

**10 - 1**  
**Graphing**  
**Quadratic Functions**



quadratic function:

$$a \neq 0$$

$$y = ax^2 + bx + c$$



parabola: graph of a quadratic



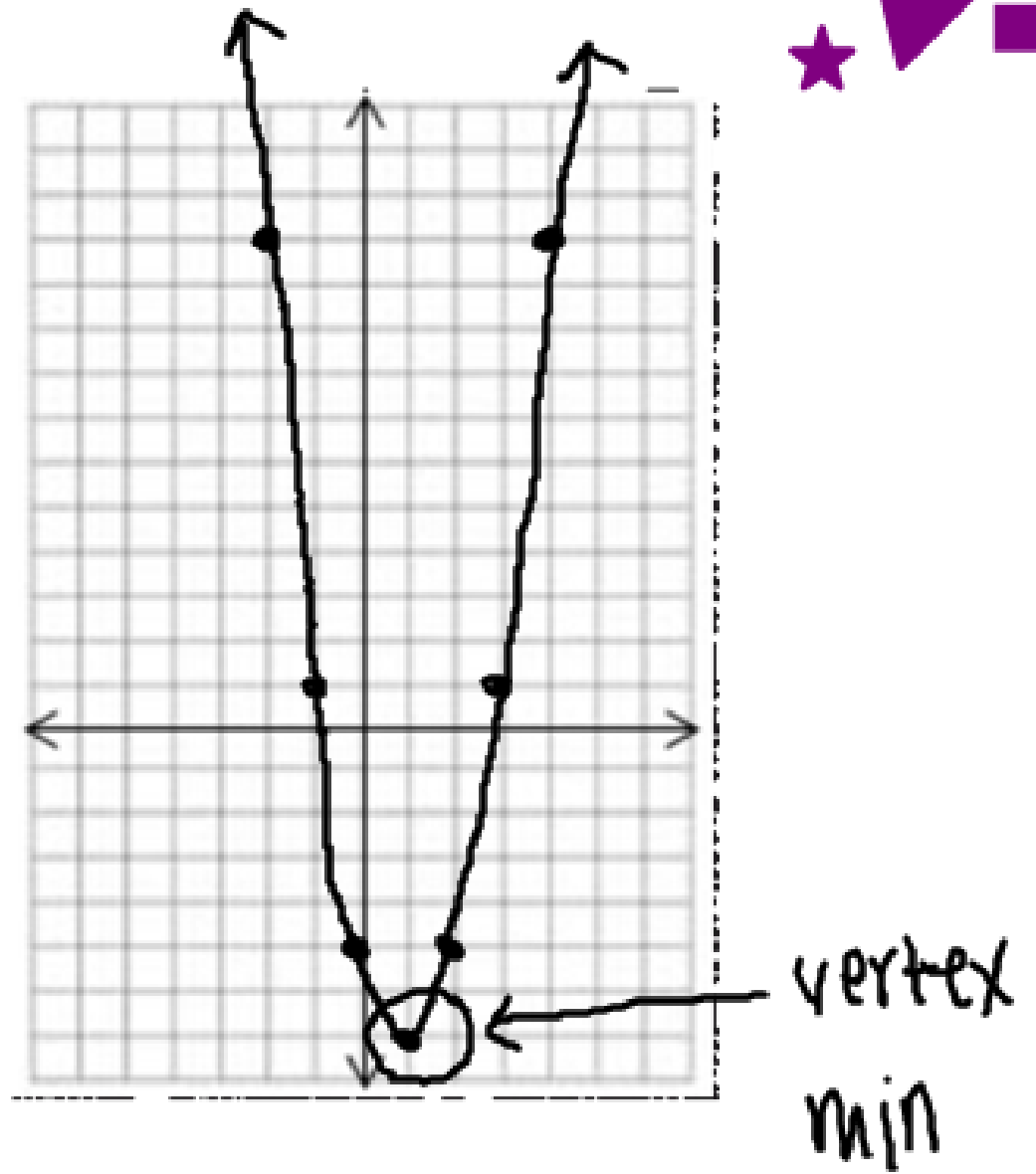
Ex: Use a table to graph  
 $y = 2x^2 - 4x - 5$



