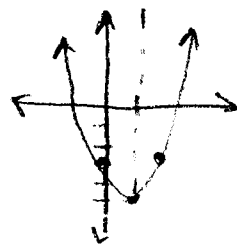


① GIVEN: $y = 2(x-1)^2 - 5$

- Ⓐ Does the parabola open up or down?
- Ⓑ What are the coordinates of the vertex?
- Ⓒ Is the vertex a maximum or minimum?
- Ⓓ What is the equation of the AOS?
(axis of symmetry)

② Change #① to $y = ax^2 + bx + c$ form

① Ⓐ ↑↑ Ⓑ (1, -5) Ⓒ minimum Ⓓ $x = 1$



② $y = 2[x^2 - 2x + 1] - 5$

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

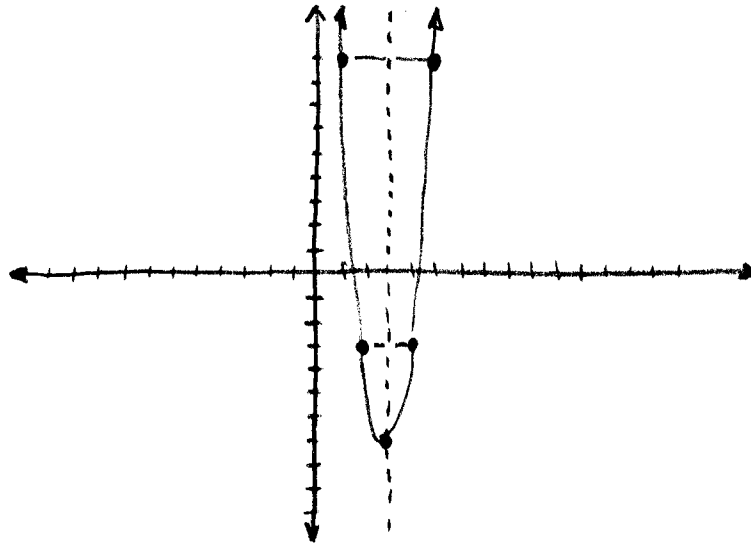
$y = 2x^2 - 4x - 3$ • AOS $\Rightarrow x = -\frac{b}{2a} = \frac{-(-4)}{2(2)} \checkmark$

• $V(1, ?)$

① $y = 4(x-3)^2 - 7$

Vertex $\rightarrow (3, -7)$ AOS $\Rightarrow x = 3$ $a = 4 \Rightarrow \text{smiley}$

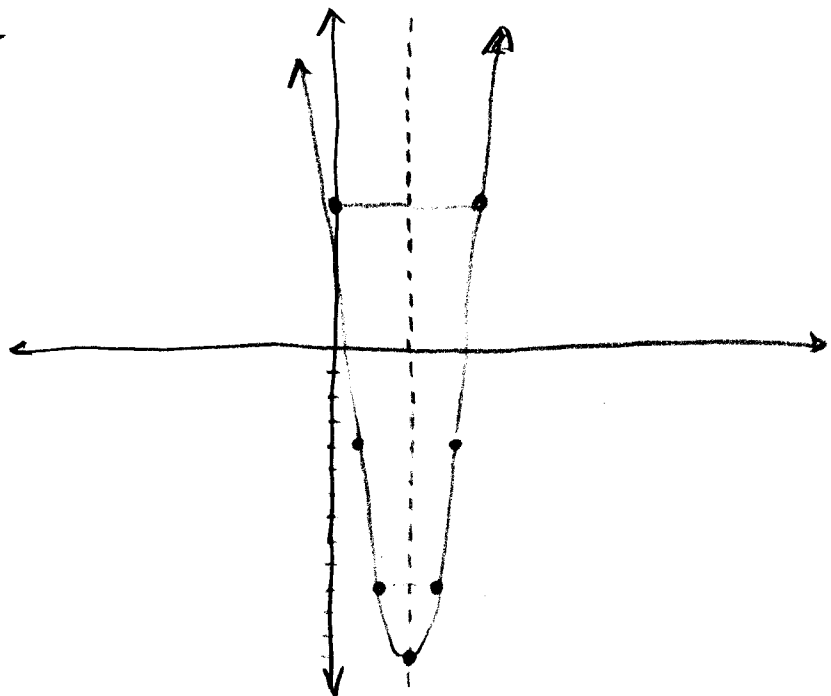
| x | y |
|---|----|
| 3 | -7 |
| 0 | 29 |
| 1 | 9 |
| 2 | -3 |



④ $y = 2x^2 - 12x + 6$

$a = + \text{smiley}$ AOS $\Rightarrow x = \frac{-b}{2a}$
 $x = \frac{12}{4} = 3$

| x | y |
|----------|---|
| Vertex 3 | $2(3)^2 - 12(3) + 6$ $18 - 36 + 6 = -12$ |
| 0 | 6 |
| 2 | $8 - 24 + 6 = -10$ |
| 1 | $2 - 12 + 6 = -4$ |



