

## Quadratic Functions in Standard Form

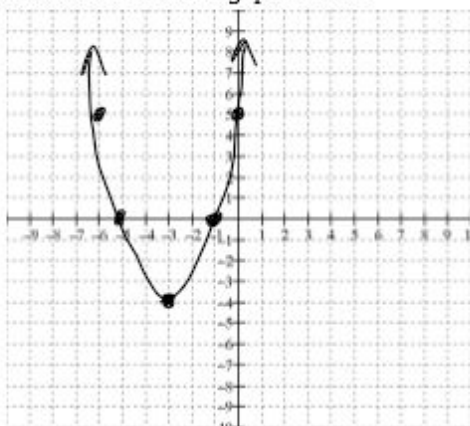
$$y = a(x-p)^2 + q$$

The standard form of a quadratic function is:

e.g.  $y = Ax^2 + Bx + C$

$$a=1 \quad b=6 \quad c=5$$

Ex. #1: Use a table of values to sketch the graph of  $y = x^2 + 6x + 5$  and answer the following questions.



Vertex:  $(-3, -4)$

Axis of symmetry:  $x = -3$

Direction of Opening: UP

Max or Min:  $y = -4$

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

Range:  $\{y \mid y \geq -4, y \in \mathbb{R}\}$

$$\boxed{x = \frac{-b}{2a}}$$

$$= \frac{-6}{2(1)} = \underline{-3}$$

x	y
0	$0^2 + 6(0) + 5 = 5$
<u>-3</u>	$(-3)^2 + 6(-3) + 5$
	$= 9 - 18 + 5$
	$= -4$
-1	$(-1)^2 + 6(-1) + 5$
	$= 0$

Ex. #2: Which functions are quadratic?

(a)  $y = (x-2)(2x+5)$

$$= 2x^2 + 5x - 4x - 10$$

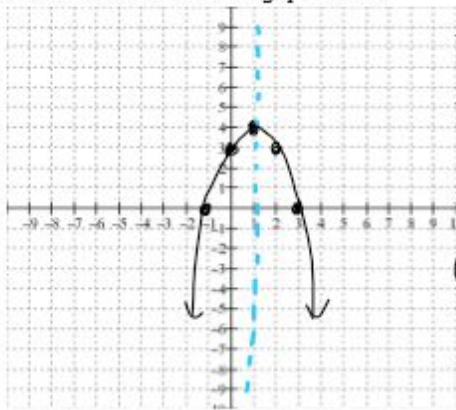
$$= 2x^2 + x - 10$$



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

line

Ex. #3: Use a graphing calculator to sketch the graph of  $y = -x^2 + 2x + 3$  and answer the following questions.



Vertex:  $(1, 4)$

Axis of symmetry:  $x = 1$

Direction of Opening: DOWN

Max or Min:  $y = 4$

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

Range:  $\{y \mid y \leq 4, y \in \mathbb{R}\}$

x	y
1	$-(1)^2 + 2(1) + 3$
	$= -1 + 2 + 3$
	$= 4$

$$x_{\text{max or min}} = \frac{-b}{2a}$$
$$= \frac{-2}{2(-1)}$$
$$= 1$$

HW: Ps 174  
4ad, 6, 7, 10  
↳ focus on symmetry.



