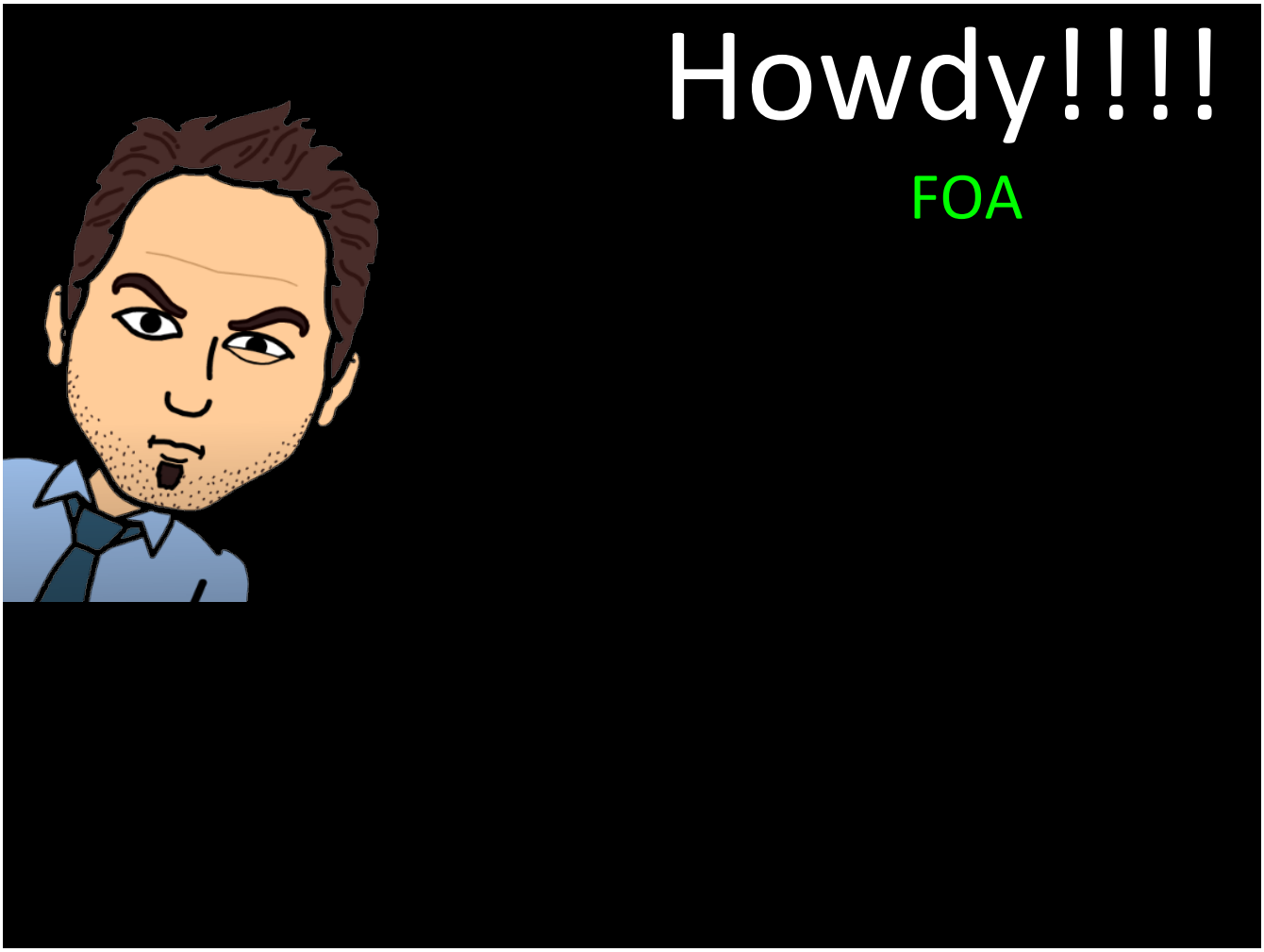
