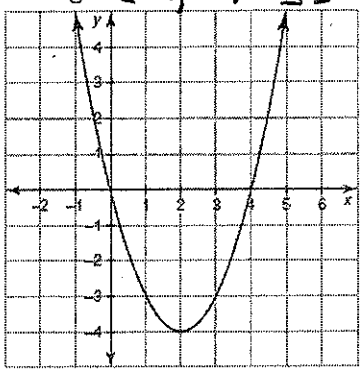
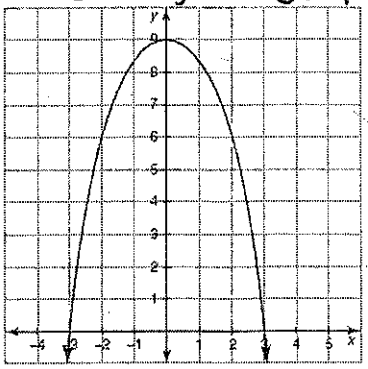
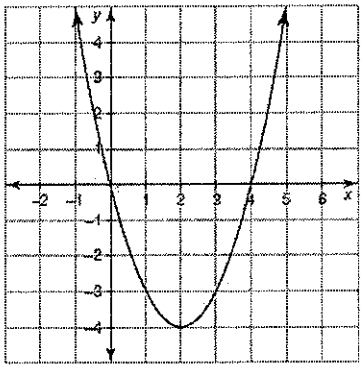
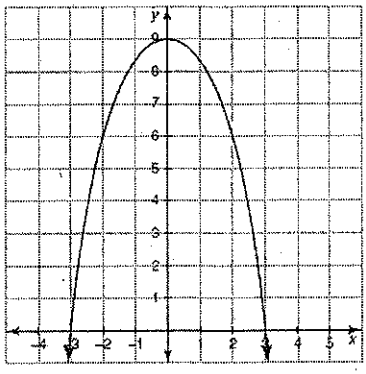
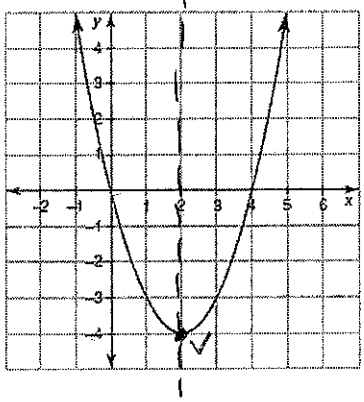
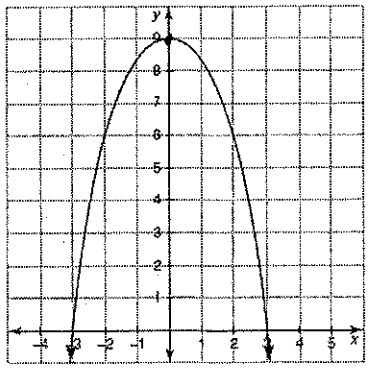
Algebra 1
Review – Graphing Quadratics

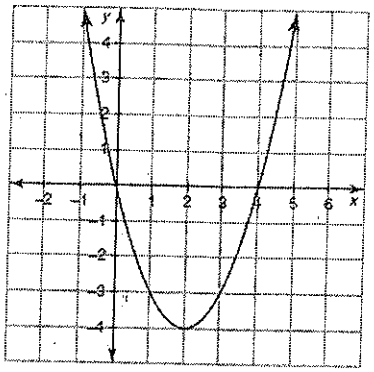
Name:_____
Date: _____ Period: _____

What you need to know & be able to do	Things to remember	Examples	
1. Describe the domain and range.	-Domain: all possible values for x -Range: all possible values for y -"How far up or down does your graph go?"	a. Domain: $\mathbb{R}$, $(-\infty, \infty)$, All Real Numbers Lo-Hi Range: $[-4, \infty)$ $y \geq -4$ 	b. Domain: $\mathbb{R}$ Range: $(-\infty, 9]$ $y \leq 9$ 
2. Describe the intercepts x-intercepts Zeros Roots Solutions	X-int: (p, 0) (q, 0) Y-int: (0, c)	a. x-intercepts: (4, 0) (0, 0) y-intercept: (0, 0) 	b. x-intercepts: (3, 0) (-3, 0) y-intercept: (0, 9) 
3. Describe the vertex, axis of symmetry, extrema, and min/max values.	Vertex: highest or lowest point (x,y) Axis of Symmetry: x value of the vertex; written as x = Extrema: Max or Min? Max/Min Value: What's the lowest or highest your graph goes; written as y =	a. Vertex: (2, -4) Axis of Sym: $x = 2$ Extrema: Max/Min Value $y = -4$ 	b. Vertex: (0, 9) Axis of Sym: $x = 0$ Extrema: Max/Min Value $y = 9$ 

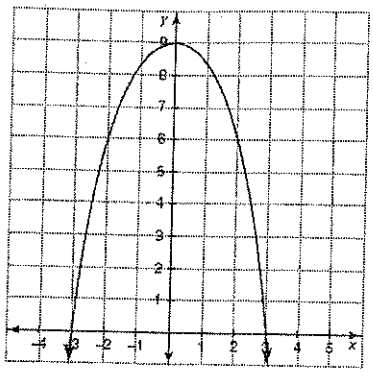
4. Describe the end behavior.

