



# 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!

Graph each quadratic equation.

1.  $y = x^2$

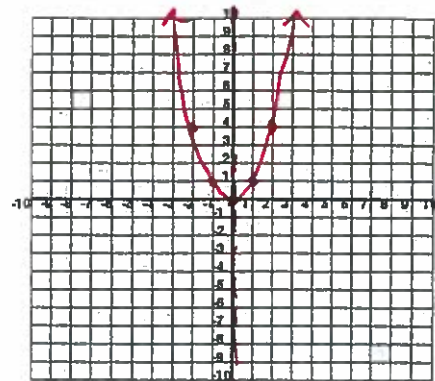
Axis of Symmetry:  $x=0$

Vertex:  $(0,0)$

Domain:  $\mathbb{R}$

Range:  $y \geq 0$

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



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

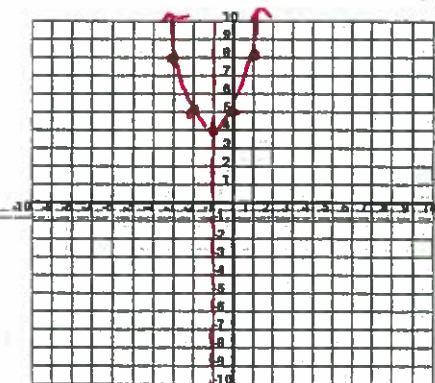
Axis of Symmetry:  $x = -1$

Vertex:  $(-1, 4)$

Domain:  $\mathbb{R}$

Range:  $y \geq 4$

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



3.  $y = -x^2 - 8x - 17$   $x = \frac{8}{2(-1)} = \frac{8}{-2} = -4$   
 $-16 + 32 - 17$

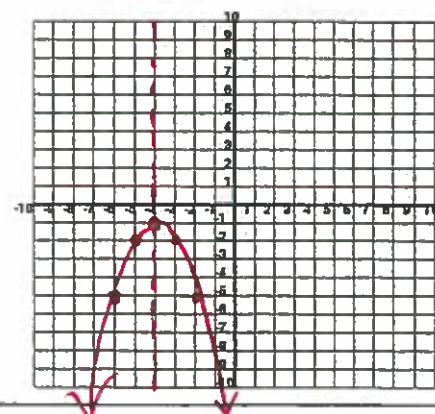
Axis of Symmetry:  $x = -4$

Vertex:  $(-4, -1)$

Domain:  $\mathbb{R}$

Range:  $y \leq -1$

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



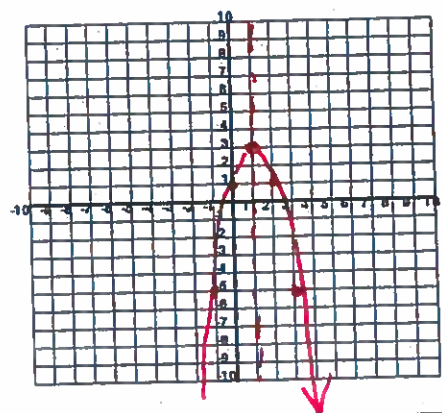
$-36 + 48 - 17 = -5$   
 $-25 + 40 - 17 = -2$

$-2 \cdot 4 + 1$

4.  $y = -2x^2 + 4x + 1$   
 $-2 + 4 + 1$       $x = \frac{-4}{2(-2)} = \frac{-4}{-4} = 1$

Axis of Symmetry:  $x = 1$   
 Vertex:  $(1, 3)$   
 Domain:  $\mathbb{R}$   
 Range:  $y \leq 3$

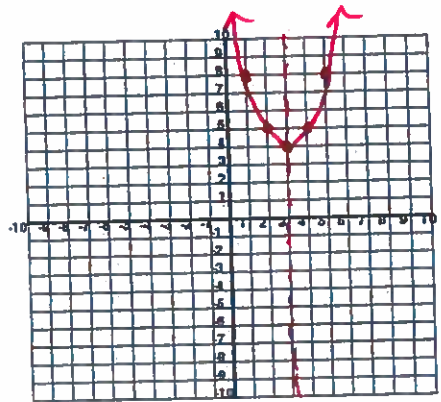
x	y
-1	-5
0	1
1	3
2	1
3	-5



5.  $y = x^2 - 6x + 13$   
 $y = 9 - 18 + 13 = 4$       $x = \frac{6}{2(1)} = \frac{6}{2} = 3$       $1 - 6 + 13 = 8$   
 $4 - 12 + 13 = 5$