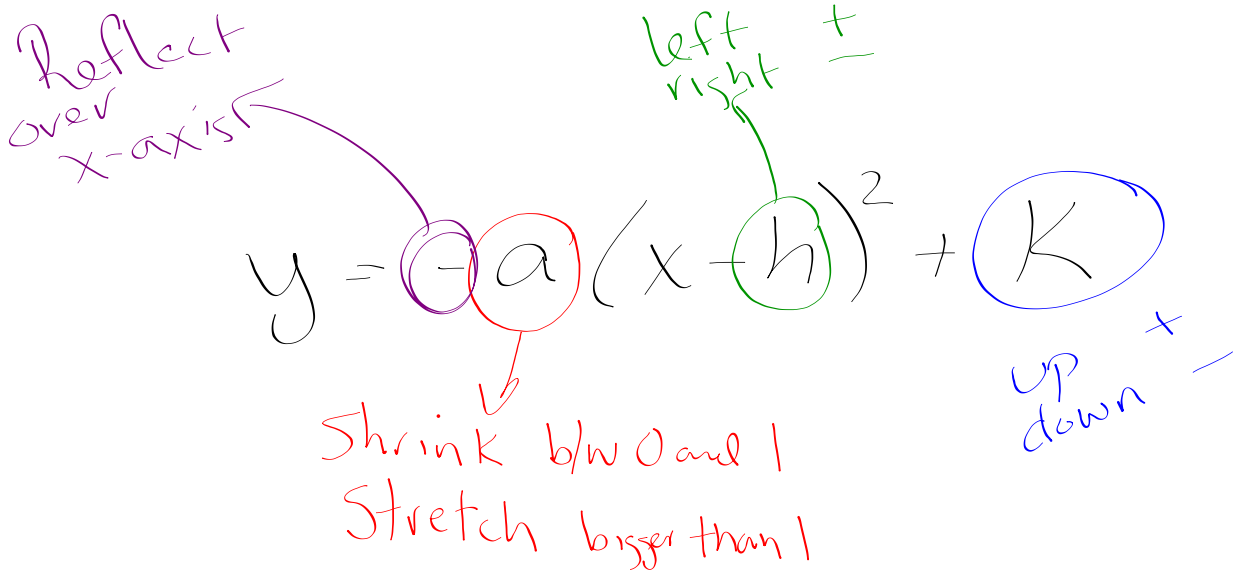

