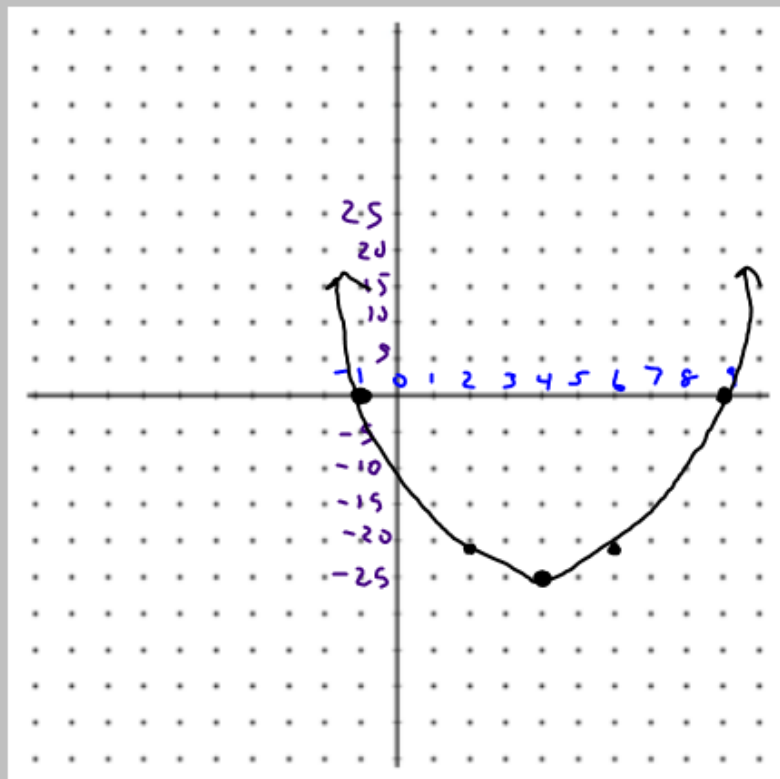
x-root (vertex):  $\frac{9 + -1}{2} = \frac{8}{2} = 4$

$$y = (4 - 9)(4 + 1)$$

$$y = -5 \cdot 5$$

$$y = -25$$

x	y
-1	0
2	-21
4	-25
6	-21
9	0



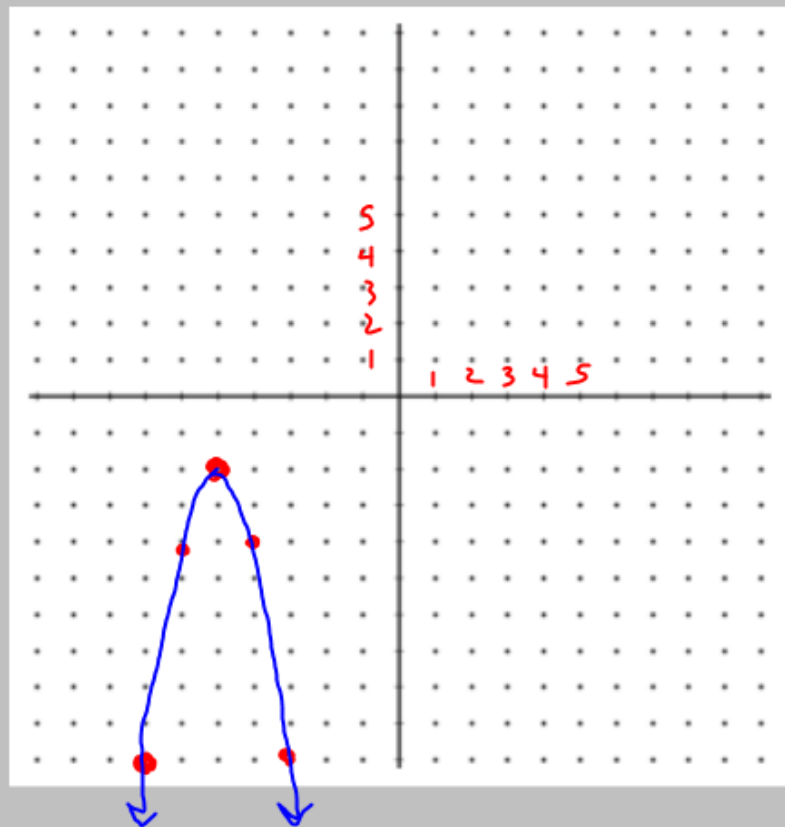
## To Graph a Quadratic in Vertex Form:

