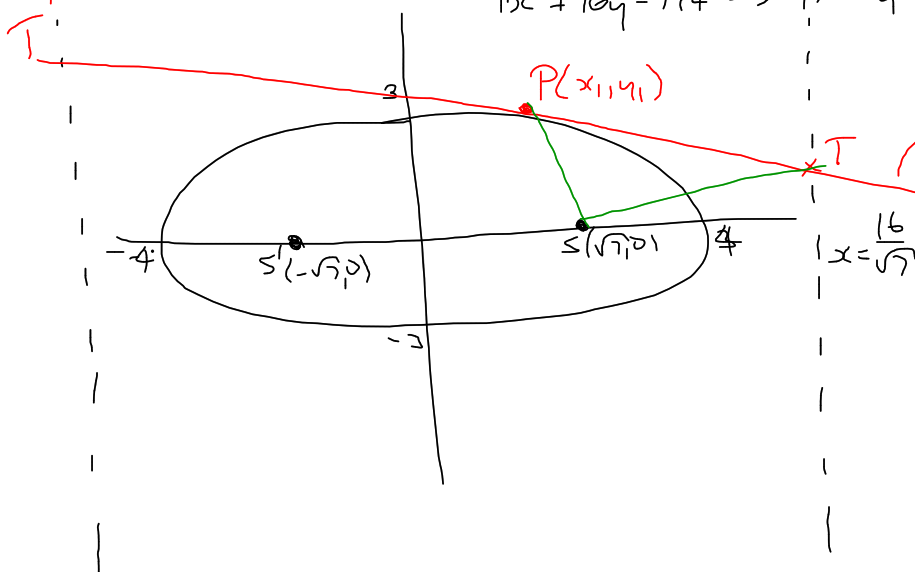


$$l: x = -\frac{16}{\sqrt{5}}$$

$$9x^2 + 16y^2 = 144 \Rightarrow \frac{x^2}{16} + \frac{y^2}{9} = 1$$



$$\frac{x x_1}{16} + \frac{y y_1}{9} = 1$$

$$\frac{x_1}{\sqrt{5}} + \frac{y y_1}{9} = 1$$

$$9x_1 + \sqrt{5}y y_1 = 9\sqrt{5}$$

$$\sqrt{5}y y_1 = 9\sqrt{5} - 9x_1$$

$$y = \frac{9(\sqrt{5} - x_1)}{\sqrt{5}y_1}$$

$$m_{PS} = \frac{y_1}{x_1 - \sqrt{7}}$$

$$\begin{aligned} m_{PS} \times m_{ST} &= \frac{y_1}{x_1 - \sqrt{7}} \times \frac{\sqrt{7} - x_1}{y_1} \\ &= \frac{-1}{1} \end{aligned}$$

$$\begin{aligned} m_{ST} &= \frac{\frac{9(\sqrt{7} - x_1)}{\sqrt{7}y_1}}{-\frac{16}{\sqrt{7}} - \sqrt{7}} \\ &= \frac{9(\sqrt{7} - x_1)}{16y_1 - 7y_1} \\ &= \frac{\sqrt{7} - x_1}{y_1} \end{aligned}$$

$$\begin{aligned} 2b) \quad \frac{PS}{PS'} &= \frac{\frac{GS}{e}}{\frac{GS'}{e}} \\ &= \frac{GS}{GS'} \end{aligned}$$

$$\frac{PS}{PS'} = \frac{GS}{GS'}$$

$$\frac{PS}{GS} = \frac{PS'}{GS'} \quad \left(\frac{PS}{\sin \theta} = \frac{GS}{\sin \beta} \right)$$

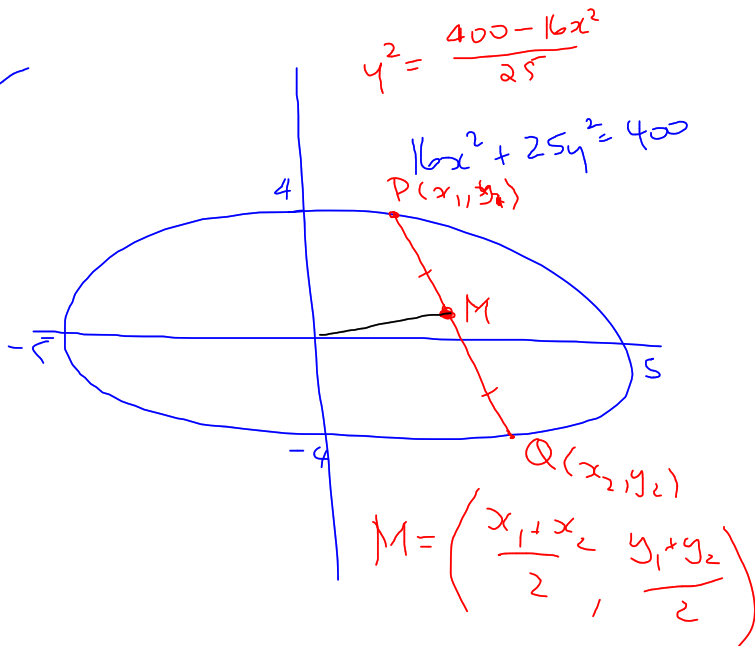
$$\frac{\sin \theta}{\sin \beta} = \frac{\sin(180 - \theta)}{\sin \alpha}$$

