9.2 #1 p.662 27, 29, 55, 59

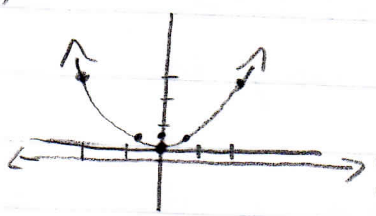
27.) $V(0,0)$, Axis of sym $\rightarrow$ y-Axis ; contains $(2,3)$ → so parabola has vertical Axis of symmetry.

$(x-h)^2 = 4p(y-k) \rightarrow (2-0)^2 = 4p(3-0)$

$\frac{4}{12} = \frac{12p}{12} \rightarrow p = \frac{1}{3}$

- $(x-0)^2 = 4\left(\frac{1}{3}\right)(y-0)$

$x^2 = \frac{4}{3}y$



Focus $(h, k+p) = \left(0, \frac{1}{3}\right)$

- To Find the 2 pts the Define the latus rectum (LR), sub the y-coordinate of the focus in for y & solve For x

$x^2 = \frac{4}{3}y \rightarrow x^2 = \frac{4}{3} \cdot \frac{1}{3} \rightarrow x^2 = \frac{4}{9} \rightarrow x = \pm\sqrt{\frac{4}{9}} = \pm\frac{2}{3}$

- points that Define the LR

↳ $\left(\frac{2}{3}, \frac{1}{3}\right)$ & $\left(\frac{-2}{3}, \frac{1}{3}\right)$

29.) $V(2,-3)$; $F(2,-5)$

- Since x-coordinate of vertex & Focus are the same, use the equ. for vertical Axis of symmetry.

$(x-h)^2 = 4p(y-k)$

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

$(x-2)^2 = -8(y+3)$

$F(h, \underline{k+p}) = (2,-5)$

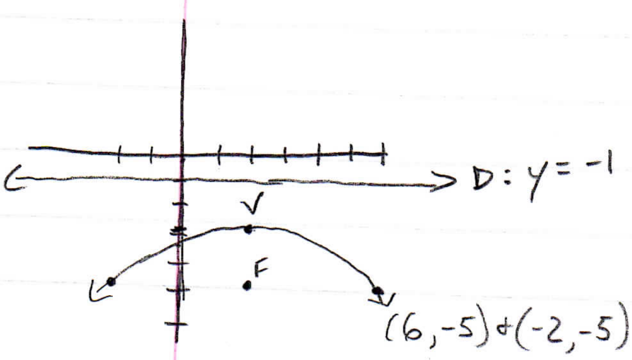
- To Find p, solve $k+p = -5$

$-3+p = -5$

$p = -2$

- Directrix : $y = k - p$

$y = -3 - (-2) \rightarrow \boxed{y = -1}$



- Sub y-coord of focus in for y & solve For x to Find 2 pts the Define the LR

$(6,-5)$ & $(-2,-5)$ $\leftarrow (x-2)^2 = -8(-5+3) \rightarrow (x-2)^2 = 16$

$x = 6, -2$

55.) $v(0,1)$; Another PT on parabola is $(1,2)$

- Since parabola opens right, use the horizontal axis of symmetry equ. $\longrightarrow (y-k)^2 = 4p(x-h)$

- Sub in vertex $(0,1)$ + $(1,2)$ in for x AND y to solve for p

$$(2-1)^2 = 4p(1-0)$$

$$\frac{1}{4} = \frac{4p}{4} \rightarrow p = \frac{1}{4}$$

- Sub vertex AND p into general form of equ.

$$(y-1)^2 = 4\left(\tfrac{1}{4}\right)(x-0)$$

$$\boxed{(y-1)^2 = x}$$

59.) $v(0,1)$; Another pt on parabola is $(2,2)$

- Parabola opens up, so use vertical axis of sym. equ:

$$(x-h)^2 = 4p(y-k)$$

- Sub in vertex $(0,1)$ + $(2,2)$ in for x AND y to solve For p

$$(2-0)^2 = 4p(2-1)$$

$$4 = 4p \rightarrow p = 1$$

- Sub vertex AND p into general form of equ.

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

$$\boxed{x^2 = 4(y-1)}$$