Howdy!!!!
FOA


reflect over x-axis
left right ±
$y = -a(x+h)^2 + K$
Shrink b/w 0 and 1
Stretch bigger than 1
up down + −

TODAYS NOTES

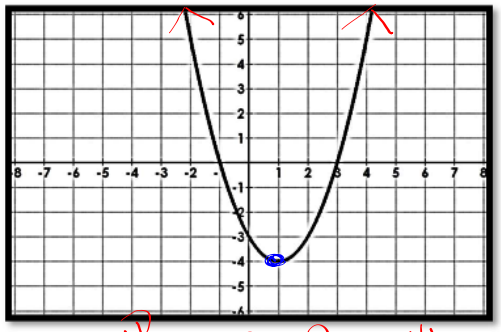
Day 2 - Characteristics of Quadratics

One key component to fully understanding quadratic functions is to be able to describe characteristics of the graph and its equation.

Domain and Range

Domain		
Define: All possible values of x	**Think:** How far left to right does the graph go?	**Write:** Smallest x ≤ x ≤ Biggest x *use < if the circles are open*
Range		
Define: All possible values of y	**Think:** How far down to how far up does the graph go?	**Write:** y ≤ highest y value (opens down) y ≥ lowest y value (opens up)

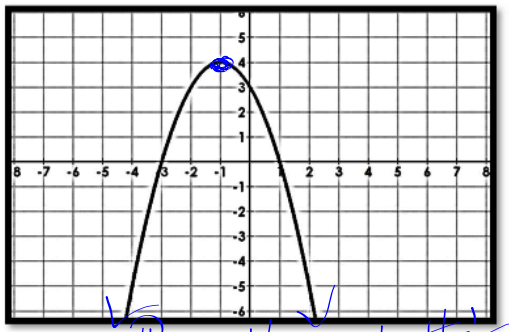
Graph 1



Domain: ℝ All Real #'s

Range: $y \geq -4$

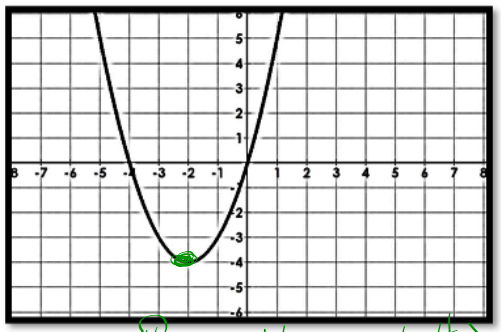
Graph 2



Domain: ℝ all real #'s

Range: $y \leq 4$

Graph 3

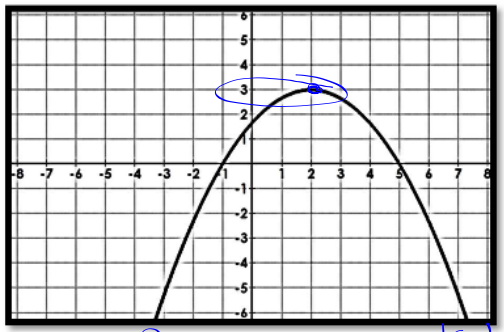


Domain: ℝ all real #'s

Range: $y \geq -4$

↑ arrows up

Graph 4



Domain: ℝ all real #'s

Range: $y \leq 3$

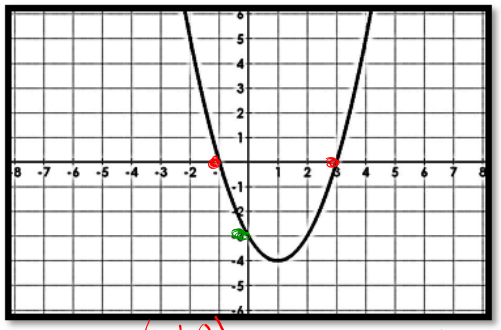
↑ arrows down

Algebra 1 Unit 8: Quadratic Functions Notes

Zeros and Intercepts

Y-Intercept		
Define: Point where the graph crosses the y-axis	**Think:** At what coordinate point does the graph cross the y-axis?	**Write:** (0, b)
X-Intercept		
Define: Point where the graph crosses the x-axis	**Think:** At what coordinate point does the graph cross the x-axis?	**Write:** (a, 0)
Zero		
Define: Where the function (y-value) equals 0	**Think:** At what x-value does the graph cross the x-axis?	**Write:** x = ____

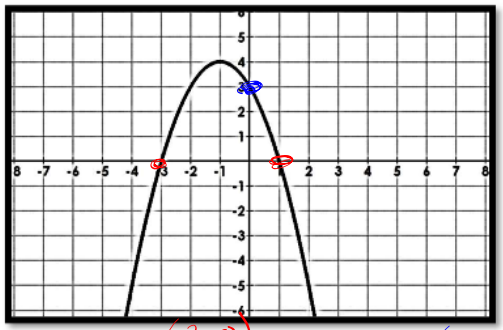
Graph 1



X-intercepts: (-1, 0) (3, 0) Y-intercept: (0, -3)

Zeros: x = -1, x = 3

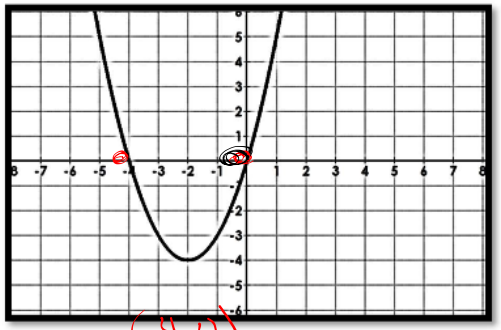
Graph 2



X-intercepts: (-3, 0) (1, 0) Y-intercept: (0, 3)