- 1) Use vertex form to find the vertex.
- 2) Make a table of values to find 4 other points on the parabola.

$$y = -2(x + \underline{5})^2 - \underline{2}$$

Vertex:  $(-5, -2)$

	x	y
*	-7	-10
	-6	-4
	-5	-2
	-4	-4
*	-3	-10



$$y = (x - 2)(x + 6)$$

$$0 = x - 2 \quad 0 = x + 6$$

$$x = 2 \quad x = -6$$

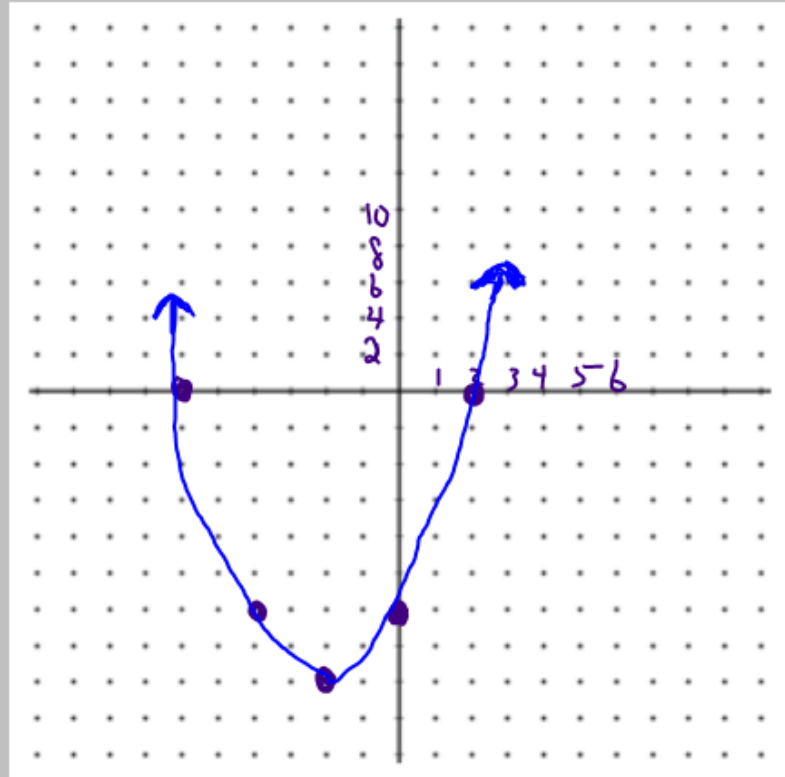
$$\frac{2 + (-6)}{2} = \frac{-4}{2} = (-2, -16)$$

