

3/2 Algebra - Downing

* Test Friday

Lesson 5: Quadratics in Intercept Form

Warm up:

1. Solve by factoring: $3x^2 - 5x = -2$

$$\begin{array}{r} ac \\ \hline 6 \\ 1 \overline{) 6} \\ -2 \overline{) 3} \end{array}$$

$$3x^2 - 5x + 2 = 0$$

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

$$x(3x - 2) - 1(3x - 2) = 0$$

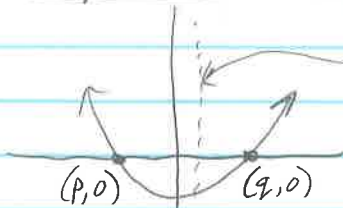
$$(x - 1)(3x - 2) = 0$$

$$x = 1, \frac{2}{3}$$

Intercept Form $\rightarrow f(x) = a(x - p)(x - q)$ \rightarrow Factored Form

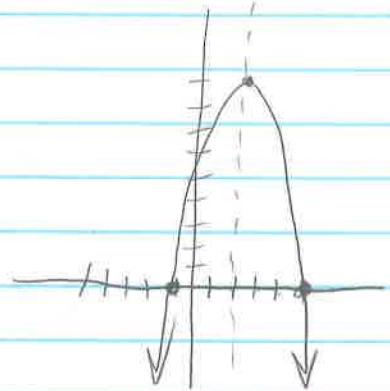
p and q are x -intercepts

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



Graphing in Intercept Form

- | Steps | Example |
|---------------------------------|--|
| 1. Graph x -intercepts | $y = -(x+1)(x-5)$
$x = -1, x = 5$
$(-1, 0) (5, 0)$ |
| 2. AOS $x = \frac{p+q}{2}$ | AOS: $x = \frac{-1+5}{2} = \frac{4}{2} = 2$ |
| 3. Find the value of the vertex | $y = -(2+1)(2-5)$
$= -(3)(-3)$
$= 9$ |
| 4. Draw your parabola | $(2, 9)$ |



Ex) Graph: $y = -2(x-4)(x+1)$

$x=4, x=-1$
 $(4,0), (-1,0)$

AOS: $x = \frac{p+q}{2} = \frac{4+(-1)}{2} = \frac{3}{2} = 1.5$

plug in 1.5 $y = -2(1.5-4)(1.5+1)$

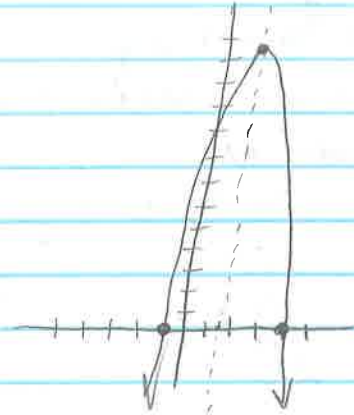
$y = 12.5$

vertex: $(1.5, 12.5)$

Max at 12.5

D: $x \in \mathbb{R}$

R: $y \leq 12.5$



* x-intercepts are also called zeros, solutions or roots

Ex) Graph: $f(x) = 2(x+2)(x-2)$

$x=-2, x=2$

$(-2,0), (2,0)$

AOS: $x = \frac{-2+2}{2} = \frac{0}{2} = 0$

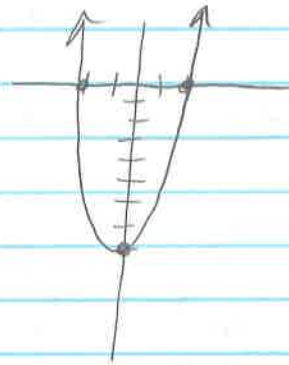
$y = 2(0+2)(0-2)$

$y = -8$ vertex $(0, -8)$

Min: $y = -8$

D: $x \in \mathbb{R}$

R: $y \geq -8$



Ex) $f(x) = \frac{-2x^2 - 10x - 12}{2}$ * use intercept form to graph

$-2(x^2 + 5x + 6)$

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

$$\begin{array}{r} 6 \\ 2 \overline{) 12} \\ \underline{2} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

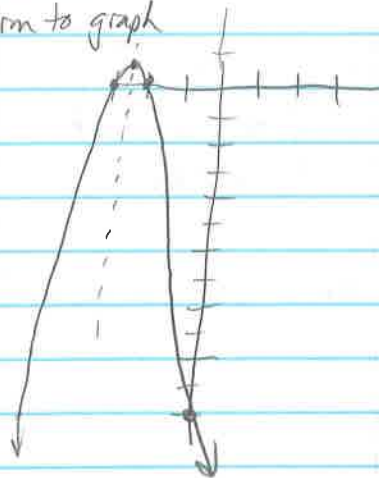
$x = -2, -3$

$(-2,0), (-3,0)$

AOS: $x = \frac{-2+(-3)}{2} = \frac{-5}{2} = -2.5$

$y = -2(-2.5+2)(-2.5+3)$

$y = .5$ $(-2.5, .5) \rightarrow$ vertex



HW - Worksheet #1-9