Zeros: x = -3, x = 1

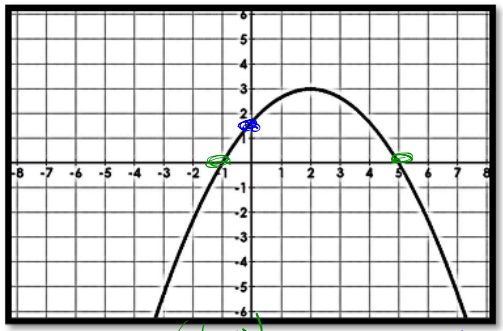
Graph 3



X-intercepts: (-4, 0) (0, 0) Y-intercept: (0, 0)

Zeros: x = -4, x = 0

Graph 4



X-intercepts: (-1, 0) (5, 0) Y-intercept: (0, 1.5)

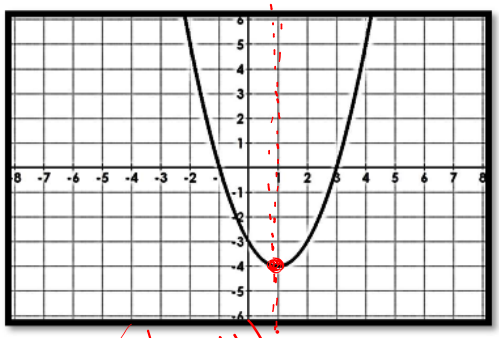
Zeros: x = -1, x = 5

Algebra 1 Unit 8: Quadratic Functions Notes

Vertex & Axis of Symmetry

Vertex		
Define: Highest or lowest point or peak of a parabola	**Think:** What is my highest or lowest point on my graph?	**Write:** Name the point (h, k)
Axis of Symmetry		
Define: The vertical line that divides the parabola into mirror images and runs through the vertex	**Think:** What imaginary, vertical line would make the parabola symmetrical?	**Write:** x = h (x value of the vertex)

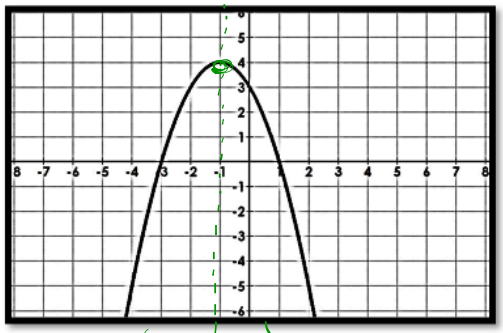
Graph 1



Vertex: (1, −4)

Axis of Symmetry: x = 1

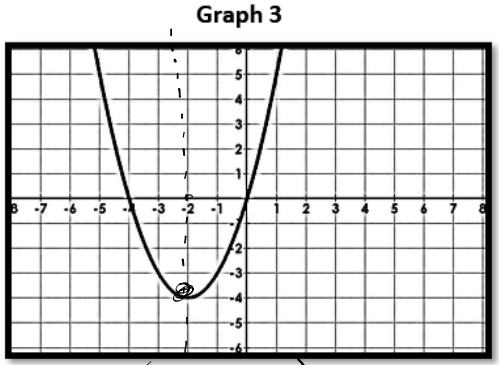
Graph 2



Vertex: (−1, 4)

Axis of Symmetry: x = −1

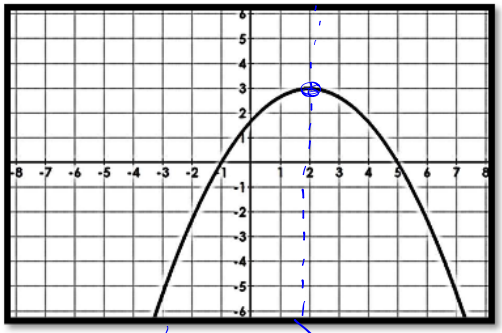
Graph 3



Vertex: (−2, −4)

Axis of Symmetry: x = −2

Graph 4



Vertex: (2, 3)

