

$$1) \begin{cases} 4x^2 + y^2 - 8 = 0 \\ y = m(x-2) \end{cases} \Rightarrow \begin{cases} 4x^2 + (mx-2m)^2 - 8 = 0 \\ y = mx - 2m \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} 4x^2 + m^2x^2 + 4m^2 - 4m^2x - 8 = 0 \\ y = mx - 2m \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} (4+m^2)x^2 - 4m^2x + 4m^2 - 8 = 0 \\ y = mx - 2m \end{cases} \Rightarrow (\Delta_x = 0)$$

$$(-4m^2)^2 - 4 \cdot (4+m^2) \cdot (4m^2 - 8) = 0 \Rightarrow$$

$$16m^4 - 4 \cdot (16m^2 - 32 + 4m^4 - 8m^2) = 0 \Rightarrow$$

$$16m^4 - 64m^2 + 128 - 16m^4 + 32m^2 = 0 \Rightarrow$$

$$-32m^2 = -128 \Rightarrow m^2 = 4 \Rightarrow m_{1,2} = \pm 2$$

$$y = 2 \cdot (x-2) \Rightarrow \boxed{y = 2x - 4}$$

$$y = -2 \cdot (x-2) \Rightarrow \boxed{y = -2x + 4}$$

$$2) \begin{cases} x^2 + 9y^2 - 18 = 0 \\ y = mx + 2 \end{cases} \Rightarrow \begin{cases} x^2 + 9(m^2x^2 + 4 + 4mx) - 18 = 0 \\ y = mx + 2 \end{cases}$$

$$\Rightarrow \begin{cases} (1+9m^2)x^2 + 36mx + 18 = 0 \\ y = mx + 2 \end{cases} \Rightarrow (\Delta_x = 0)$$

$$(36m)^2 - 4 \cdot (1+9m^2) \cdot 18 = 0 \rightarrow$$

$$1296m^2 - 4 \cdot (18 + 162m^2) = 0 \Rightarrow 1296m^2 - 72 - 648m^2 = 0$$

$$648m^2 = 72 \Rightarrow m^2 = \frac{72}{648} \Rightarrow m^2 = \frac{1}{9} \Rightarrow m_{1,2} = \pm \frac{1}{3}$$

$$\boxed{y = \frac{1}{3}x + 2}$$

$$\boxed{y = -\frac{1}{3}x + 2}$$

$$3) \text{ } \mathcal{J}: 4x^2 + 9y^2 - 72 = 0 \quad p(3;2) \quad x^2 \rightarrow 3 \cdot x \quad ; \quad y^2 \rightarrow 2 \cdot y$$

$$\text{t: } 4 \cdot (3x) + 9 \cdot (2y) - 72 = 0 \Rightarrow 12x + 18y - 72 = 0 \Rightarrow (\text{DIVIDO PER 6})$$

$$\boxed{2x + 3y - 12 = 0} \Rightarrow \boxed{y = -\frac{2}{3}x + 4}$$



$$4) \begin{cases} 9x^2 + y^2 - 18 = 0 \\ y = -3x + k \end{cases} \Rightarrow \begin{cases} 9x^2 + (9x^2 + k^2 - 6kx) - 18 = 0 \\ y = -3x + k \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} 18x^2 - 6kx + k^2 - 18 = 0 \\ y = -3x + k \end{cases} \Rightarrow (\Delta_x = 0)$$

$$(-6k)^2 - 4 \cdot 18 \cdot (k^2 - 18) = 0 \Rightarrow 36k^2 - 72 \cdot (k^2 - 18) = 0 \Rightarrow$$

$$36k^2 - 72k^2 + 1296 = 0 \Rightarrow -36k^2 = -1296 \Rightarrow k^2 = 36 \Rightarrow$$

$$\Rightarrow k_{1;2} = \pm 6 \Rightarrow \boxed{y = -3x + 6} ; \boxed{y = -3x - 6}.$$

$$5) c(4;5); e = 4; f = 2 \Rightarrow b^2 = a^2 - e^2 \Rightarrow b^2 = 16 - 4 \Rightarrow$$

$$\Rightarrow b^2 = 12 \Rightarrow b = \sqrt{12}. \quad \frac{(x-4)^2}{16} + \frac{(y-5)^2}{12} = 1$$

$$(x^2 + 16 - 8x) \cdot 12 + (y^2 + 25 - 10y) \cdot 16 = 16 \cdot 12 \Rightarrow$$

$$12x^2 + 192 - 96x + 16y^2 + 400 - 160y - 192 = 0 \Rightarrow$$

$$\boxed{12x^2 + 16y^2 - 96x - 160y + 400 = 0}$$

$$x^2 \rightarrow 6 \cdot x; \quad y^2 \rightarrow 2 \cdot y; \quad x \rightarrow \frac{x+6}{2}; \quad y \rightarrow \frac{y+2}{2}$$

$$12 \cdot (6x) + 16 \cdot (2y) - 96 \cdot \left(\frac{x+6}{2}\right) - 160 \cdot \left(\frac{y+2}{2}\right) + 400 = 0 \Rightarrow$$

$$72x + 32y - 48x - 288 - 80y - 160 + 400 = 0 \Rightarrow$$

$$24x - 48y - 48 = 0 \Rightarrow \boxed{x - 2y - 2 = 0}.$$

DIRETTRICI DELL'ELLISSE:

$$d_{1;2}: x = 4 \pm \frac{16}{2} \Rightarrow x = 4 \pm 8 \begin{cases} \nearrow d_1: x = 12 \\ \searrow d_2: x = -4 \end{cases}$$

2° METODO PER LA TANGENTE IN P: determino le bisettrici delle

rette  $PF_2$  e  $PF_1$ ;  $PF_2: x = 6$ ;  $PF_1: y = -\frac{3}{4}(x-2) + 5$

$$|x-6| = \frac{|3x+4y-26|}{\sqrt{3^2+4^2}} \Rightarrow |x-6| = \frac{|3x+4y-26|}{5} \Rightarrow$$

$$3x+4y-26 = \begin{cases} \nearrow 5 \cdot (x-6) \rightarrow 2x-4y-4=0 \rightarrow m_1 = 1/2 \\ \searrow 5 \cdot (6-x) \rightarrow 8x+4y-56=0 \rightarrow m_2 = -2 \end{cases}$$

ci INTERESSA LA PENDENZA  $m_1 = 1/2$ :

$$y = \frac{1}{2}(x-6) + 2 \Rightarrow \boxed{y = \frac{1}{2}x - 1} \text{ sola}$$

$$\boxed{x - 2y - 2 = 0}.$$