$$\frac{\sin \theta}{\sin \beta} = \frac{\sin \theta}{\sin \alpha}$$

$$\sin \beta = \sin \alpha$$

$$\underline{\beta = \alpha}$$

4



$$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{OM} = \frac{y_2 + y_1}{x_2 + x_1}$$

$$m_{PQ} \times m_{OM}$$

$$= \frac{y_2 - y_1}{x_2 - x_1} \times \frac{y_2 + y_1}{x_2 + x_1}$$

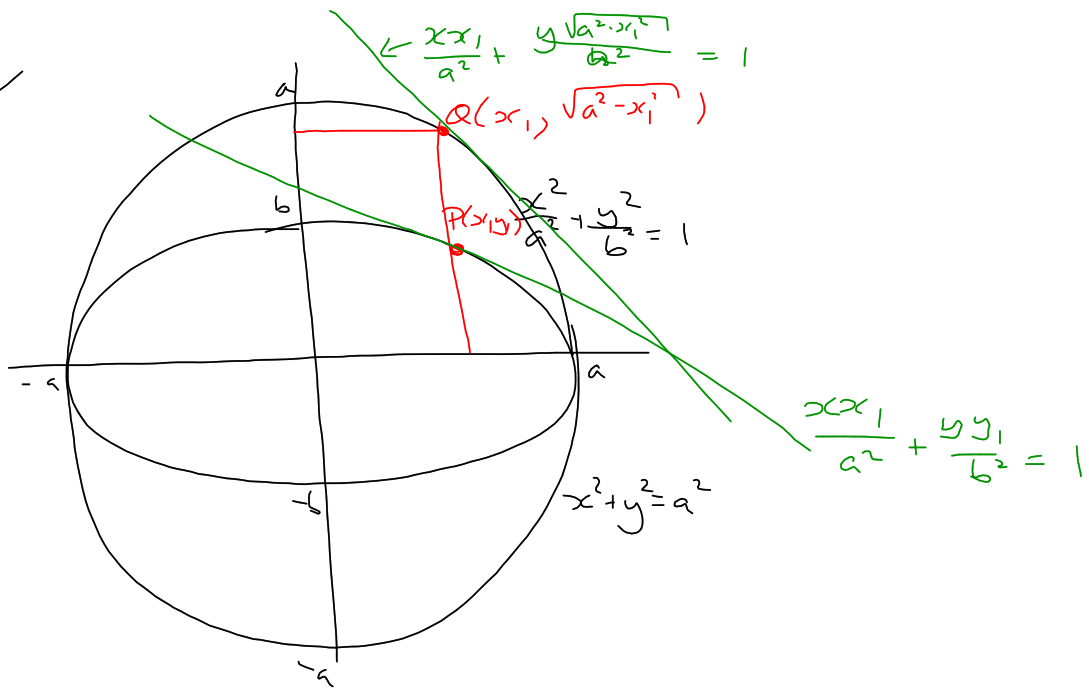
$$= \frac{400 - 16x_2^2}{25} - \frac{400 - 16x_1^2}{25}$$

$$= \frac{-16x_2^2 + 16x_1^2}{25(x_2^2 - x_1^2)}$$

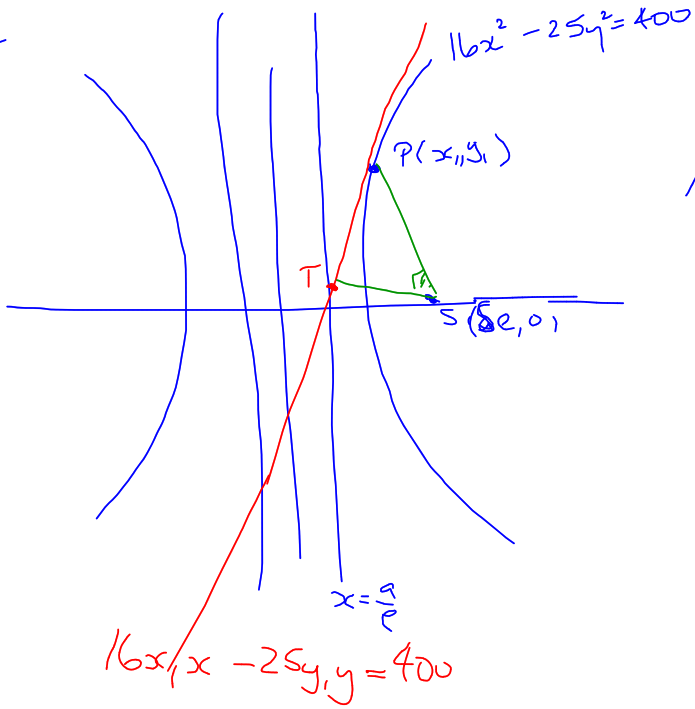
$$= \frac{-16(x_2^2 - x_1^2)}{25(x_2^2 - x_1^2)}$$