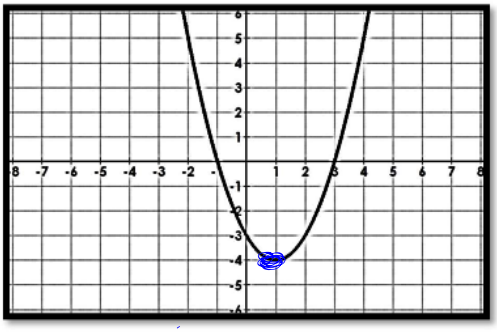
Axis of Symmetry: x = 2

Algebra 1 Unit 8: Quadratic Functions Notes

Extrema

Maximum		
Define: Highest point or peak of a function.	**Think:** What is my highest point on my graph?	**Write:** y = k (y-value of the vertex)
Minimum		
Define: Lowest point or valley of a function.	**Think:** What is the lowest point on my graph?	**Write:** y = k (y-value of the vertex)

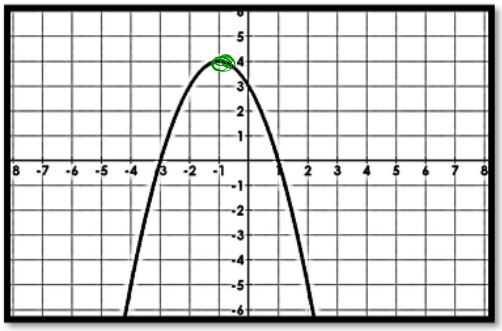
Graph 1



Extrema: minimum

Min/Max Value: y = −4

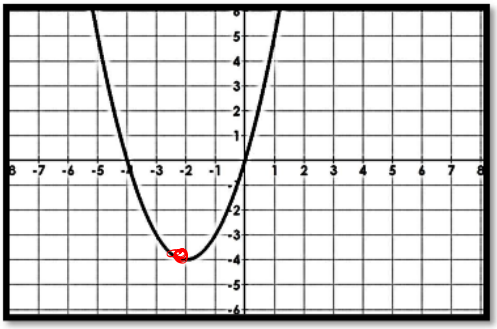
Graph 2



Extrema: maximum

Min/Max Value: y = 4

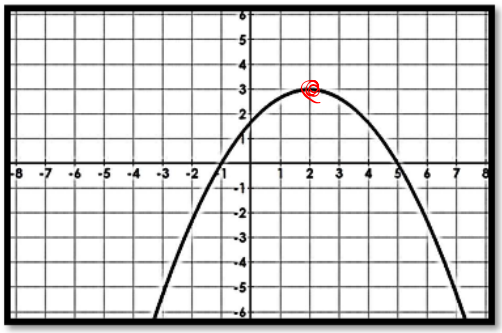
Graph 3



Extrema: min

Min/Max Value: y = −4

Graph 4



Extrema: max

Min/Max Value: y = 3

End Behavior

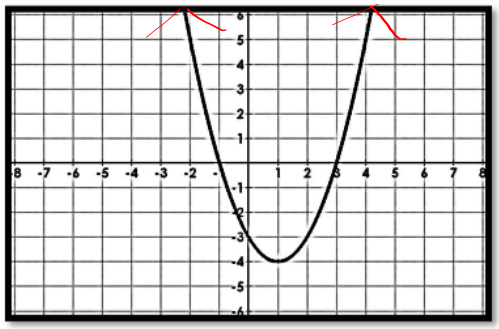
End Behavior

Define:

Behavior of the ends of the function (what happens to the y-values or f(x)) as x approaches positive or negative infinity. The arrows indicate the function goes on forever so we want to know where those ends go.

Think:	**Write:**
As x goes to the left (negative infinity), what direction does the left arrow go?	As x → -∞, f(x) → _____
Think:	**Write:**
As x goes to the right (positive infinity), what direction does the right arrow go?	As x → ∞, f(x) → _____

Graph 1

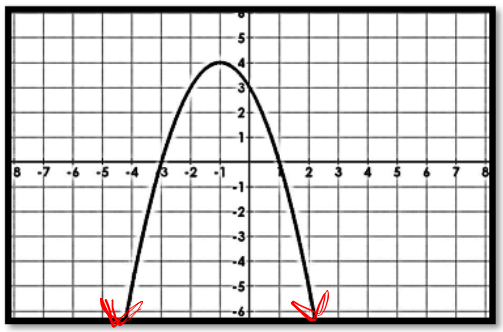


As x → -∞, f(x) → ∞.

