0-3 Guided Notes #1
Quadratic Functions and Equations

Objectives: Graph quadratic functions using a variety of methods

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STANDARD

$$f(x) = ax^2 + bx + c$$

y

function

degree 2

constant

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

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

~~$f(x) = 5$~~

~~$f(x) = 3x + 5$~~

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The graph of a quadratic equation is called a ___PARABOLA___.

$y = ax^2 + bx + c$

Axis of Symmetry: $x = \dfrac{-b}{2a}$

Vertex: $(x, f(x))$

y-intercept: $(0, c)$

x-intercepts: x-int, zeros, solutions
solve the equation

Domain: x's   D: ℝ $(-\infty, \infty)$ $x = -1$

Range: y's   R: $\{y \mid y \geq -2\}$

$[-2, \infty)$

max

x-int   vertex   y-int   min

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Ex 1: Graph by making a table.

$f(x) = 2x^2 - 8x + 4$

| x	Graph $f(x) = 2x^2 - 8x + 4$	$f(x)$	$(x, f(x))$
0	$f(0) = 2(0)^2 - 8(0) + 4$	4	$(0, 4)$
1	$2(1)^2 - 8(1) + 4$	-2	$(1, -2)$
2	$2(2)^2 - 8(2) + 4$	-4	$(2, -4)$
3	$2(3)^2 - 8(3) + 4$	-2	$(3, -2)$
4	$2(4)^2 - 8(4) + 4$	4	$(4, 4)$

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2
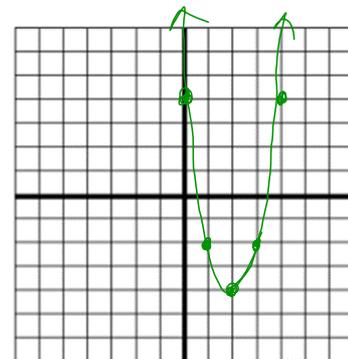
Ex 2: Use the axis of symmetry, y-intercept, and vertex to graph $f(x) = x^2 - 8x + 4$

Axis of Symmetry: $x = \dfrac{-b}{2a} = \dfrac{8}{2(1)} = 4$

$X = 4$

Vertex: $(4, -12)$ $y = (4)^2 - 8(4) + 4$
$y = -12$

y-intercept: $(0, 4)$
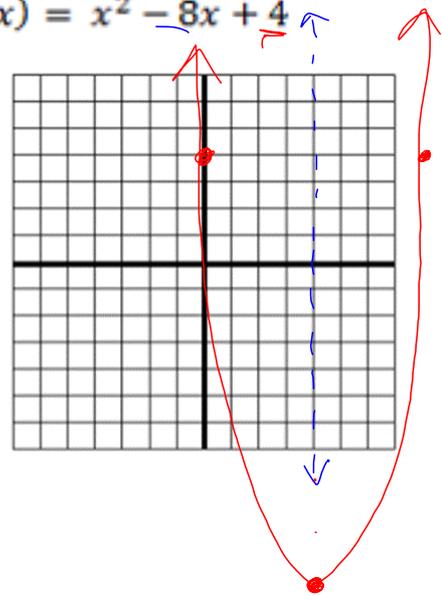
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MAXIMUM AND MINIMUM VALUES

Ex 3: Consider $f(x) = -3x^2 + 12x + 11$

$(2, 23)$
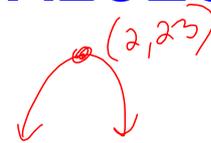
a.) Determine whether the function has a maximum or minimum value.

maximum

b.) Find the max or min of the function.

$x = \dfrac{-b}{2a} = \dfrac{-12}{2(-3)} = (2, 23)$ $-3(2^2) + 12(2) + 11$
$-12 + 24 + 11$
23

c.) State the domain and range of the function.

$D: \mathbb{R}$

$R: \{ y \mid y \le 23 \}$

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Homework

P13 #1, 9-19odd

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