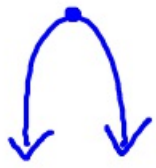


Warm Up

5/7/19

Find the Axis of Symmetry and Vertex for the following:



1. $y = -3x^2 - 24x - 42$

$x = \frac{-b}{2a} = \frac{24}{2(-3)} = \frac{24}{-6} = -4$ A.O.S. $x = -4$

$y = -3(-4)^2 - 24(-4) - 42$
 $-48 + 96 - 42$

$y = 6$

$(-4, 6)$
Vertex



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

$x = \frac{-b}{2a} = \frac{-4}{-2} = 2$ A.O.S. $x = 2$

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

$y = 4$

$(2, 4)$ vertex

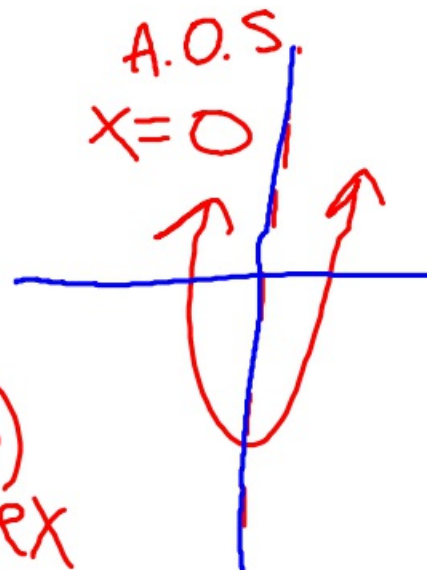
3. $y = x^2 - 3$

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

$y = 0^2 - 3$

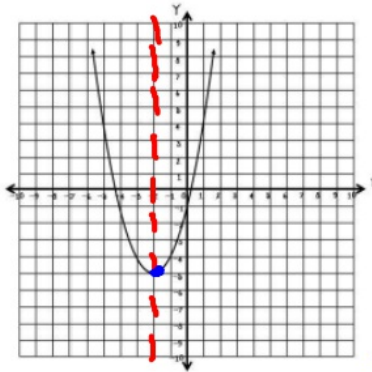
$y = -3$

$(0, -3)$
Vertex



Analyzing Quadratic Graphs

GRAPH A



Answer the questions given the graphs above.

1. What is the axis of symmetry for Graph A? $x = -2$

2. What is the axis of symmetry for Graph B? $x = 3$

3. What is the vertex of Graph A? $(-2, -5)$ Maximum or Minimum? Min.

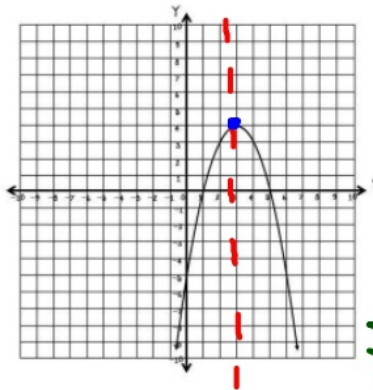
4. What is the vertex of Graph B? $(3, 4)$ Maximum or Minimum? Max.

5. Identify the domain and range of Graph A.

D: $-\infty \leq x \leq \infty$

R: $y \geq -5$

GRAPH B



6. Identify the domain and range of Graph B.

D: $-\infty \leq x \leq \infty$

R: $y \leq 4$

7. Identify the equation for Graph A:

$\frac{-b}{2a} = \frac{4}{2} = 2$

~~A. $y = x^2 - 4x - 1$~~ ~~C. $y = x^2 + 4x - 1$~~
 B. $y = x^2 + 4x - 1$ ~~D. $y = x^2 + 4x - 1$~~
 $\frac{-b}{2a} = \frac{-4}{2} = -2$

8. Identify the equation for Graph B:

$\frac{-b}{2a} = \frac{6}{-2} = -3$

~~A. $y = x^2 - 6x - 5$~~ C. $y = -x^2 - 6x - 5$

~~B. $y = x^2 + 6x - 5$~~ D. $y = -x^2 + 6x - 5$
 $\frac{-b}{2a} = \frac{-6}{-2} = 3$

