

Notes Section 7.1 - Parabolas

standard form of a parabola

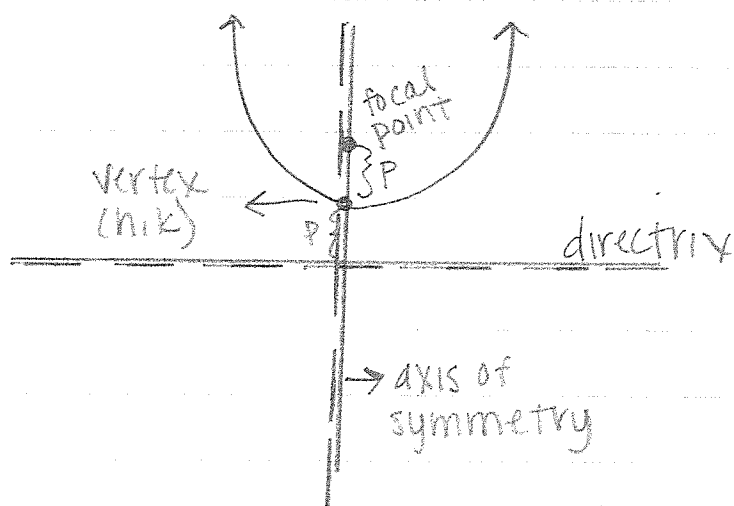
$$(x-h)^2 = 4p(y-k) \quad \uparrow \downarrow$$

$$p > 0 \quad \uparrow \downarrow$$

$$(y-k)^2 = 4p(x-h) \quad \leftarrow \rightarrow$$

$$p < 0 \quad \leftarrow \rightarrow$$

vertex: (h, k)



example 1:

graph $(y-3)^2 = -8(x+1)$ and find all parts

$$\hookrightarrow V(-1, 3)$$

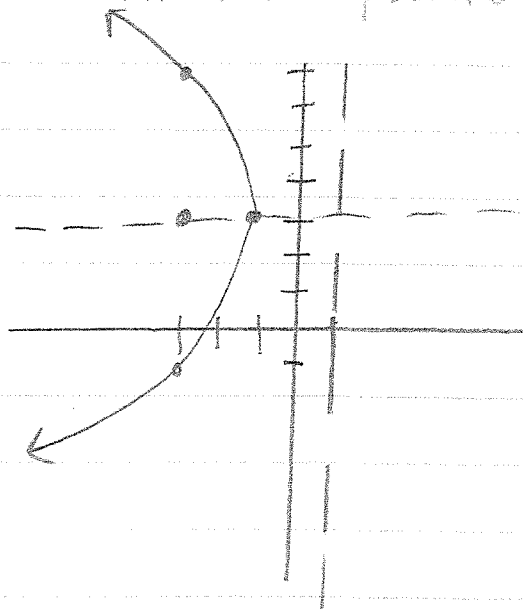
$$4p = -8$$

$$p = -2$$

$$F(-3, 3)$$

$$\text{AOS: } y = 3$$

$$\text{dir: } x = 1$$



example 2

write $3y^2 + 6y + 15 = 12x$ in standard form.
graph and find all parts

$$3y^2 + 6y = 12x - 15$$

$$3(y^2 + 2y + 1) = 12x - 15 + 3$$

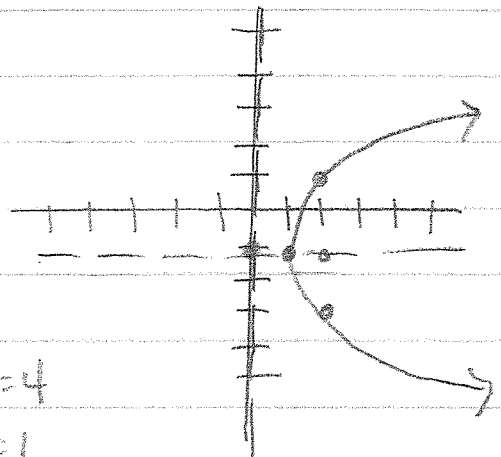
$$3(y+1)^2 = 12x - 12$$

$$3(y+1)^2 = 12(x-1)$$

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

$$4p = 4$$

$$p = 1$$



$$V(1, -1) \quad F(2, -1)$$

$$AOS: y = 1 \quad dir: x = 0$$

example 3

write the equation for the parabola given
vertex $(3, -2)$, directrix $y = -1$

$$(x-3)^2 = -4(1)(y+2)$$

$$(x-3)^2 = -4(y+2)$$



$$p = 1$$