x	y
-2	11
-1	1
0	-5
1	-7
2	-5
3	1
4	11

$$2(2)^2 - 4(2) - 5$$
$$8 - 8 - 5$$

$x$	$y$
-2	11
-1	1
0	-5
1	-7
2	-5
3	1
4	11



Ex: Use a table to graph

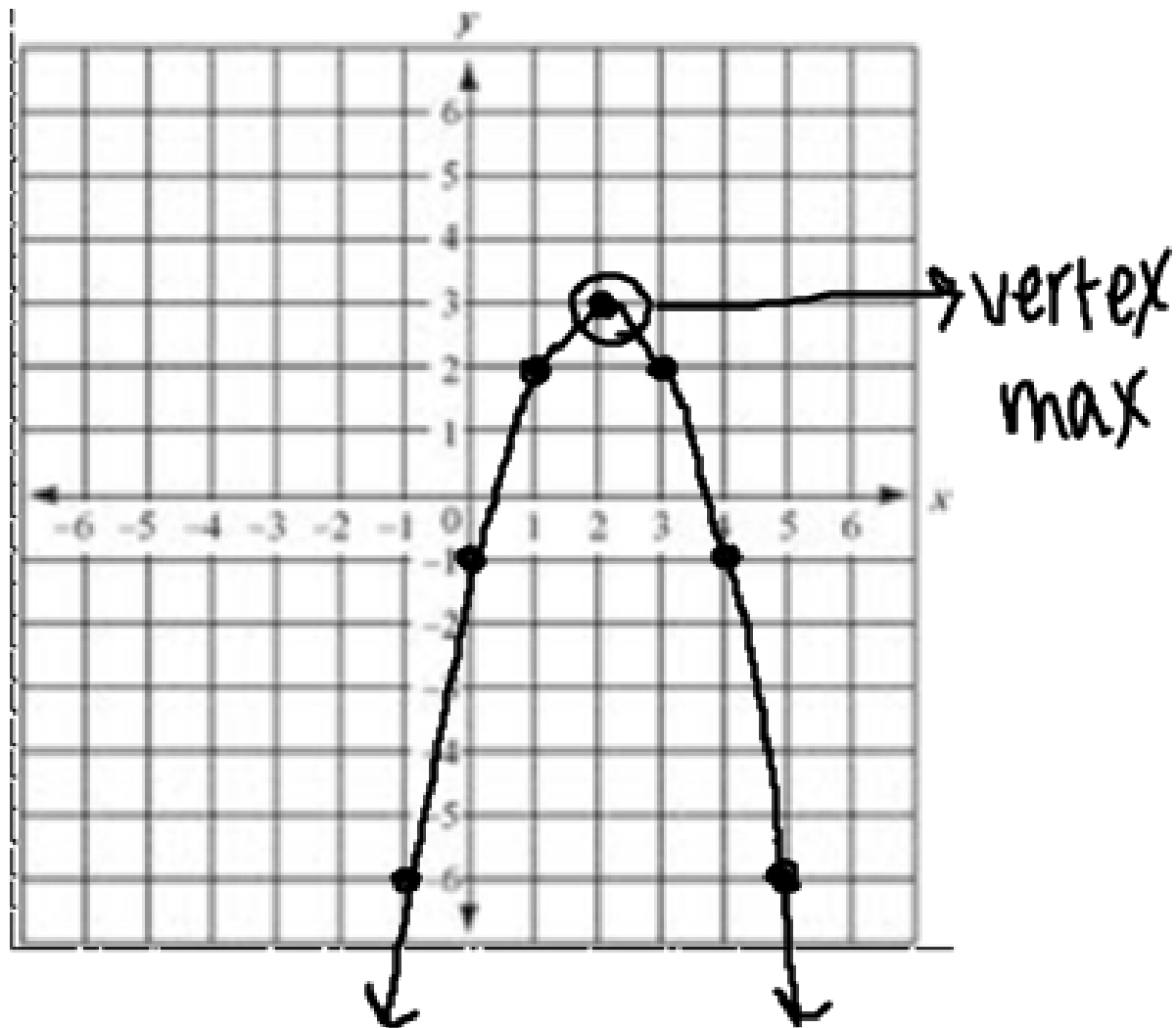
$$y = -x^2 + 4x - 1$$



x	y	
-1	-6	$-(1)^2 + 4(1) - 1$
0	-1	$-1 + 4 - 1$
1	2	
2	3	$-(2)^2 + 4(2) - 1$
3	2	$-4 + 8 - 1$
4	-1	$-(3)^2 + 4(3) - 1$
5	-6	$-9 + 12 - 1$



$x$	$y$
-1	-6
0	-1
1	2
2	3
3	2
4	-1
5	-6



vertex: minimum  
(opens  $\uparrow$ )

or maximum  
(opens  $\downarrow$ )





axis of symmetry: vertical line  
through vertex ( $x = \text{---}$ )



Ex 1:  $x = 1$

Ex 2:  $x = 2$

\*\*\*also found by  $x = \frac{-b}{2a}$

Ex:  $y = \underbrace{-3}_{A}x^2 \underbrace{-6}_{B}x \underbrace{+4}_{C}$



a.) Write the equation of the axis of symmetry.

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

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

$$x = -1$$

Ex:  $y = -3x^2 - 6x + 4$



b.) Find the coordinates of the vertex.  $(-1, 7)$

$$-3(-1)^2 - 6(-1) + 4$$

$$-3 + 6 + 4$$

Ex:  $y = -3x^2 - 6x + 4$



c.) Is the vertex a minimum or maximum?

a neg:

max

a pos:



Homework:

10 - 1 WS