Warm-Up March 28, 2019

1. Write the slope-intercept form of an equation for the line that passes through (-8, -1) with a slope of -3.

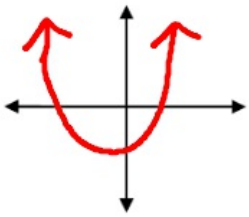
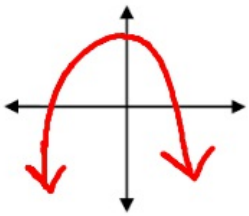
2. A plumber charges $15 per hour, h, plus a $25 service fee for house calls.

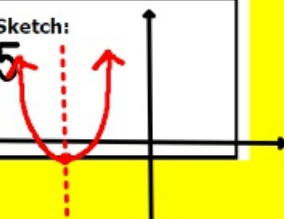
   a. Write a linear equation to show how to find the total cost, c.

   b. How much would it cost for a 6 hour job?

3. Factor completely: $8x^2 - 36y^2$

Intro to Quadratic Equations

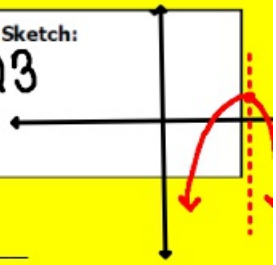
Main Ideas/Questions	Notes
Standard Form	***All quadratic equations are written in the form:*** ax^2+bx+c
Graph	***When graphed, a quadratic equation creates a U-shaped curve called a*** parabola.
Types of Parabolas	***Use your graphing calculator to sketch the following:*** $y = x^2 + 2x - 5$  $y = -x^2 + 3x + 7$  ▪ **If 'a' is** positive**, then the parabola opens** up**, like a smile ☺** ▪ **If 'a' is** negative**, then the parabola opens** down **like a frown ☹**

Axis of Symmetry	a vertical line that separates the parabola into two equal parts *Formula for the axis of symmetry:* $x=\frac{-b}{2a}$
Vertex	turning point of the parabola ▪ When the vertex is the lowest point, it is called a minimum ▪ When the vertex is the highest point, it is called a maximum
Examples **1.** $y = x^2 + 8x + 15$ $a=1\ b=8\ c=15$	Axis of Symmetry: $x=\frac{-8}{2(1)}$, $x=-4$ Vertex: $y=(-4)^2+8(-4)+15$, $y=-1$, $(-4,-1)$ Sketch:  min

Domain: all real #s Range: $y \geq -1$ (up) → y value of vertex

Increasing Interval: $x > -4$ Decreasing Interval: $x < -4$

Y - Intercept: $(0,15)$ → "c" value

2. $y = -x^2 + 10x - 23$ $a=-1\ b=10$ $c=-23$	Axis of Symmetry: $x=\frac{-10}{2(-1)}$, $x=5$ Vertex: $y=-(5)^2+10(5)-23$, $y=2$, $(5,2)$ Sketch:  max

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:**

$a=3 \quad b=-12 \quad c=5$

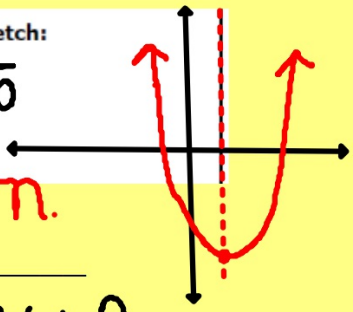
$x = \frac{12}{2(3)}$

$x = 2$

$y = 3(2)^2 - 12(2) + 5$

$y = -7$

$(2, -7)$ min.



Domain: all real #s Range: $y \geq -7$

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

Y-Intercept: $(0, 5)$

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:**

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

$a=-1 \quad b=4 \quad c=0$

Axis of Symmetry: _____ **Vertex:** _____ **Sketch:**

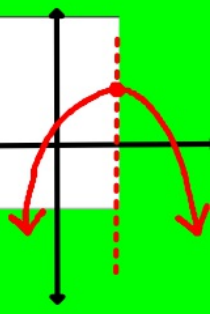
$x = \frac{-4}{2(-1)}$

$x = 2$

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

$y = 4$

$(2, 4)$ max



Domain: all real #s Range: $y \leq 4$

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

Y-Intercept: $(0, 0)$

9. $y = x^2 - 3$

$a=1 \quad b=0 \quad c=-3$

Axis of Symmetry: _____ **Vertex:** _____ **Sketch:**

Domain: _____ Range: _____

Increasing Interval: Decreasing Interval: _____

10. $y = -2x^2 + 8$

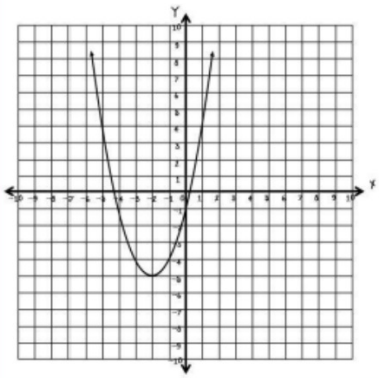
Axis of Symmetry: _____ **Vertex:** _____ **Sketch:**

Domain: _____ Range: _____

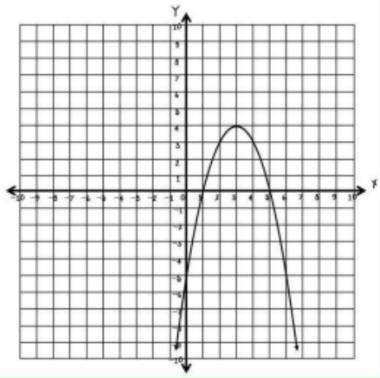
Increasing Interval: _____ Decreasing Interval: _____

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****:*

A. $y = x^2 - 4x - 1$ **C.** $y = -x^2 - 4x - 1$

B. $y = x^2 + 4x - 1$ **D.** $y = -x^2 + 4x - 1$

8. *Identify the* ***equation*** *for* ***Graph B****:*

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

B. $y = x^2 + 6x - 5$ **D.** $y = -x^2 + 6x - 5$