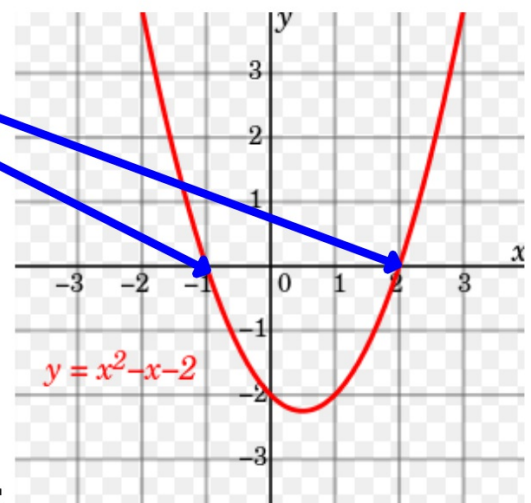
Solution(s) to a Quadratic Function

ROOTS

(These all mean the same thing)

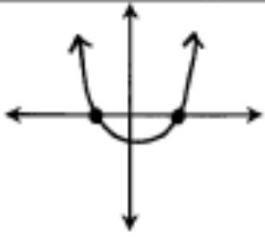
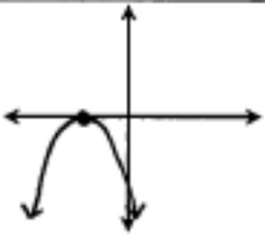
ZEROS

X-Intercepts



*Where the parabola crosses the x-axis

Draw each of the following graphs on your worksheet....

NUMBER OF SOLUTIONS	2 SOLUTIONS	1 SOLUTION	NO SOLUTION
			

<p style="text-align: center;">THE DISCRIMINANT</p>		
	<p>Formula:</p> $b^2 - 4ac$	<p> > If $d > 0$, then there are <u>2</u> solutions. > If $d = 0$, then there are <u>1</u> solutions. > If $d < 0$, then there are <u>0</u> solutions. </p>
<p style="text-align: center;">EXAMPLES</p> <p>Use the discriminant to determine the number of solutions.</p>	<p>7. $y = x^2 + 5x + 4$ <input checked="" type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p> $25 - 4(1)(4)$ $25 - 16 = 9$	<p>8. $y = x^2 - 3x + 10$ <input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input checked="" type="checkbox"/> 0 solutions</p> $9 - 4(1)(10)$ $9 - 40 = -31$
	<p>9. $y = x^2 + 10x + 25$ <input type="checkbox"/> 2 solutions <input checked="" type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p> $100 - 4(1)(25)$ $100 - 100 = 0$	<p>10. $y = 2x^2 - 4x - 3$ <input checked="" type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p> $16 - 4(2)(-3)$ $16 + 24 = 40$
	<p>11. $y = 4x^2 - 12x + 9$ <input type="checkbox"/> 2 solutions <input checked="" type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p> $144 - 4(4)(9)$ $144 - 144 = 0$	<p>12. $y = -3x^2 + 5x - 8$ <input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input checked="" type="checkbox"/> 0 solutions</p> $25 - 4(-3)(-8)$ $25 - 96 = -71$



Graphing Quadratic Equations

$$y = ax^2 + bx + c$$

Steps to graph a quadratic equation:

Step 1: Find the axis of symmetry.

Step 2: Find the vertex.

Step 3: Fill in a table of values using your calculator.

Step 4: Graph!

Practice!