Which direction are the ends of the graph headed? To positive or negative infinity?

a. As $x \to -\infty$, $f(x) \to \infty$.
As $x \to \infty$, $f(x) \to \infty$.



b. As $x \to -\infty$, $f(x) \to -\infty$.
As $x \to \infty$, $f(x) \to -\infty$.



5. Describe the intervals of increase or decrease.

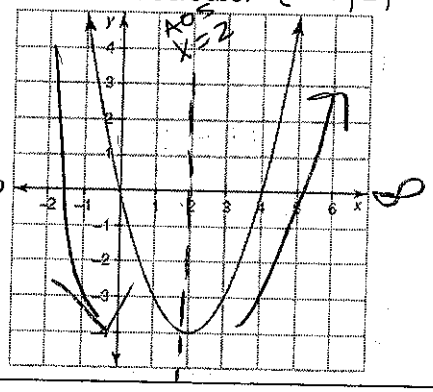
only use x-values

Draw your axis of symmetry.

Then determine which direction the graph is going on the left and then on the right.

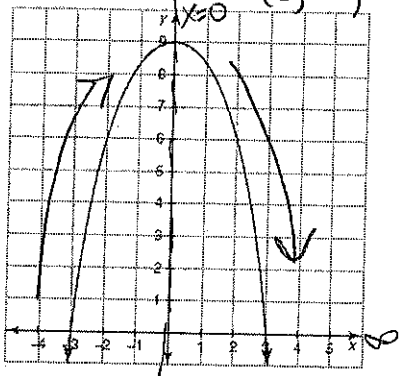
a. Interval of Increase: $(2, \infty)$

Interval of Decrease: $(-\infty, 2)$



b. Interval of Increase: $(-\infty, 0)$

Interval of Decrease: $(0, \infty)$

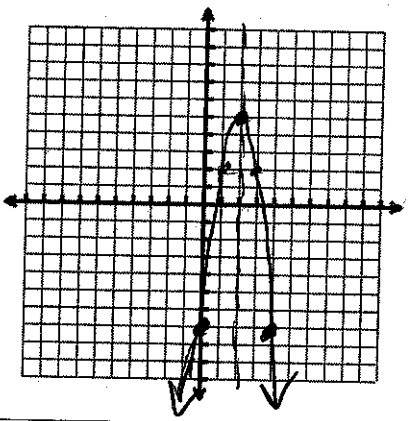


6. Graph in vertex form

1. Determine your vertex. (h,k) AOS x =
2. Find 2 values to the left and right of the vertex.
3. Graph.

a. Graph the following equation: $y = -3(x-2)^2 + 5$

opposite — same



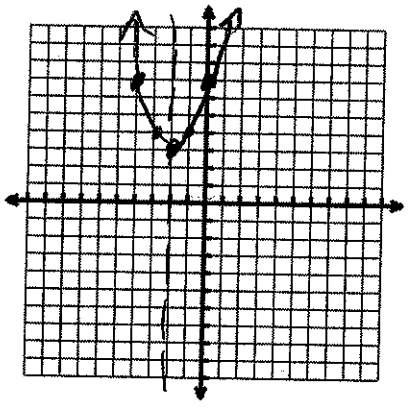
- Vertex (2,5)
- AOS x = 2

$f(1) = -3(1-2)^2+5 = 2$ (1,2)
$f(3) = -3(3-2)^2+5 = 2$ (3,2)
$f(4) = -3(4-2)^2+5 = -7$ (4,-7)
$f(0) = -3(0-2)^2+5 = -7$ (0,-7)

7. Graph in standard form

1. Determine your vertex AOS $\left(x = \frac{-b}{2a}\right)$.
2. Find 2 values to the left and right of the vertex.
3. Graph.

a. Graph the following equation: $y = x^2 + 4x + 7$ $a = 1$ $b = 4$



AOS: $x = \frac{-b}{2a} = \frac{-4}{2(1)} = -2$

Vertex $(-2, 3)$

$(-2)^2 + 4(-2) + 7 = 3$

$f(0) = 7$
$f(-1) = 4$
$f(-3) = 4$
$f(-4) = 7$

x	y
-1	
0	

8. Graph in intercept form

1. Determine your x-intercepts and plot them.

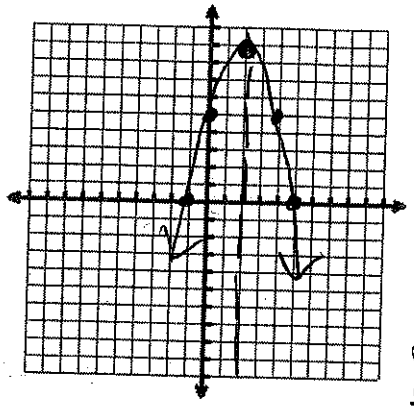
2. Determine you vertex (find the middle of the two x-intercepts or use $x = \frac{p+q}{2}$).