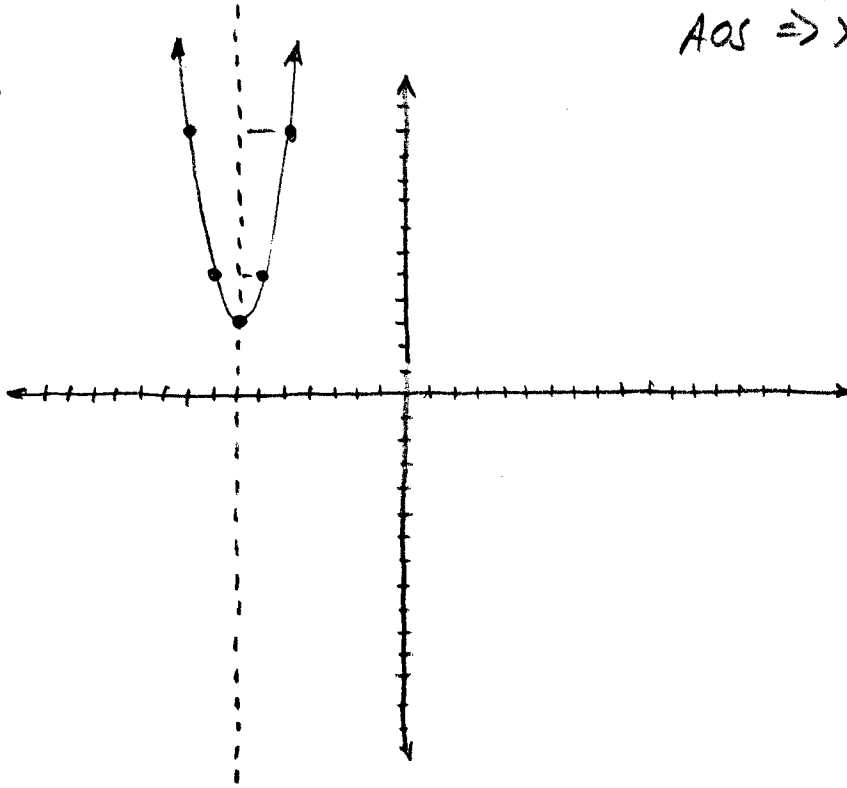
$$\textcircled{6} \quad y = 2(x+7)^2 + 3$$

$$a = +2 \Rightarrow \text{smiley face}$$

$$\text{Vertex} = (-7, 3)$$

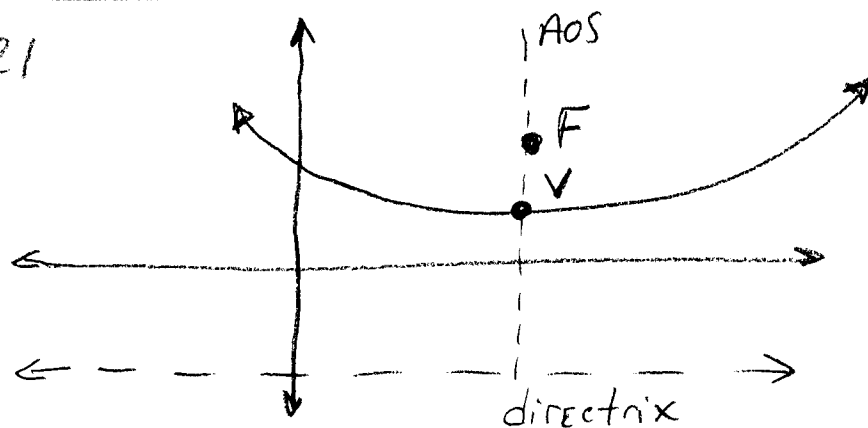
$$\text{Axis} \Rightarrow x = -7$$

| x | y |
|----|----|
| -7 | 3 |
| -6 | 5 |
| -4 | 21 |
| -5 | 11 |



FINDING the values for the Focus, $F(x, y)$
(A point)
AND the directrix, $y = \text{number}$
(A horizontal line).

SEE Pg 421



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

$$\text{AOS} \Rightarrow x = h$$

$$V \Rightarrow (h, k)$$

$$F \Rightarrow (h, k + \frac{1}{4a})$$

$$\text{Directrix} \Rightarrow y = k - \frac{1}{4a}$$

BE Example $y = 2(x-1)^2 - 5 \quad \therefore a=2 \quad h=1 \quad k=-5$

$$\text{AOS} \Rightarrow x = 1$$

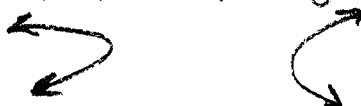
$$V \Rightarrow (1, -5) \quad \text{halfway between Focus \& Directrix}$$

$$F \Rightarrow (1, -5 + \frac{1}{4(2)}) = (1, -4\frac{7}{8}) = F$$

$$\text{Directrix} \Rightarrow y = -5 - \frac{1}{8} \Rightarrow y = -5\frac{1}{8}$$

4.

If you swap x, y, h, k you get
parabolas that open to left & right



These are not functions. Why not?

Let's look at a parabola on
"conic paper" using $y = a(x-h)^2 + k$
(see next page)

(EX) $y = \frac{1}{4}(x)^2 - 7$

$$a = \frac{1}{4} \quad h = 0 \quad k = -7$$

since $(x-0)^2$

$$\text{AOS} \Rightarrow x = 0$$

$$V \Rightarrow (0, -7)$$

$$F \Rightarrow \left(0, -7 + \frac{1}{4\left(\frac{1}{4}\right)}\right) = (0, -6)$$

$$\text{Directrix} \Rightarrow y = -7 - \frac{1}{4\left(\frac{1}{4}\right)} = -8$$

Homework

HW: ① Can you find the equation of your
conic paper parabola? (put focus at center)
② PAGE 423 # 5, 7, 9

Conic Graph Paper

(circles and lines)

