

3/2 Algebra 1 - Downing Warm-up

$$f(x) = -3x^2 + 4x - 6$$

opens down Max

Graphing Quadratics in Standard Form Steps

① Label a, b, and c
Does it open up or down?

② Find the Axis of Symmetry (AOS)
 $x = \frac{-b}{2a}$

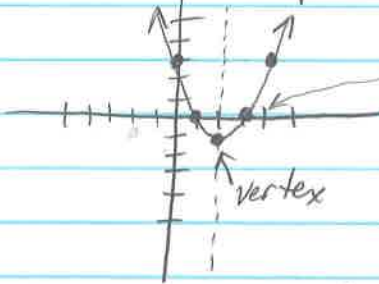
③ Find the y value of the vertex by plugging in the "AOS" into the equation

④ Plot the vertex

⑤ Find the y-intercept (this is your c-value)
Plot this point

⑥ Mirror the y-intercept on the other side of the AOS

⑦ Draw the "U" parabola



Example

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

* opens up
 $a = 1$ $b = -4$ $c = 3$

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

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

$$y = 4 - 8 + 3 \quad \text{Vertex: } (2, -1)$$

$$y = -4 + 3$$

$$y = -1$$

y-intercept (0, 3)

Solve by factoring

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

$$(x^2 - 1x) - 3x + 3$$

$$x(x-1) - 3(x-1)$$

$$(x-3)(x-1)$$

$$x = 3, 1$$

Solutions are on x-axis

Note: If your vertex is the same as your y-intercept, you will need to pick another x value on either the left or right of that point. Plug that value into your function to get the point. Then mirror it over the AOS

Ex) Graph: $y = -2x^2 - 5$ $a = -2$ $b = 0$ $c = -5$

opens down

$$x = \frac{-b}{2a} = \frac{0}{2(-2)} = 0$$

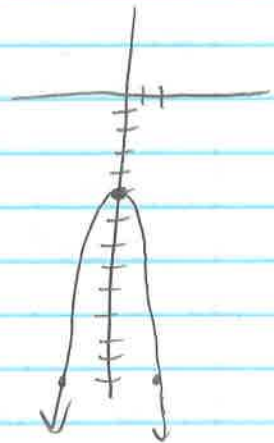
$$y = -2(0)^2 - 5 = -5 \quad \text{Vertex } (0, -5)$$

Plug in $x = 2$ then $y = -2(2)^2 - 5$

$$y = -8 - 5$$

$$y = -13$$

$$(2, -13)$$



HW - Graphing Quadratics WS - Front side only

#1 done together in class

$$y = 2x^2 - 4x + 1 \quad \text{opens up} \quad a = 2, b = -4, c = 1$$

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

$$\begin{aligned} y &= 2(1)^2 - 4(1) + 1 && \text{Vertex} \\ &= 2 - 4 + 1 && (1, -1) \\ &= -1 \end{aligned}$$

$$y\text{-int} = 1 \quad (0, 1)$$

then mirror $(2, 1)$

$$\text{Min} = y = -1$$

$$\text{Domain} = x \in \mathbb{R}$$

$$\text{Range } y \geq -1$$

x-intercepts