3. Plot vertex and graph.

4. Find one more point on each side of axis of symmetry.

a. Graph the following equation: $y = -(x+1)(x-5)$

opp opp



$p=-1 \quad q=5$

x-intercept $(-1,0)(5,0)$

$x = \frac{p+q}{2} = \frac{-1+5}{2} = \frac{4}{2} = 2$

$y = -(2+1)(2-5) = 9$

AOS $x=2$ Vertex $(2,9)$

$f(0)=5$

$f(4)=5$

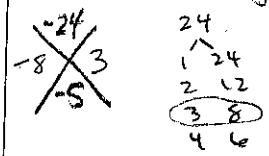
9. Converting between forms

a. Name the form and it's characteristics

$y = x^2 - 5x - 24$

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

Convert to intercept form. *factoring



$y = (x-8)(x+3)$

b. Name the form and it's characteristics $y = (x+4)(x-7)$?

Intercept form $y = a(x-p)(x-q)$

Convert to standard form.

$y = (x+4)(x-7)$

$y = x^2 - 7x + 4x - 28$

$y = x^2 - 3x - 28$

c. Name the form and it's characteristics $y = (x+3)^2 - 5$

Vertex form $y = a(x-h)^2 + k$

Convert to standard form.

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

$y = (x+3)(x+3) - 5$

$y = x^2 + 3x + 3x + 9 - 5$

$y = x^2 + 6x + 4$

10. Graph inequality in standard form

Solid Curve $\leq \quad \geq$

Dashed Curve $< \quad >$

1. Determine your vertex $\left(x = \frac{-b}{2a}\right)$.

2. Find 2 values to the left and right of the vertex.

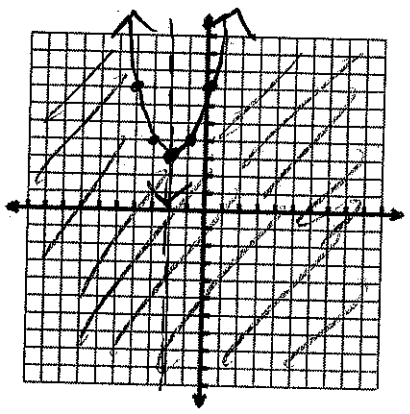
3. Graph.

4. Shade up or down.

5. Solid or dashed curve.

Graph the following inequality:

$y \leq x^2 + 4x + 7 \quad a=1 \quad b=4$



$\leq$ Shade form vertex down

* Solid curve

* ↑ ↓

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

Vertex $(-2, 3)$

$(-2)^2 + 4(-2) + 7 = 3$

$f(-1) = (-1)^2 + 4(-1) + 7 = 4 \quad (-1,4)$

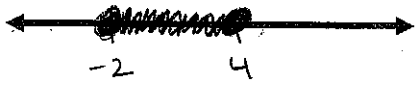
$f(-4) = 7 \quad (-4,7)$

$f(-3) = 4 \quad (-3,4)$

$f(0) = 7 \quad (0,7)$

a) Name 1 solution $(0,0)$

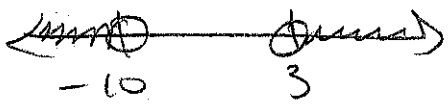
b) Name 1 point not a solution $(-2,5)$

11. Solve the inequality in 1 variable	1. Replace inequality with = sign. 2. Move all terms to the left with zero on the right. 3. Factor or use quadratic formula to find solutions. 4. Draw number line using open or closed circles. 5. Test x-value in each section and shade. 6. Write answer.	Graph the following inequality on a number line: $x^2 - 2x - 8 \leq 0$ $x^2 - 2x - 8 = 0$ -8, -4, 2, -2 $(x-4)(x+2)=0$ $x-4=0 \quad x+2=0$ $x=4, -2$ closed circle  $-2 \quad 4$ Test $f(-3)=7 \quad 7 \leq 0$ False $f(0)=-8 \quad -8 \leq 0$ True $f(5)=7 \quad 7 \leq 0$ False $-2 \leq x \leq 4$ or $[-2, 4]$

$x^2 + 7x - 30 > 0$

$(x+10)(x-3)$

$x = -10, 3$



$-10 \quad 3$

$-30 > 0$

$x < -10$ OR $x > 3$