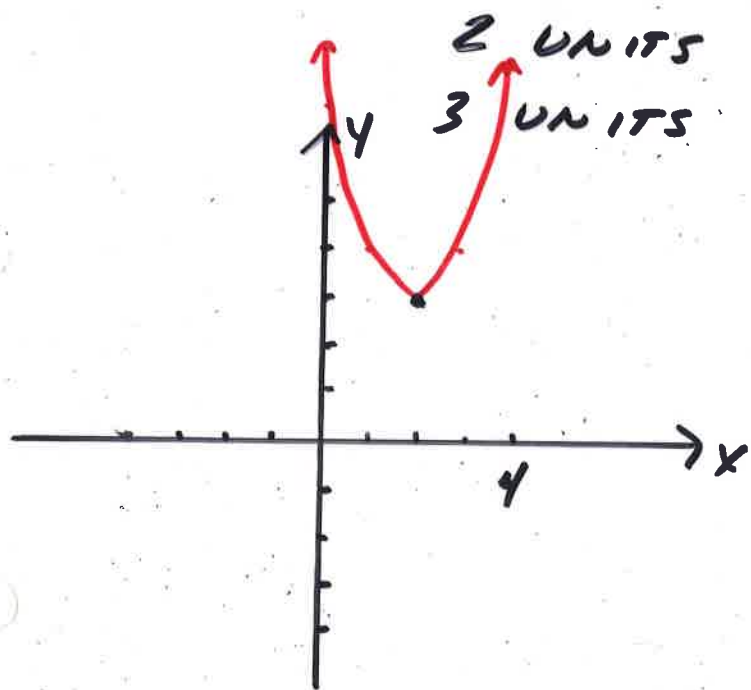


5.3 TRANSFORMING PARABOLAS

RECALL $y = (x-2)^2 + 3$ IS SHIFTED



2 UNITS TO THE RIGHT AND
3 UNITS UP

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

VERTEX FORM

VERTEX IS $(2, 3)$

$$y = a(x-h)^2 + k$$

VERTEX IS (h, k)