As x → ∞, f(x) → ∞.

arrows up

Graph 2

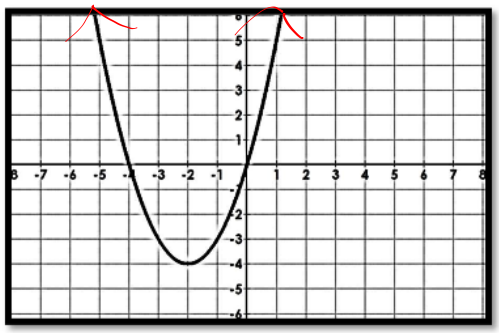


As x → -∞, f(x) → −∞.

As x → ∞, f(x) → −∞.

arrows down

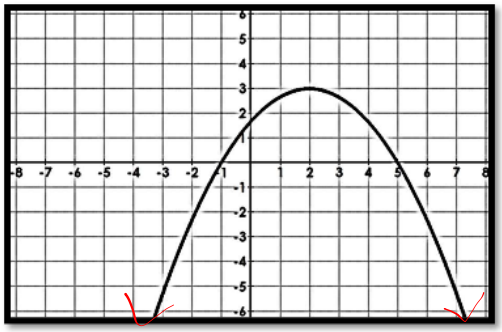
Graph 3



As x → -∞, f(x) → ∞.

As x → ∞, f(x) → ∞.

Graph 4



As x → -∞, f(x) → −∞.

As x → ∞, f(x) → −∞.

Class Practice

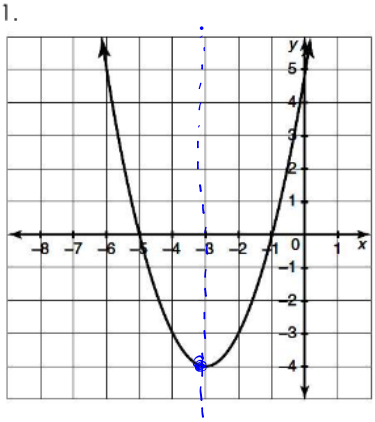
Algebra 1 Unit 8: Quadratic Functions Practice

Day 3 - Characteristics of Quadratic Functions Name:_____

Practice Assignment Date:_____ Block:_____

Identify all of the characteristics listed for the following graphs.

1.



Domain: $\mathbb{R}$ **Range:** $y \geq -4$

Vertex: $(-3,-4)$ **Axis of Sym.** $x=-3$

Y-Intercept: $(0,5)$ **Zeroes:** $x=-5$ $x=-1$

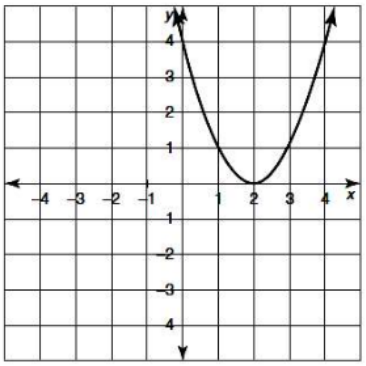
Extrema: min **Max/Min Value:** $y=-4$

Int of Inc: _____ **Int of Dec:** _____

Positive: _____ **Negative:** _____

End Behavior: As x → -∞, f(x) → ∞. As x → ∞, f(x) → ∞

2.



Domain: $\mathbb{R}$ **Range:** $y \geq 0$

Vertex: $(2,0)$ **Axis of Sym.** $x=2$

Y-Intercept: $(0,4)$ **Zeroes:** $x=2$

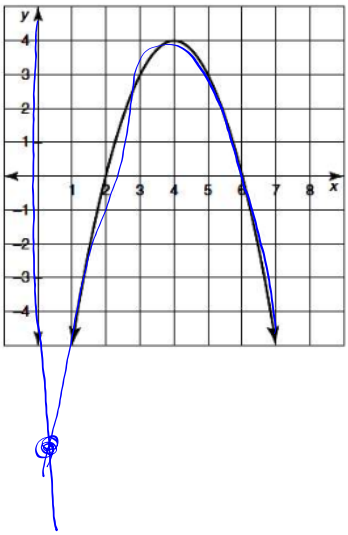
Extrema: min **Max/Min Value:** $y=0$

Int of Inc: _____ **Int of Dec:** _____

Positive: _____ **Negative:** _____

End Behavior: As x → -∞, f(x) → ∞. As x → ∞, f(x) → ∞

3.