$$= \underline{\underline{-\frac{16}{25}}}$$

6/



7



$$16x, \left(\frac{5e}{2}\right) - 25y, y = 400$$

$$16x_1 - 5ey, y = 80e$$

$$5ey, y = 16x_1 - 80e$$

$$y = \frac{16x_1 - 80e}{5ey}$$

$$m_{ST} = \frac{16x_1 - 80e}{5ey_1} \cdot \frac{5}{e - 5e}$$

$$= \frac{16x_1 - 80e}{5ey_1} \times \frac{\cancel{5}}{5 - 5e^2}$$

$$= \frac{16x_1 - 80e}{25y_1(1 - e^2)}$$

$$= \frac{16x_1 - 80e}{-16y_1}$$

$$= \frac{x_1 - 5e}{-y_1}$$

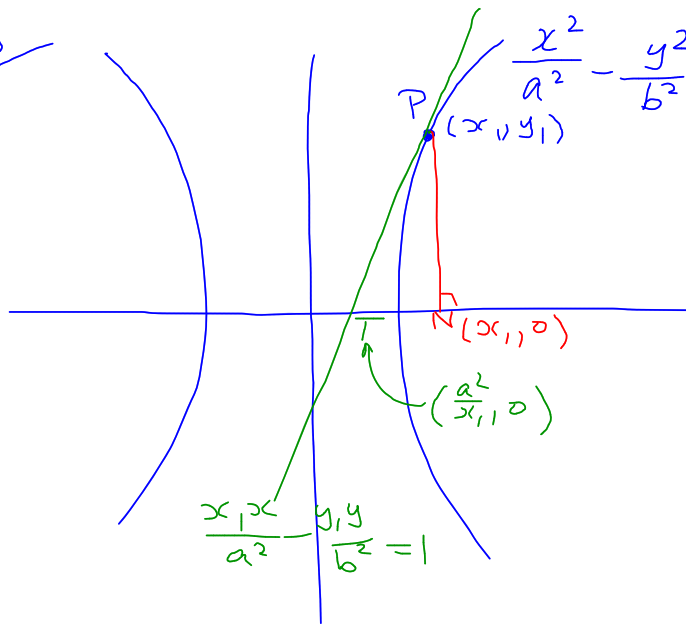
$$m_{PS} = \frac{y_1}{x_1 - 5e}$$

$$m_{ST} \times m_{PS} = \frac{x_1 - 5e}{-y_1} \times \frac{y_1}{x_1 - 5e}$$

$$= -1$$

$\therefore \underline{ST \perp PS}$

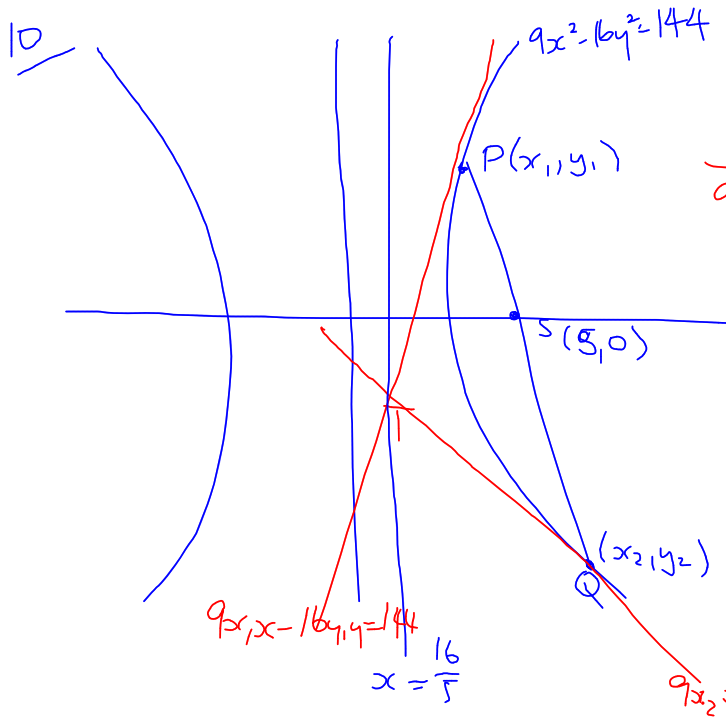
8/



$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

$$\boxed{ON \cdot OT = a^2}$$

$$= x_1 \times \frac{a^2}{x_1} = a^2$$



$$\begin{aligned}
 9x_1y_2x - 16y_1y_2y &= 144y_2 \\
 9x_2y_1x - 16y_1y_2y &= 144y_1 \\
 \hline
 9(x_1y_2 - x_2y_1)x &= 144(y_2 - y_1) \\
 x &= \frac{144(y_2 - y_1)}{9(x_1y_2 - x_2y_1)}
 \end{aligned}$$

$$m_{PS} = m_{QS}$$

$$\frac{y_1}{x_1 - 5} = \frac{y_2}{x_2 - 5}$$

$$x_2 y_1 - 5 y_1 = x_1 y_2 - 5 y_2$$

$$x_1 y_2 - x_2 y_1 = 5(y_2 - y_1)$$

$$\Rightarrow \frac{y_2 - y_1}{x_1 y_2 - x_2 y_1} = \frac{1}{5}$$

