Sec 5-2:

Standard Form for the Equation of a Quadratic Function:

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

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a
- Determines if graph opens up or down
- Vertical Stretch/Shrink Factor

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

Tell if each Parabola has a Max or a Min.

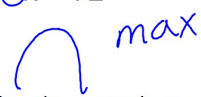
1. $50x^2 - 115x - 276$

Opens up because a is pos.

2. $-0.15x^2 + 43x + 99$

Opens down because a is neg.

3. $16x - x^2 + 72$



Opens down because a is neg.

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

Finding the Vertex:

1. Find the LOS: LOS: $x = \frac{-b}{2a}$ "Opposite of b divided by two times a"

remember, the LOS is a vertical line passing through the Vertex.

2. The x-coordinate of the Vertex is the LOS. Find the y-coord of the Vertex by....substituting this value of x into the equation.

Vertex of a Parabola when equation is in STANDARD FORM

(x, y)

Same value as LOS

$\frac{-b}{2a}$

evalute the equation using the x from LOS

Find the vertex of each parabola:

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

Vertex: (3, 13)

LOS = $x = \frac{-12}{-4} = 3$

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

$= -18 + 36 - 5 = 13$

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

Vertex: (0, 3)

LOS: $x = \frac{0}{10} = 0$

$y = 5(0)^2 + 3$

$= 0 + 3 = 3$

3. $y = -(x - 4)^2 + 17$

Vertex: (4, 17)

This equation is in Vertex Form, therefore, the Vertex is just (h,k)

y-intercept of a Parabola:

Using a Quadratic in Standard Form: $y = ax^2 + bx + c$

To find the y-intercept for ANY EQUATION you make x=0 and find the value of y

For a Quadratic in Standard Form

the y-intercept is always C

State the y-intercept of each parabola.

1. $y = -x^2 + 7x - 13$

y-int: $y = -13$

2. $y = 8x^2 + 21x$

y-int: $y = 0$

no C which means C = 0

3. $y = 2(x + 3)^2 - 10$

y-int: $= 2(0+3)^2 - 10$

$= 2(3)^2 - 10$

$= 2(9) - 10$

$= 18 - 10 = 8$

y-int = 8

This equation is in Vertex Form, therefore, you must substitute zero for x and find the value of y.

When graphing a quadratic, after finding the vertex and the y-int, you can find the remainder of the Five points by

Using a table of values and their reflections over the LOS

Pick x-values near the Vertex

OR

Using the Vertical Stretch/Shrink factor a.

Graph this Quadratic:

$$y = x^2 - 4x - 1$$

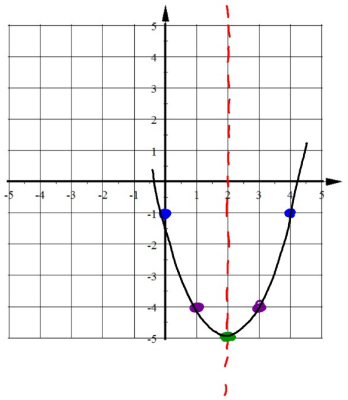
y-int = −1 plot this then reflect over the LOS

LOS: $x = \frac{4}{2} = 2$

Vertex: $(2, -5)$

$(2)^2 - 4(2) - 1$

$= 4 - 8 - 1 = -5$



Find 1 more point & Reflect it over LOS:

parent func. this func.

1 · 1 → 1

(a = 1) 1