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

Vertex: $(4,4)$ **Axis of Sym.** $x=4$

Y-Intercept: N/A **Zeroes:** $x=2$ $x=6$

Extrema: max **Max/Min Value:** $y=4$

Int of Inc: _____ **Int of Dec:** _____

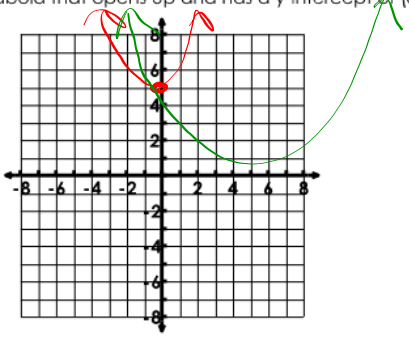
Positive: _____ **Negative:** _____

End Behavior: As x → -∞, f(x) → $-\infty$. As x → ∞, f(x) → $-\infty$

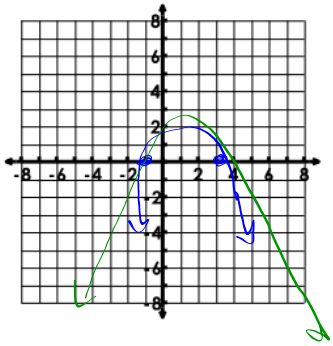
Algebra 1 Unit 8: Quadratic Functions Practice

Problems 4 – 9: Use the given description to create a rough sketch of a quadratic function. Your graphs might look different than mine, but they must meet the characteristic described below. Start by placing your characteristics on the graph and create the sketch after that.

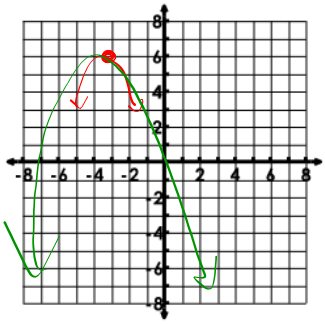
4. Parabola that opens up and has a y-intercept of (0, 5).



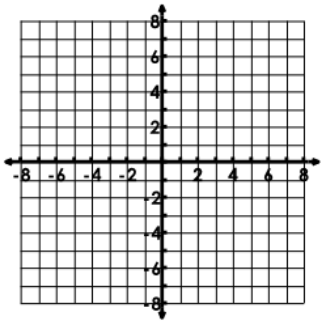
5. Parabola that opens down and has x-intercepts of 3 and -1.



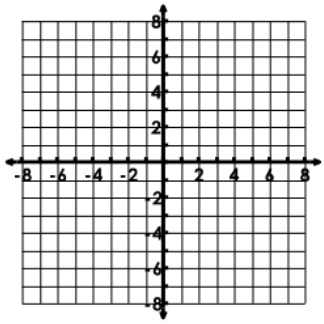
6. Parabola with end behavior that approaches $-\infty$ and has a vertex of (-3, 6).



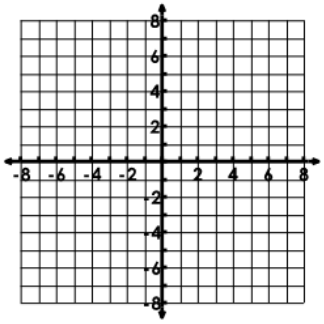
7. Parabola with a negative part of the graph between $-2 \le x \le 2$.



8. Parabola with a maximum of 3 and zeros of 0 and 4.



9. Parabola with an axis of symmetry of x = -1 and a range of $y \ge -5$.



Attachments

Syllabus - Math I A.doc