IF $a > 0$, OPENS UP

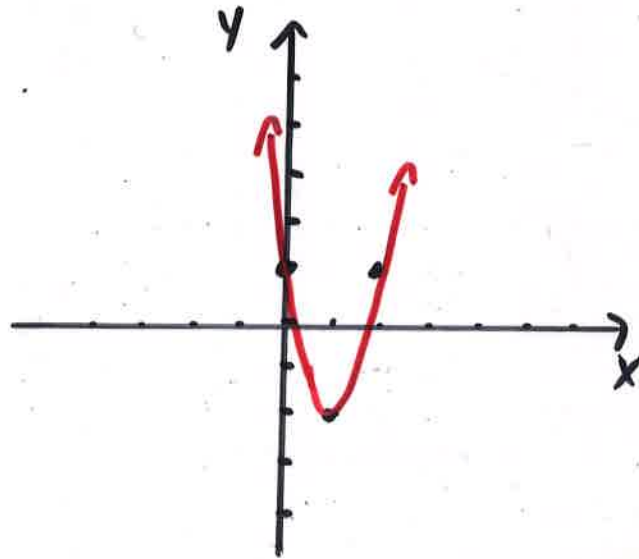
IF $a < 0$, OPENS DOWN

EX: GRAPH $Y = 3(x-1)^2 - 2$

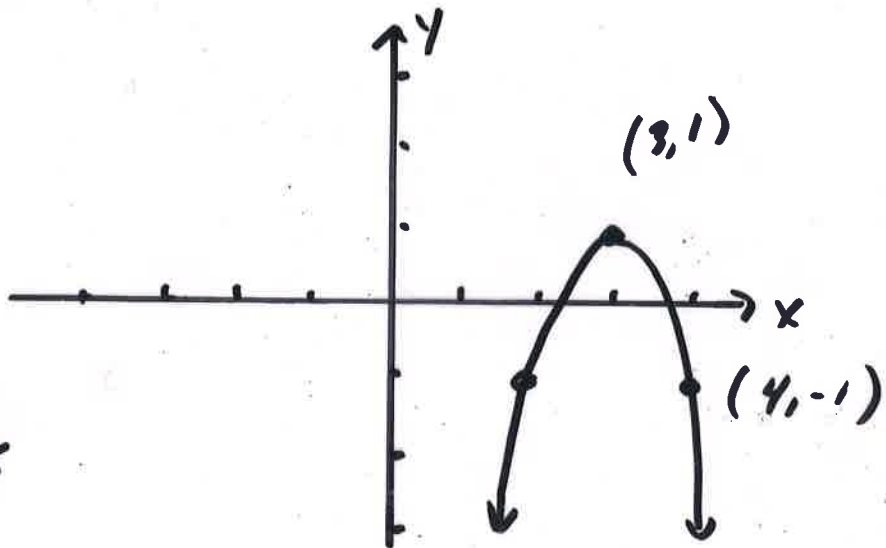
VERTEX IS $(1, -2)$

X	Y
0	1
2	1

USED FOR AN
ACCURATE WIDTH
OPENING



EX: FIND EQUATION OF PARABOLA
GRAPHED BELOW.



$$Y = a(x-h)^2 + k$$

$$Y = a(x-3)^2 + 1$$

$$-1 = a(4-3)^2 + 1 \quad \text{TO FIND } a$$

$$-1 = a + 1$$

$$a = -2$$

$$Y = -2(x-3)^2 + 1$$

Ex: PLACE $Y = 2x^2 + 4x + 6$ IN
VERTEX FORM AND GRAPH

$$Y = 2x^2 + 4x + 6$$
$$= 2(x^2 + 2x \quad \quad) + 6$$

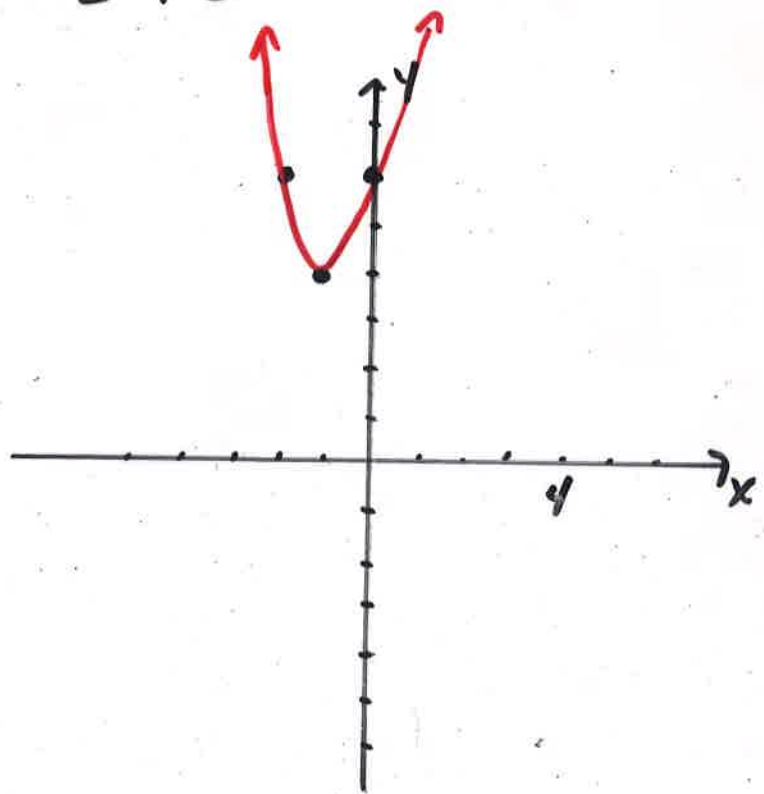
$$= 2(x^2 + 2x + 1 - 1) + 6$$

$$= 2(x^2 + 2x + 1) - 2 + 6$$

$$= 2(x+1)^2 + 4$$

VERTEX $(-1, 4)$

X	Y
0	6
-2	6



NOTE: THIS METHOD IS CALLED

"COMPLETING THE SQUARE"

2-34 EVEN