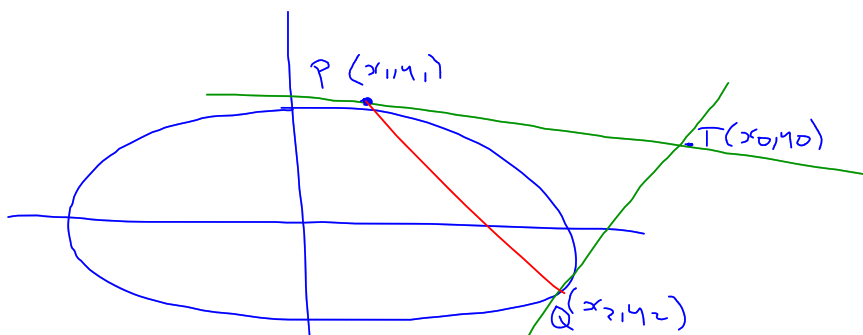
$$x = \frac{144(y_2 - y_1)}{9(x_1 y_2 - x_2 y_1)}$$

$$x = \frac{144}{9} \times \frac{1}{5}$$

$$= \frac{144}{45}$$

$$= \frac{16}{5}$$

chord of contact "the hodway"!!!



$$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$$

$$(x_2 - x_1)y - x_2y_1 + x_1y_1 = (y_2 - y_1)x - x_1y_2 + x_1y_1$$

$$(y_2 - y_1)x - (x_2 - x_1)y = x_1y_2 - x_2y_1$$

$$\frac{x_1 x}{a^2} + \frac{y_1 y}{b^2} = 1$$

$$\frac{x_2 x}{a^2} + \frac{y_2 y}{b^2} = 1$$

$$\Rightarrow \frac{x_1 y_2 x}{a^2} + \frac{y_1 y_2 y}{b^2} = y_2$$

$$\frac{x_2 y_1 x}{a^2} + \frac{y_1 y_2 y}{b^2} = y_1$$

$$\frac{x_1 y_2 - x_2 y_1}{a^2} x = y_2 - y_1$$

$$\frac{x_1}{a^2} x \frac{y_2 - y_1}{(x_1 y_2 - x_2 y_1)} + \frac{y_1 y}{b^2} = 1$$

$$x = \frac{a^2 (y_2 - y_1)}{(x_1 y_2 - x_2 y_1)}$$

$$\frac{y_1 y}{b^2} = \frac{x_1 y_2 - x_2 y_1 - x_1 y_2 + x_1 y_1}{x_1 y_2 - x_2 y_1}$$

$$= \frac{b^2 (x_1 - x_2)}{(x_1 y_2 - x_2 y_1)}$$

$$x_0 = \frac{a^2(y_2 - y_1)}{x_1 y_2 - x_2 y_1}$$

$$y_0 = \frac{b^2(x_1 - x_2)}{x_1 y_2 - x_2 y_1}$$

PQ

$$(y_2 - y_1)x - (x_2 - x_1)y = x_1 y_2 - x_2 y_1$$

$$\frac{(y_2 - y_1)x}{x_1 y_2 - x_2 y_1} - \frac{(x_2 - x_1)y}{x_1 y_2 - x_2 y_1} = 1$$

$$\frac{x_0 x}{a^2} + \frac{y_0 y}{b^2} = 1$$

