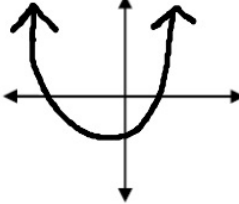
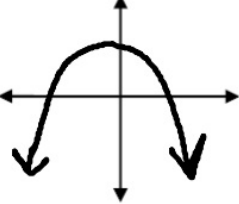


1. Write the slope-intercept form of an equation for the line that passes through  $(-8, -1)$  with a slope of  $-3$ .
  
2. A plumber charges \$15 per hour,  $h$ , plus a \$25 service fee for house calls.
  - a. Write a linear equation to show how to find the total cost,  $c$ .
  
  - b. How much would it cost for a 6 hour job?
  
3. Factor completely:  $8x^2 - 36y^2$

# **Intro to Quadratic Equations**



Main Ideas/Questions	Notes
<p>STANDARD FORM</p>	<p>All quadratic equations are written in the form:</p> $ax^2 + bx + c$
<p>GRAPH</p>	<p>When graphed, a quadratic equation creates a U-shaped curve called a <u>parabola</u>.</p>
<p>Types of parabolas</p>	<p>Use your graphing calculator to sketch the following:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <math display="block">y = x^2 + 2x - 5</math>  </div> <div style="text-align: center;"> <math display="block">y = -x^2 + 3x + 7</math>  </div> </div> <ul style="list-style-type: none"> <li>▪ If 'a' is <u>positive</u>, then the parabola opens <u>up</u>, like a smile 😊</li> <li>▪ If 'a' is <u>negative</u>, then the parabola opens <u>down</u>, like a frown 😞</li> </ul>

Axis of Symmetry	a vertical line that divides the parabola into 2 equal parts Formula for the axis of symmetry: $X = \frac{-b}{2a}$
Vertex	turning point of the parabola <ul style="list-style-type: none"> <li>When the vertex is the <u>lowest point</u>, it is called a <u>minimum</u></li> <li>When the vertex is the <u>highest point</u>, it is called a <u>maximum</u></li> </ul>
Examples 1. $y = x^2 + 8x + 15$ $a=1$ $b=8$	Axis of Symmetry: _____ Vertex: _____ Sketch:

$C=15$   $X=-4$   $(-4, -1)$   
 Domain: all real #s Range:  $y \geq -1$   
 Increasing Interval:  $X > -4$  Decreasing Interval:  $X < -4$   
 Y - Intercept:  $(0, 15)$  "c"

2. $y = -x^2 + 10x - 23$ $a=-1$ $b=10$ $C=-23$	Axis of Symmetry: _____ Vertex: _____ Sketch:
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$X=5$   $(5, 2)$   
 Domain: all real #s Range:  $y \leq 2$   
 Increasing Interval:  $X < 5$  Decreasing Interval:  $X > 5$   
 Y-Intercept:  $(0, -23)$

$$3. y = 3x^2 - 12x + 5$$

Axis of Symmetry: \_\_\_\_\_ Vertex: \_\_\_\_\_ Sketch:

Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Increasing Interval: \_\_\_\_\_ Decreasing Interval: \_\_\_\_\_

$$4. y = 4x^2 + 8x - 1$$

Axis of Symmetry: \_\_\_\_\_ Vertex: \_\_\_\_\_ Sketch:

Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Increasing Interval: \_\_\_\_\_ Decreasing Interval: \_\_\_\_\_

$$5. y = -x^2 - 4x - 2$$

Axis of Symmetry: \_\_\_\_\_ Vertex: \_\_\_\_\_ Sketch:

<p>8. <math>y = -x^2 + 4x</math></p> <p><math>a = -1</math> <math>b = 4</math> <math>c = 0</math></p>	<p>Axis of Symmetry: _____</p> <p><math>X = \frac{-4}{2(-1)}</math> <math>X = 2</math></p>	<p>Vertex: _____</p> <p><math>y = -(2)^2 + 4(2)</math> <math>y = 4</math> <math>(2, 4)</math></p>	<p>Sketch:</p>
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Domain: all real #s      Range:  $y \leq 4$

Increasing Interval:  $X < 2$       Decreasing Interval:  $X > 2$

Y-Intercept:  $(0, 0)$

<p>9. <math>y = x^2 - 3</math></p> <p><math>a = 1</math> <math>b = 0</math> <math>c = -3</math></p>	<p>Axis of Symmetry: _____</p> <p><math>X = \frac{0}{2(1)}</math> <math>X = 0</math></p>	<p>Vertex: _____</p> <p><math>y = (0)^2 - 3</math> <math>y = -3</math> <math>(0, -3)</math></p>	<p>Sketch:</p>
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Domain: \_\_\_\_\_      Range: \_\_\_\_\_

Increasing Interval: \_\_\_\_\_      Decreasing Interval: \_\_\_\_\_

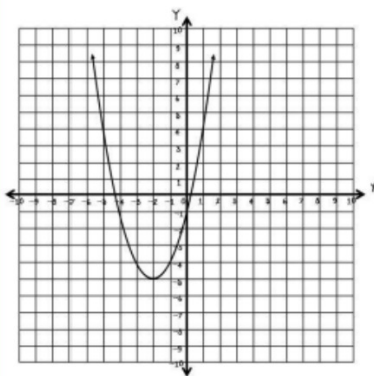
<p>10. <math>y = -2x^2 + 8</math></p>	<p>Axis of Symmetry: _____</p>	<p>Vertex: _____</p>	<p>Sketch:</p>
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Domain: \_\_\_\_\_      Range: \_\_\_\_\_

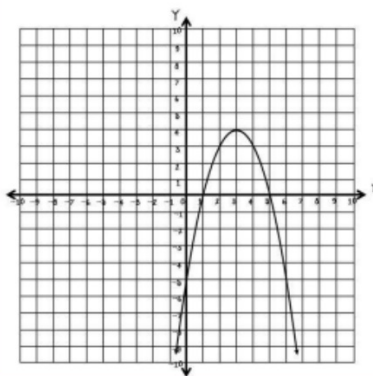
Increasing Interval: \_\_\_\_\_      Decreasing Interval: \_\_\_\_\_

## Analyzing Quadratic Graphs

**GRAPH A**



**GRAPH B**



Answer the questions given the graphs above.

1. What is the axis of symmetry for Graph A? \_\_\_\_\_
2. What is the axis of symmetry for Graph B? \_\_\_\_\_
3. What is the vertex of Graph A? \_\_\_\_\_ Maximum or Minimum? \_\_\_\_\_
4. What is the vertex of Graph B? \_\_\_\_\_ Maximum or Minimum? \_\_\_\_\_
5. Identify the domain and range of Graph A.
6. Identify the domain and range of Graph B.
7. Identify the equation for Graph A:
 

<b>A.</b> $y = x^2 - 4x - 1$	<b>C.</b> $y = -x^2 - 4x - 1$
<b>B.</b> $y = x^2 + 4x - 1$	<b>D.</b> $y = -x^2 + 4x - 1$
8. Identify the equation for Graph B:
 

<b>A.</b> $y = x^2 - 6x - 5$	<b>C.</b> $y = -x^2 - 6x - 5$
<b>B.</b> $y = x^2 + 6x - 5$	<b>D.</b> $y = -x^2 + 6x - 5$

