2(a) Parabola, focus $F(1,1)$, directrix $x=7$ $\Rightarrow$ horizontal.

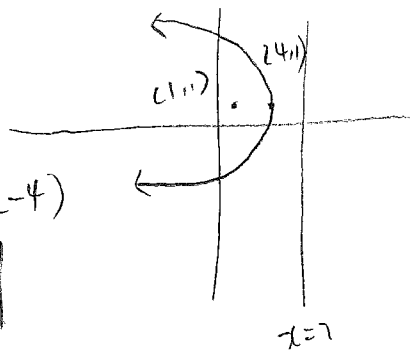
vertex: $(4,1)$

$\Rightarrow h=4,\ k=1$

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

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

$$\boxed{(y-1)^2 = -12(x-4)}$$



(b) Ellipse, center $(-1,4)$, vertex $(-1,1)$, focus $(-1,6)$ $\Rightarrow$ vertical.

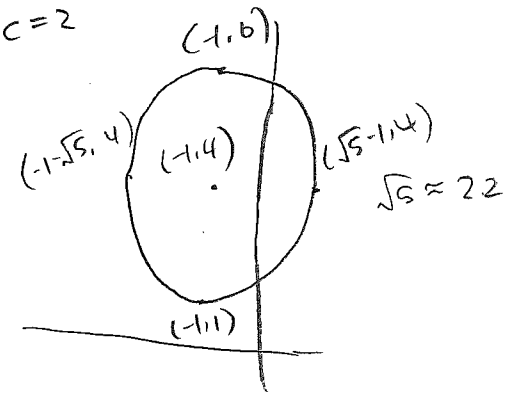
$\Rightarrow h=-1,\ k=4$ $\Rightarrow a=3$ $\Rightarrow c=2$

$a^2 - b^2 = c^2$

$9 - b^2 = 4$

$b^2 = 5$

$$\boxed{\frac{(x+1)^2}{5} + \frac{(y-4)^2}{9} = 1}$$



(c) Hyperbola. vertices $(-1,2)$, $(7,2)$, foci $(-2,2)$, $(8,2)$ $\Rightarrow$ horizontal

$\Rightarrow$ center: $(3,2)$ $\Rightarrow c=5$

$\Rightarrow a=4$ $a^2+b^2=c^2$

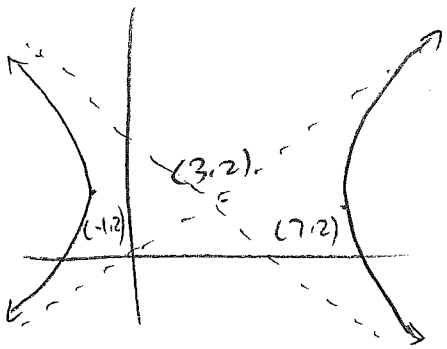
$\Rightarrow h=3,\ k=2$ $16+b^2=25$

$b^2=9$

$b=3$

$$\boxed{\frac{(x-3)^2}{16} - \frac{(y-2)^2}{9} = 1}$$

Asymptotes: $y-2 = \pm\frac{4}{5}(x-3)$



(d) hyperbola. foci $(2,0)$, $(2,8)$. asymptotes: $y = 3 + \frac{x}{2}$, $y = 5 - \frac{x}{2}$

$\Rightarrow$ vertical, $h=2,\ k=4$ $\Rightarrow y-4 = \frac{1}{2}(x-2),\ y-4 = -\frac{1}{2}(x-2)$

$\Rightarrow c=4$

$$\begin{cases} a^2+b^2=16 \\ \frac{a}{b}=\frac{1}{2} \\ \frac{a^2}{b^2}=\frac{1}{4} \\ 4a^2=b^2 \end{cases}$$

$a^2+4a^2=16$

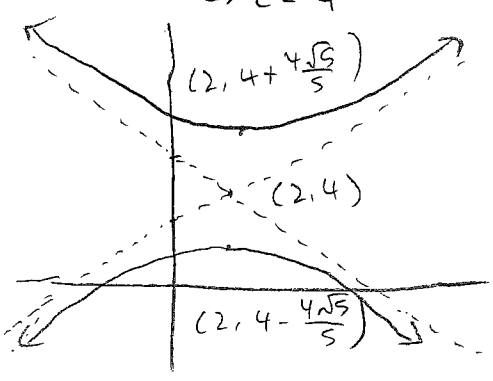
$5a^2=16$

$a^2=\frac{16}{5}$

$a=\frac{4}{\sqrt{5}}=\frac{4\sqrt{5}}{5}$

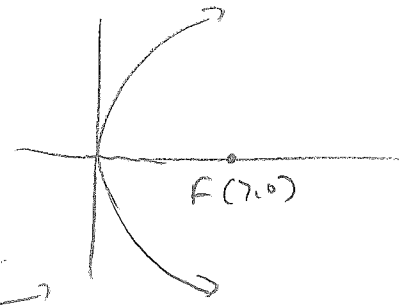
$b^2 = 4\left(\frac{16}{5}\right) = \frac{64}{5}$

$$\boxed{\frac{(y-4)^2}{\frac{16}{5}} - \frac{(x-2)^2}{\frac{64}{5}} = 1}$$



7. (a). $y^2 = 28x$

$x = \frac{y^2}{28}$

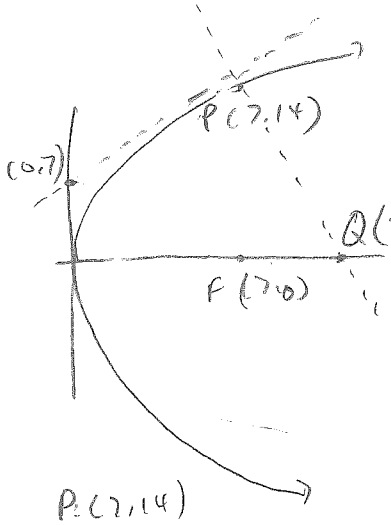


vertex: (0,0)

$p = \frac{28}{4} = 7$

focus: $(0+7, 0) = (7,0)$

(b)



Tangent line $= y = \frac{2(\frac{28}{4})x}{14} + \frac{14}{2}$

$y = x + 7$

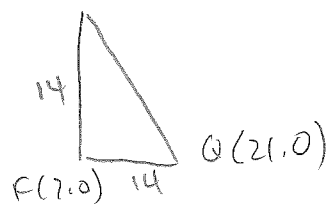
Nomal line $(y-14) = -\frac{1}{1}(x-7)$

$\boxed{y = -x + 21}$

$0 = -x + 21$

$x = 21$

(c)



$S_{\Delta PQR} = \frac{1}{2}(14-0)(21-7)$

$= \frac{1}{2}(196)$

$\boxed{= 98}$

6(b) $y = \frac{2px}{y_0} + \frac{y_0}{2}$