1. $y = x^2$

Axis of Symmetry: $x = \frac{-b}{2a} = \frac{0}{2} = 0$

Vertex: $(0, 0)$

Domain: $-\infty \leq x \leq \infty$

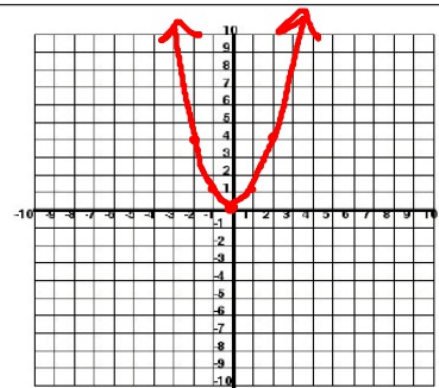
Range: $y \geq 0$

Zeros: 0

$$y = x^2$$
$$y = 0$$

x	y
-2	4
-1	1
0	0
1	1
2	4

Graph each quadratic equation.



2. $y = x^2 + 2x + 5$ $x = \frac{-b}{2a} = \frac{-2}{2} = -1$ $(-1)^2 + 2(-1) + 5$

Axis of Symmetry: $x = -1$

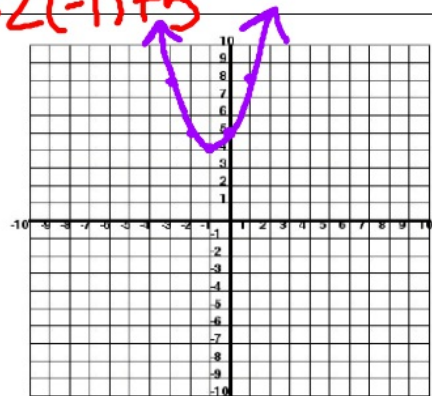
Vertex: $(-1, 4)$

Domain: $-\infty \leq x \leq \infty$

Range: $y \geq 4$

Zeros: None

x	y
-3	8
-2	5
-1	4
0	5
1	8



3. $y = -x^2 - 8x - 17$ $\frac{-b}{2a} = \frac{-8}{-2} = -4$

Axis of Symmetry: $x = -4$

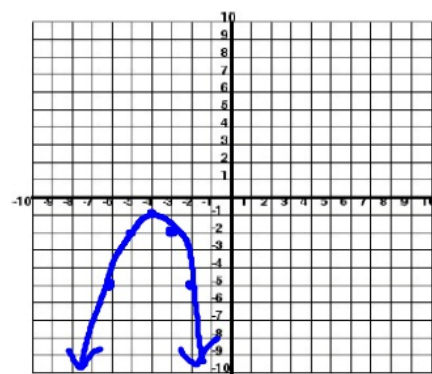
Vertex: $(-4, -1)$

Domain: $-\infty \leq x \leq \infty$

Range: $y \leq -1$

Zeros: NONE

x	y
-6	-5
-5	-2
-4	-1
-3	-2
-2	-5



$$y = -(-4)^2 - 8(-4) - 17$$

$$-16 + 32 - 17$$

$$-1$$

$$y = -(-6)^2 - 8(-6) - 17$$

$$-(36)$$

$$-36 + 48 - 17$$

$$-5$$

$$= -x^2 - 4$$

Axis of Symmetry: $x=0$

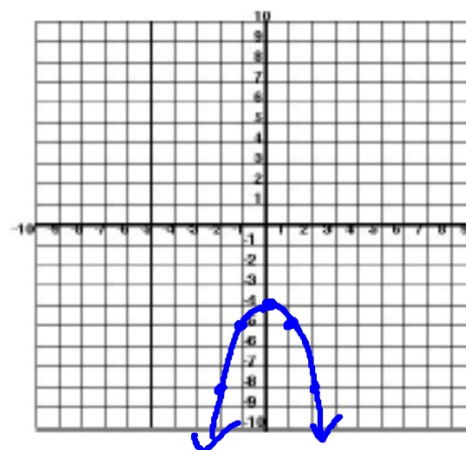
Vertex: $(0, -4)$

Domain: $-\infty \leq x \leq \infty$

Range: $y \leq -4$

Zeros: NONE

x	y
-2	-8
-1	-5
0	-4
1	-5
2	-8



$$= 2x^2 + 8x$$

Axis of Symmetry: _____

Vertex: _____

Domain: _____

Range: _____

Zeros: _____

x	y