Axis of Symmetry:  $x = 3$   
 Vertex:  $(3, 4)$   
 Domain:  $\mathbb{R}$   
 Range:  $y \geq 4$

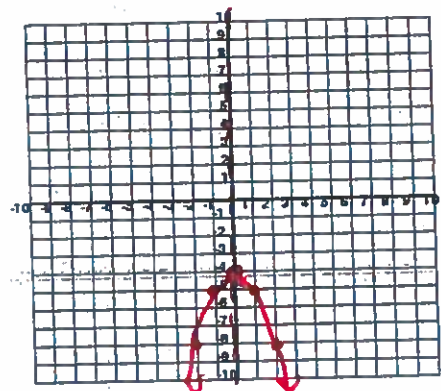
x	y
1	8
2	5
3	4
4	5
5	8



6.  $y = -x^2 - 4$   
 $y = 0 - 4 = -4$       $x = \frac{0}{2(-1)} = \frac{0}{-2} = 0$       $-4 - 4 = -8$   
 $-1 - 4 = -5$

Axis of Symmetry:  $x = 0$   
 Vertex:  $(0, -4)$   
 Domain:  $\mathbb{R}$   
 Range:  $y \leq -4$

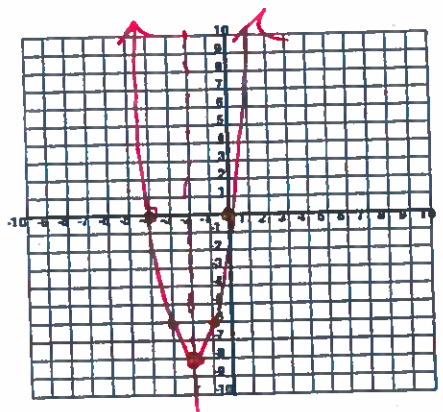
x	y
-2	-8
-1	-5
0	-4
1	-5
2	-8



7.  $y = 2x^2 + 8x$   
 $8 + (-16) = -8$       $x = \frac{-8}{2(2)} = \frac{-8}{4} = -2$

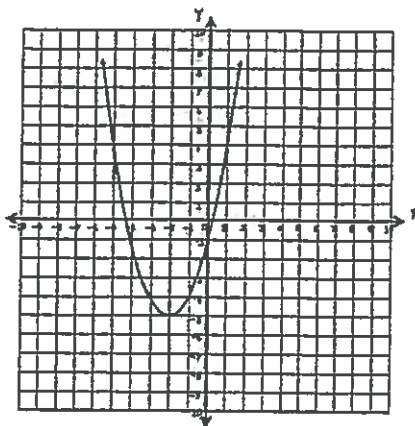
Axis of Symmetry:  $x = -2$   
 Vertex:  $(-2, -8)$   
 Domain:  $\mathbb{R}$   
 Range:  $y \geq -8$

x	y
-4	0
-3	-6
-2	-8
-1	-6
0	0

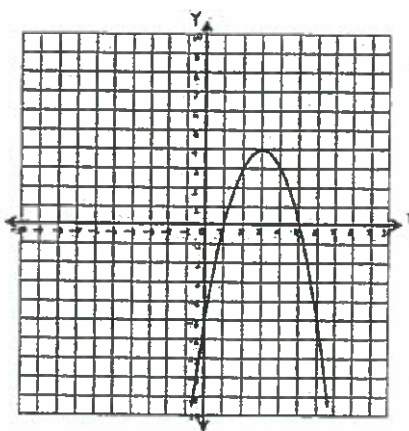


# Analyzing Quadratic Graphs

**GRAPH A**



**GRAPH B**



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? Minimum

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

5. Identify the domain and range of Graph A.

Domain:  $x = \mathbb{R}$   
Range:  $y \geq -5$

6. Identify the domain and range of Graph B.

Domain:  $x = \mathbb{R}$   
Range:  $y \leq 4$

7. Identify the equation for Graph A:

- ~~A.  $y = x^2 - 4x - 1$~~   
 B.  $y = x^2 + 4x - 1$

- ~~C.  $y = -x^2 - 4x - 1$~~   
~~D.  $y = -x^2 + 4x - 1$~~

$y = (-2)^2 - 4(-2) - 1$   
 $y = 4 + 8 - 1$   
 $y = 12 - 1$   
 $y = 11$

8. Identify the equation for Graph B:

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

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

$y = -(3)^2 - 6(3) - 5$   
 $y = -9 - 18 - 5$   
 $y = -27 - 5$   
 $y = -32$