$$y = (-2 - 2)(-2 + 6)$$

$$-4 \cdot 4$$

$$-16$$

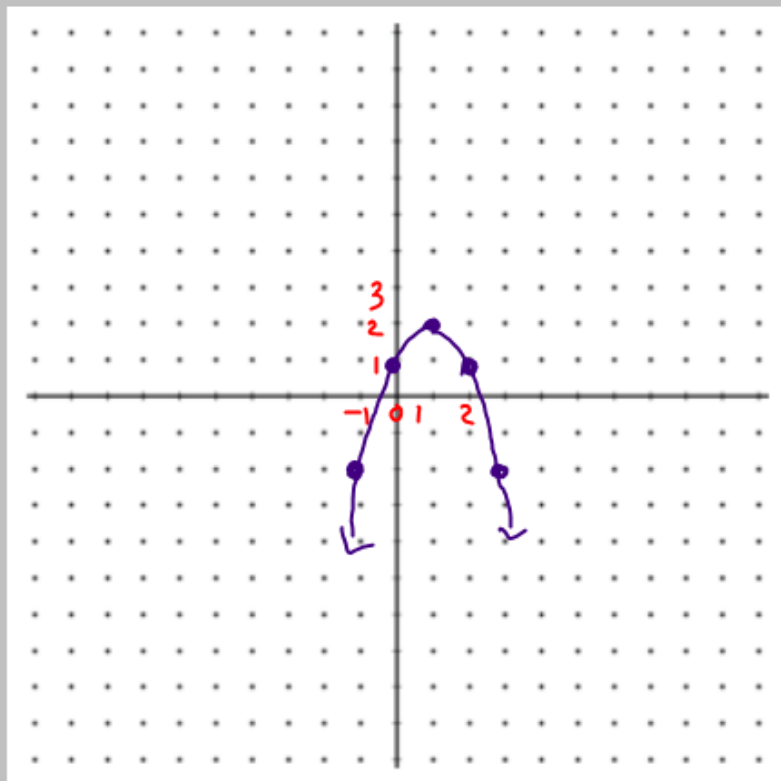
x	y
-6	0
-4	-12
-2	-16
0	-12
2	0



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

Vertex: (1, 2)

x	y
-1	-2
0	1
1	2
2	1
3	-2



$$y = x^2 + 8x + 7$$

$$x = \frac{-8}{2(1)} = \frac{-8}{2} = (-4, -9)$$

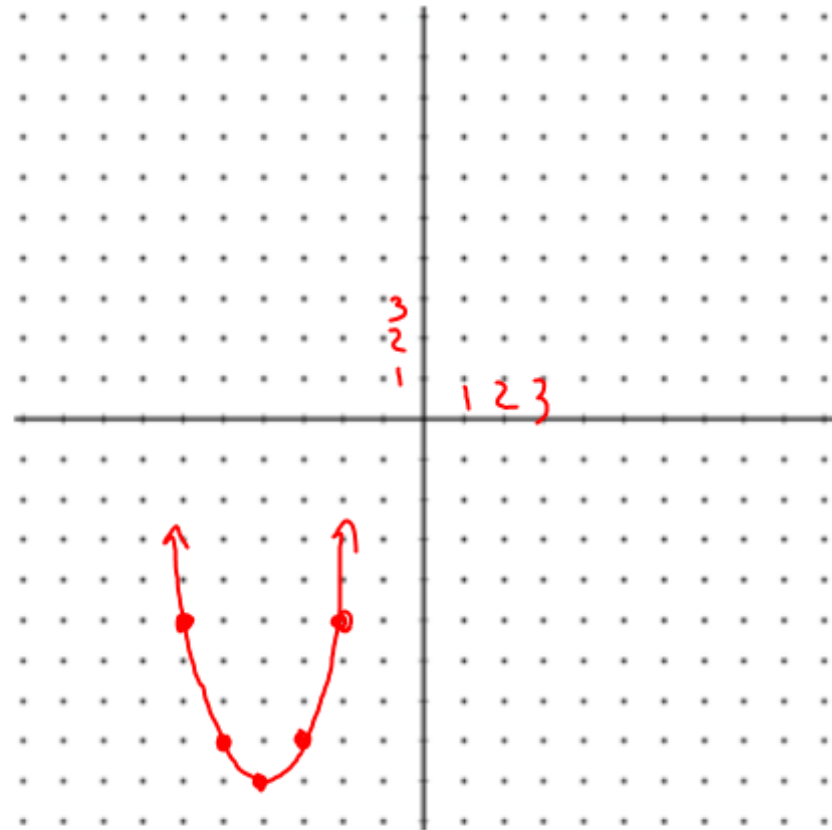
$$y = (-4)^2 + 8(-4) + 7$$

$$16 - 32 + 7$$

$$-16 + 7$$

$$-9$$

x	y
-6	-5
-5	-8
-4	-9
-3	-8
-2	-5



HW #9:

# Graphing Quadratic Equations