1. Write a Quadratic Function in Standard Form:

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

2. Given the Quadratic Function: $f(x) = 9x^2 - 4x + 8$

a. Identify the quadratic term: $9x^2$

b. Identify the linear term: $-4x$

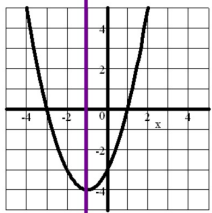c. Identify the constant term: $+8$

3. What part of the equation for a Quadratic in Standard Form determines if a parabola opens up or down?

the coefficient a

4. a. A parabola opens up if __a>0__

b. A parabola opens down if __a<0__

5. Use the parabola shown. Draw the Line of Symmetry (also known as the Axis of Symmetry).

a. State the coordinates of the vertex.

(-1,-4)

b. What kind of line is the Line of Symmetry?

Vertical

c. Write the equation of the Line of Symmetry. x = -1

d. The Line of Symmetry always passes through what point?

Vertex

e. How is the Line of Symmetry related to the x-coordinate of the vertex?

The x-coord of the vertex is always the number used in the Equation of the LOS.

f. Is the vertex of this parabola a Maximum or a Minimum?

since the vertex is a low point it is a Minimum

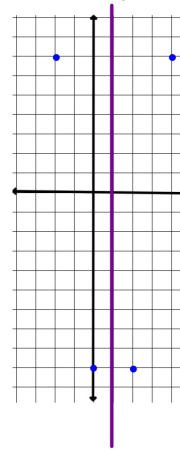6. The vertex of a parabola is a Maximum if...

It opens down.....a<0

The vertex of a parabola is a Minimum if...

If it opens up.....a>0

7. Since the y-intercept of any function is found by replacing x with zero, what will the y-intercept of every quadratic function in standard form turn out to be?

it is always the constant C

8. The Line of Symmetry of a parabola is $x = 1$.
Given the points $(2, -9)$ and $(4, 7)$ are on the parabola, use the Line of Symmetry to find two other points on this parabola.

Reflect these two points over the LOS to get:

(0,-9)   (-2,7)

The vertex of a parabola is the point (-8,2)

What is the equation for the Line of Symmetry?

x = -8

The parabola $y = 2x^2 - 12x + 1$

has the following Line of Symmetry:

x = 3

Find the coordinates of the Vertex.

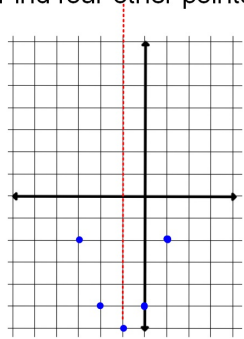First, the x-coordinate must be 3. Plug this into the equation to find the y-coordinate

(3,-17)

When you graph a parabola I'll ask for five points.

Use this quadratic: $y = x^2 + 2x - 5$

The Vertex is (-1, -6)

Find four other points on this parabola.

Set up a table to find two more points

Reflect these over the LOS to find two more pts.

x	y	
0	-5	(-2,-5)
1	-2	(-3,-2)

How many points define a line?

2 points

How many points define a parabola?

3 noncollinear points

Find the equation of the parabola
that passes through these three points:

(-1,2)   (2,-6)   (4,5)

Give your answer in Standard Form:
$y = ax^2 + bx + c$

Write a system of equations and use matrices
to find a, b, and c.

(-1,2)   (2,-6)   (4,5)

$y = ax^2 + bx + c$

Use (-1,2)   2 = a - b + c

Use (2,-6)   -6 = 4a + 2b + c

Use (4,5)   5 = 16a + 4b + c

Find a, b, and c by solving
this system of equations
using matrices:

$$\begin{bmatrix} 1 & -1 & 1 \\ 4 & 2 & 1 \\ 16 & 4 & 1 \end{bmatrix} \begin{bmatrix} 2 \\ -6 \\ 5 \end{bmatrix}$$

A   B

a= 1.63, b=-4.3, c=-3.93

$y = 1.63x^2 - 4.3x - 3.93$

Use the graphing calculator to
perform a Quadratic Regression:

(-1,2)   (2,-6)   (4,5)

$y = ax^2 + bx + c$

Students were also shown how to perform a
Quadratic Regression using the graphing calculator
to get the same equation.

Find the equation of the parabola
that passes through this set of points:

(4,1)   (11, 3)   (6, -2)   (9,9)

You must use a regression if there are more than
three points.

Use a link from my Blog to perform
a quadratic regression.

(-1,2)   (2,-6)   (4,5)

$y = ax^2 + bx + c$

Students were shown a link on my blog that
sends them to a website that has an applet for
Quadratic Regression.

Given the point (4,11) is on the
graph of $y = x^2 + c$

Find the value of c.

Use the point to replace x and y then solve for c.

$11 = (4)^2 + c$

$c = -5$

Given the points (-3,-20) and (-1,4)
are on the graph of $y = ax^2 + c$

Find the values of a and c.

Create a system of equations by using both points:

$-20 = 9a + c$

$4 = a + c$

solve this system of equations to find both a and c.

$a = -3$ $c = 7$