Thursday, May 31, 2018 2:41 PM

Ch. 4 Review Notes

Chapter 4 Analyzing Quadratics Review Name ______________________

To graph a quadratic function, it is easiest if the function is in Standard Form. (vertex form)

$y=a(x-p)^2+q \rightarrow$ vertex (p,q)

In order to convert a quadratic from standard to vertex form, we must "complete the square." → leading coefficient must be 1!

a) $y = -x^2 - 12x - 33$

$\frac{12}{2}=6$

$6^2=36$

$y=-(x^2+12x)-33$

$y=-(x^2+12x+36-36)-33$

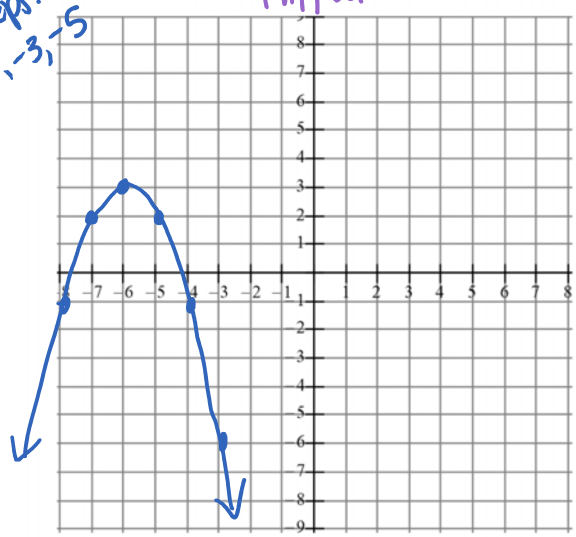
$y=-(x^2+12x+36)+36-33$

$\boxed{y=-(x+6)^2+3}$

↑ flipped ←6 ↑3

steps: 1, 3, 5

-1, -3, -5



Vertex: $(-6,3)$

Axis of symmetry: $x=-6$

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

Range: $\{y \mid y\le 3, y\in\mathbb{R}\}$

b) $y = 2x^2 - 20x + 47$

$\frac{-10}{2}=-5$

$(-5)^2=25$

$y=2(x^2-10x)+47$

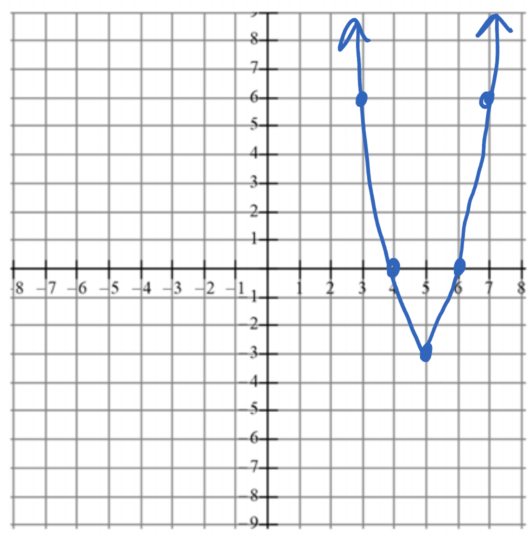
$y=2(x^2-10x+25-25)+47$

$y=2(x-5)^2-50+47$

$\boxed{y=2(x-5)^2-3}$

↑ →5 ↓3

steps x2: 2, 6, 10



Vertex: $(5,-3)$

Axis of symmetry: $x=5$

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

Range: $\{y \mid y\ge -3, y\in\mathbb{R}\}$

Different forms of the quadratic equation can be used depending on the information given.

General Form	Standard Form (vertex)	Factored form
$y=ax^2+bx+c$	$y=a(x-p)^2+q$	$y=a(x-x_1)(x-x_2)$
y-int.	vertex (p,q)	x-int.

When given the vertex, use the Standard Form (Vertex form)

Ex. Determine the equation of the quadratic with a vertex $(2,-4)$ that passes through $(3,-2)$

p q

x y

$$y=a(x-p)^2+q$$
$$-2=a(3-2)^2-4$$
$$-2=a(1)^2-4$$
$$-2=a-4$$
$$+4 \quad +4$$
$$\boxed{a=2}$$

$$\boxed{y=2(x-2)^2-4}$$

When given the x-intercepts, you can use the factored form of the quadratic equation

Ex. Determine the equation of the quadratic that passes through $A(2,9)$ and has x-intercepts -1 and 3

x y

x_1 x_2

$$y=a(x-x_1)(x-x_2)$$
$$9=a(2-(-1))(2-3)$$
$$9=a(3)(-1)$$
$$\frac{9}{-3}=\frac{-3a}{-3}$$
$$\boxed{-3=a}$$

$$\boxed{y=-3(x+1)(x-3)}$$