

Bellwork

Graph the function identifying Key Elements:

1. $y = 5x^2 - 25x - 70$

$$y = 5(x^2 - 5x - 14)$$

$$y = 5(x^2 - 7x + 2x - 14)$$

$$y = 5((x^2 - 7x) + (2x - 14))$$

$$y = 5(x(x - 7) + 2(x - 7))$$

$$y = 5(x+2)(x-7)$$

x	$y = 5x^2 - 25x - 70$	(x, y)
1	$y = 5(1)^2 - 25(1) - 70$	(1, -90)
2	$y = 5(2)^2 - 25(2) - 70$	(2, -100)
2.5	$y = 5(2.5)^2 - 25(2.5) - 70$	(2.5, -101.25)
3	$y = 5(3)^2 - 25(3) - 70$	(3, -100)
4	$y = 5(4)^2 - 25(4) - 70$	(4, -90)

X-INTERCEPTS:

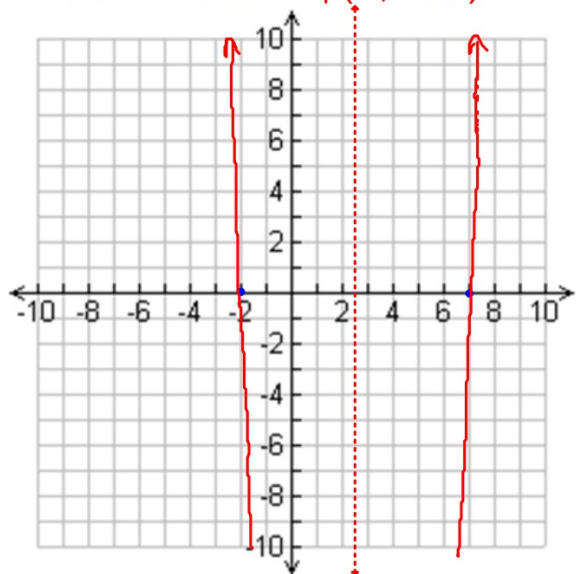
$$x + 2 = 0 \quad \& \quad x - 7 = 0$$

$$\begin{array}{ccc} -2 & -2 & +7 & +7 \end{array}$$

$$x = -2 \qquad \qquad \qquad x = 7$$

So $(-2, 0)$ & $(7, 0)$

$$\text{AOS: } x = \frac{-2 + 7}{2} = \frac{5}{2} = 2.5$$



Graphing by Completing the Square

Procedure:

Step 1: Divide the x-terms by a...

Have... $a(x^2 + (b/a)x) + c$

Step 2: Divide the (b/a) by 2 and square it.

Step 3: Add the result from Step 2 inside the () behind the $(b/a)x$.

Step 3: Subtract the result from Step 2 times a, after the c.

Have... $a(x^2 + (b/a)x + (b/2a)^2) + c - a(b/2a)^2$

Step 4: Factor the expression to be... $a(x + (b/2a))^2 + \#$

Step 5: Vertex is at $(-b/2a, \#)$

Step 6: Create a chart around the vertex again as we have in the introduction to graphing quadratics.

Example

Graph by using Completing the Square:

$$1. y = 2x^2 + 4x + 7$$

$$y = (2x^2 + 4x) + 7$$

$$y = 2(x^2 + 2x) + 7$$

$$y = 2(x^2 + 2x + (1)^2) + 7 - 2(1)^2$$

$$y = 2(x+1)^2 + 7 - 2$$

$$y = 2(x+1)^2 + 5$$

Vertex... (-1, 5)

AOS $x = -1$

Show 4 values in your table...

x	$y = 2x^2 + 4x + 7$	(x, y)
-3	$y = 2(-3)^2 + 4(-3) + 7$	$(-3, 13)$
-2	$y = 2(-2)^2 + 4(-2) + 7$	$(-2, 7)$
0	$y = 2(0)^2 + 4(0) + 7$	$(0, 7)$
1	$y = 2(1)^2 + 4(1) + 7$	$(1, 13)$

x-intercepts: NONE

y-intercept: (0, 7)

AOS: $x = -1$

Vertex: (-1, 5)

