Warm Up Algebra 2 3/10/17

Reminders: Quiz Wednesday of next week, Office hours Tuesday and Thursday next week.

For each of the following equations (in vertex form) find the vertex, axis of symmetry, x intercepts and y intercept.

$f(x) = -3(x-2)^2 - 4$

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

Vertex Form of quadratic equations

$f(x) = a(x-h)^2 + k$

Ex. $f(x) = -3(x-2)^2 + (-4)$

$a = -3 \quad h = 2 \quad k = -4$

Vertex - The vertex in vertex form is the point (h, k)

Process
Identify (h, k)

Ex. $h = 2 \quad k = -4$

vertex $(2, -4)$

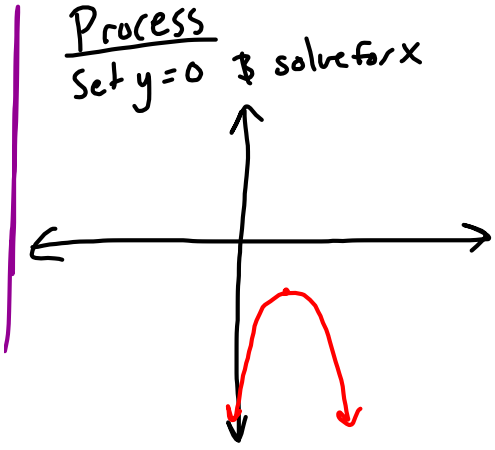
Axis of Symmetry - The AOS in vertex form is the vertical line $x = h$

Process
Identify h
$x = h$

Ex. $h = 2$

AOS: $x = 2$

X-intercepts - points where the parabola "hits" the x axis. ALWAYS occurs when $y = 0$



Process
Set $y = 0$ & solve for x

Ex. $f(x) = -3(x-2)^2 - 4$

$0 = -3(x-2)^2 - 4$

$+4 \qquad +4$

$\frac{4}{-3} = \frac{-3(x-2)^2}{-3}$

$\sqrt{-\frac{4}{3}} = \sqrt{(x-2)^2}$

$2 \pm \sqrt{-\frac{4}{3}} = x - 2$

$+2$

$x = 2 \pm i\sqrt{\frac{4}{3}}$

No x int

Y-intercept - Where the parabola "hits" the y axis. ALWAYS where $x = 0$

Process
Set $x = 0$ solve for y

Ex. $f(x) = -3(x-2)^2 - 4$

$f(0) = -3(0-2)^2 - 4$

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

$= -3(4) - 4$

$= -12 - 4$

$f(0) = -16$ $(0, -16)$

Intercept Form of quadratic equations

$f(x) = a(x-p)(x-q)$ Ex. $f(x) = 3(x-2)(x+4)$

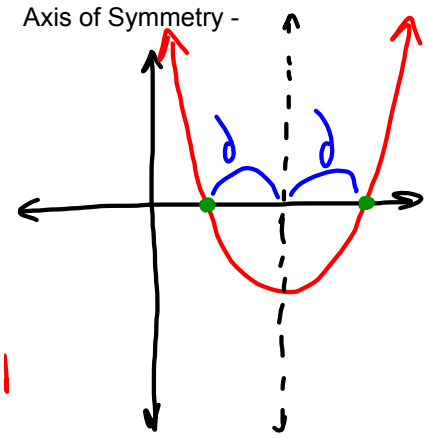
X-intercepts - when in intercept form the x int are the two points $(p,0)$ $(q,0)$.

Process
Identify p & q

Ex. $p = 2$ $q = -4$

x int - $(2,0)$ $(-4,0)$

Axis of Symmetry - halfway between the two x intercepts



$x = \frac{p+q}{2}$ AOS

Ex.
$p = 2$ $q = -4$

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

$x = -1$

Vertex - The vertex in intercept form can be found by plugging the x value from the AOS into the function.

$\left(\frac{p+q}{2}, f\left(\frac{p+q}{2}\right)\right)$

x y

Ex. $\frac{p+q}{2} = -1 = x$

$f(x) = 3(x-2)(x+4)$

$f(-1) = 3(-1-2)(-1+4)$

$f(-1) = 3(-3)(3)$

$= -27$

$(-1,-27)$

Y-intercept - ALWAYS where $x=0$

Ex. $f(x) = 3(x-2)(x+4)$

$f(0) = 3(0-2)(0+4)$

$f(0) = 3(-2)(4)$

$= -24$

$(0,-24)$

For each of the following find the axis of symmetry, the vertex and all intercepts:

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

$f(x) = (x+2)^2 - 1$

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

$y = 4(x+2)(x+1)$