

## 6-1 Graphing Quadratic Functions

Objective: Graph quadratic functions.  
Find and interpret the maximum and minimum values of quadratic functions.

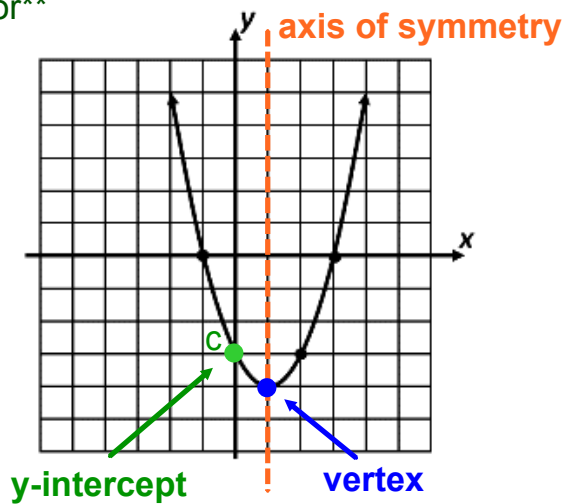
\*\* Use Graphing Calculator\*\*

$$f(x) = ax^2 + bx + c, \text{ where } a \neq 0$$

$\nearrow$   
 Quadratic  
Term

$\uparrow$   
 Linear  
Term

$\nwarrow$   
 Constant  
Term

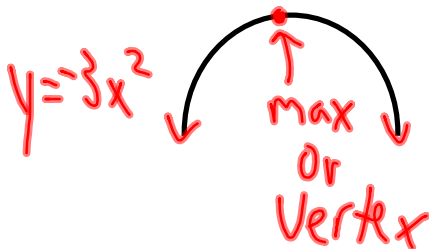


\* Axis of symmetry :  $x = \frac{-b}{2a}$

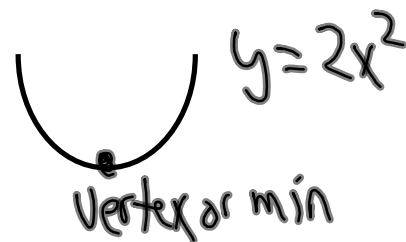
\* Vertex: x coordinate is  $\frac{-b}{2a}$

Y-intercept is when  $x = 0$ , so  $a(0)^2 + b(0) + c$ , is just c

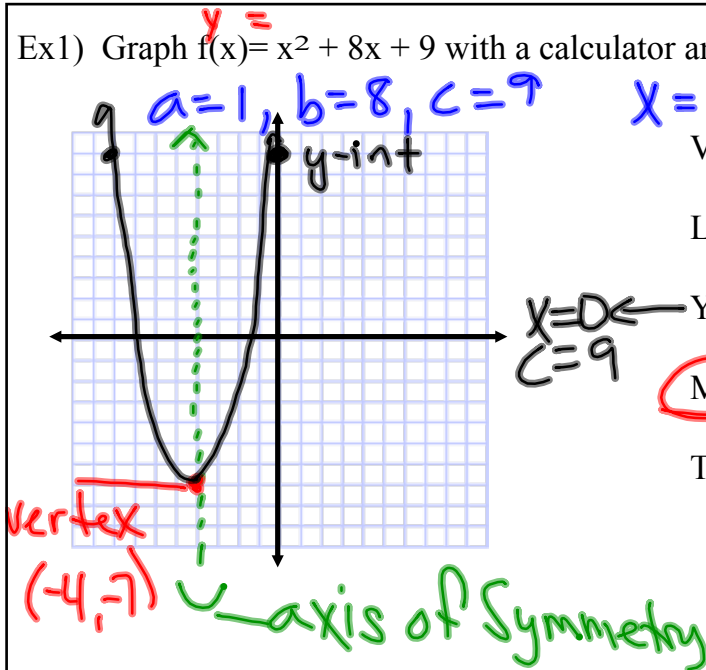
**Max:** opens down and a is negative



**Min:** opens up and a is positive



Ex1) Graph  $f(x) = x^2 + 8x + 9$  with a calculator and use formulas.



$$x = \frac{-b}{2a} = \frac{-8}{2 \cdot 1} = -4$$

$$\text{Vertex: } (-4, -7)$$

$$(-4)^2 + 8(-4) + 9 = 16 - 32 + 9 = -7$$

Line of symmetry:  $x = -4$

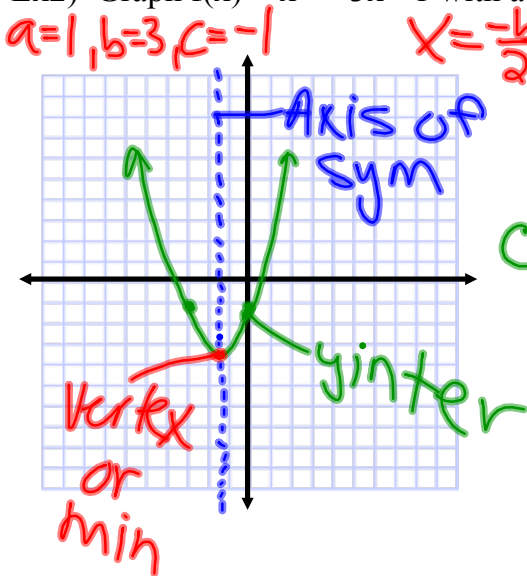
Y-intercept:  $(0, 9)$

Min/Max:  $(-4, -7)$

Table of values:

x	y
-4	-7
0	9
-4	9

Ex2) Graph  $f(x) = x^2 + 3x - 1$  with a calculator and use formulas.



$$x = \frac{-b}{2a} = \frac{-3}{2 \cdot 1} = -1.5$$

$$\text{Vertex: } (-1.5, -3.25)$$

$$(-1.5)^2 + 3(-1.5) - 1 = -3.25$$

Line of symmetry:  $x = -1.5$

Y-intercept:  $(0, -1)$

Min/Max:  $(-1.5, -3.25)$

Table of values:

x	y
-3	-1
0	-1
-1.5	-3.25

\*\* Do #14 from the Homework

$$14. y = 2x^2$$

$$\begin{aligned} a &= 2 \\ b &= 0 \\ c &= 0 \end{aligned}$$

Axis Vertex:  $(0, 0)$   $x = \frac{-b}{2a} = \frac{-0}{2 \cdot 2} = 0$

Line of Sym:  $x = 0$

$c = 0$  y-int:  $(0, 0)$

min/max: min  $(0, 0)$

Table:

x	y
0	0

1	2	$2(1)^2 = 2$
-1	2	

