

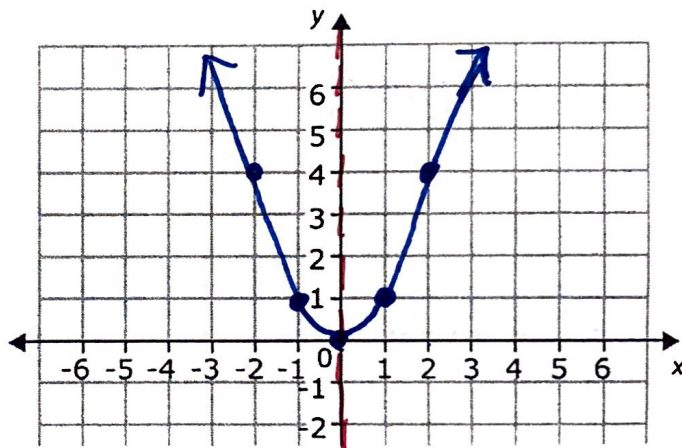
9-1 Characteristics of Quadratic Functions

Quadratic Functions:

- ANY FUNCTION WITH A DEGREE OF 2.
- CAN BE WRITTEN IN STANDARD FORM, VERTEX FORM, FACTORED FORM.
- ITS GRAPH IS A PARABOLA (U-SHAPED) $\curvearrowright \curvearrowleft$

$$y = x^2 \quad (\text{PARENT FUNCTION})$$

x	$y = x^2$	y
-2	$y = (-2)^2$	4
-1	$y = (-1)^2$	1
0	$y = (0)^2$	0
1	$y = 1^2$	1
2	$y = 2^2$	4



AXIS OF SYMMETRY (AOS): A VERTICAL LINE THAT DIVIDES THE PARABOLA IN HALF.



VERTEX: THE POINT WHERE A PARABOLA CROSSES ITS AXIS (THE HIGHEST OR LOWEST POINT)

$(0, 0)$

MINIMUM OR MAXIMUM:

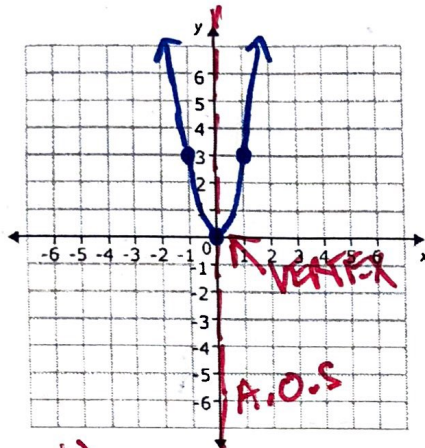
- IF PARABOLA OPENS UPWARD \curvearrowright , IT HAS A MINIMUM (LOW POINT).
- IF A PARABOLA OPENS DOWNWARD \curvearrowleft IT HAS A MAXIMUM (HIGH POINT)

EXAMPLES:

- Sketch the graph of each function.
- Label and state the axis of symmetry ($x=...$).
- Label and state the coordinate of the vertex (x, y).
- Tell whether the vertex is a minimum or a maximum.

1) $y = 3x^2$

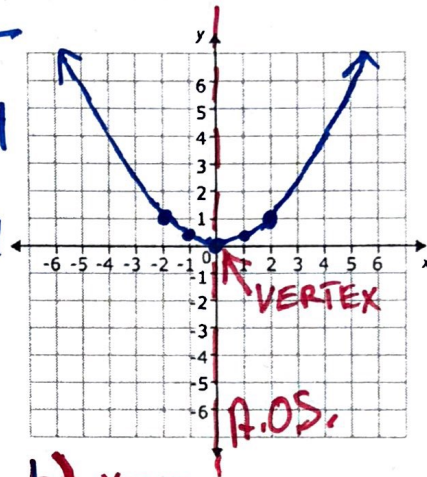
x	y
-2	12
-1	3
0	0
1	3
2	12



- $x=0$
- $(0,0)$
- MINIMUM

2) $y = \frac{1}{4}x^2$

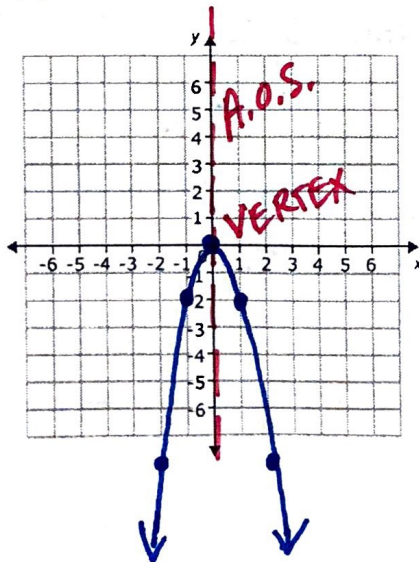
x	y
-2	1/4
-1	1/4
0	0
1	1/4
2	1



- $x=0$
- $(0,0)$
- MINIMUM

3) $y = -2x^2$

x	y
-2	-8
-1	-2
0	0
1	-2
2	-8



- $x=0$
- $(0,0)$
- MAXIMUM