

$$\frac{x^2}{25} + \frac{y^2}{10} = 1$$

$$a^2 = 25$$

$$a = 5$$

$$b^2 = a^2(1 - e^2)$$

$$10 = 25(1 - e^2)$$

$$1 - e^2 = \frac{2}{5}$$

$$e^2 = \frac{3}{5}$$

$$e = \sqrt{\frac{3}{5}}$$

foci $(\pm\sqrt{15}, 0)$

$$\underline{9} \quad 9x^2 + 4y^2 = 36$$
$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

$$a = 2$$

$$b = 3$$

$$e = \frac{\sqrt{5}}{3}$$

$$\text{focli } (0, \pm\sqrt{5})$$
$$\text{directrices: } y = \pm\frac{9}{\sqrt{5}}$$

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$$x^2 + 6y^2 = 15$$

tangents with $m = \frac{1}{2}$.

$$2x + 12y \frac{dy}{dx} = 0$$

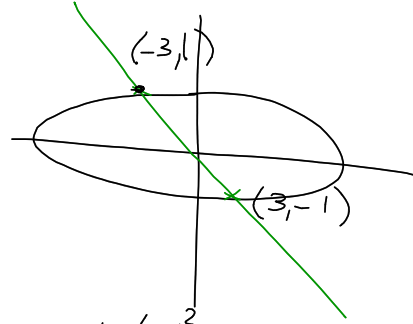
$$\frac{dy}{dx} = -\frac{x}{6y}$$

$$\text{slope} = \frac{1}{2}$$

$$\therefore -\frac{x}{6y} = \frac{1}{2}$$

$$-2x = 6y$$

$$y = -\frac{1}{3}x$$



$$x^2 + 6\left(\frac{x^2}{9}\right) = 15$$

$$\frac{15x^2}{9} = 15$$

$$x^2 = 9$$

$$x = \pm 3$$

15

$$2a = 10$$

$$a = 5$$

$$2b = 6$$

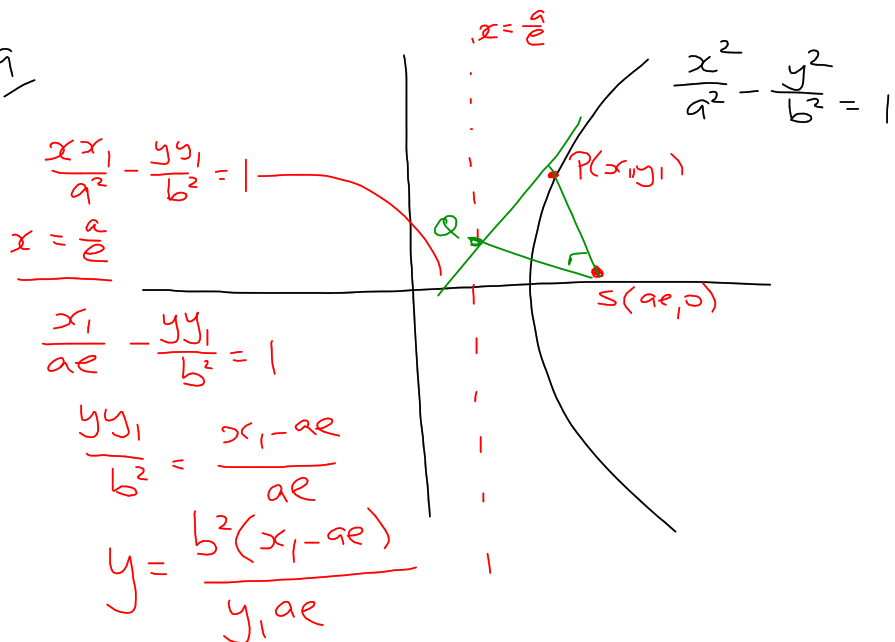
$$b = 3$$

$$\frac{x^2}{25} + \frac{y^2}{9} = 1$$

OR

$$\frac{x^2}{9} + \frac{y^2}{25} = 1$$

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$$m_{PS} = \frac{y_1}{x_1 - ae}$$

$$\begin{aligned} m_{PS} \times m_{QS} &= \frac{y_1}{x_1 - ae} \times \frac{x_1 - ae}{-y_1} \\ &= -1 \\ &= \end{aligned}$$

$$\begin{aligned} m_{QS} &= \frac{\frac{b^2(x_1 - ae)}{y_1 ae}}{\frac{a}{e} - ae} \\ &= \frac{b^2(x_1 - ae)}{a^2 y_1 - a^2 e^2 y_1} \\ &= \frac{b^2(x_1 - ae)}{a^2 y_1 (1 - e^2)} \\ &= \frac{b^2(x_1 - ae)}{-b^2 y_1} \end{aligned}$$