

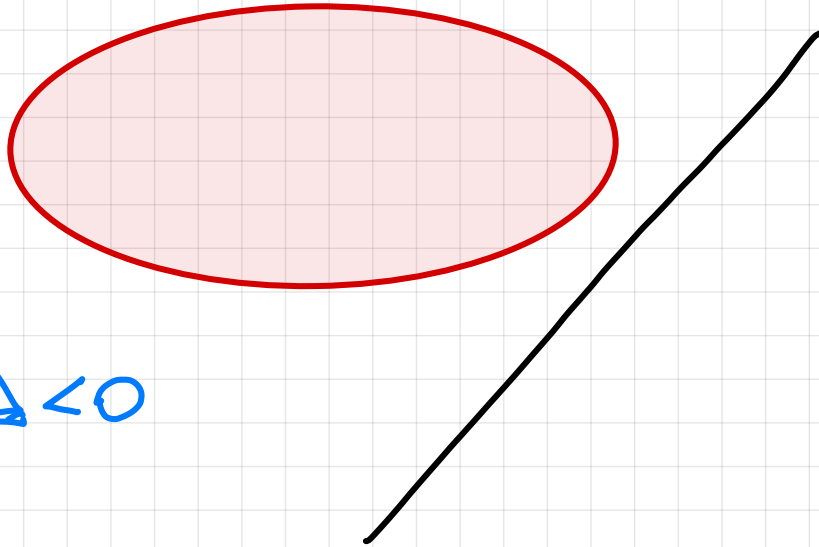
# ELLISSE E LA RETTA



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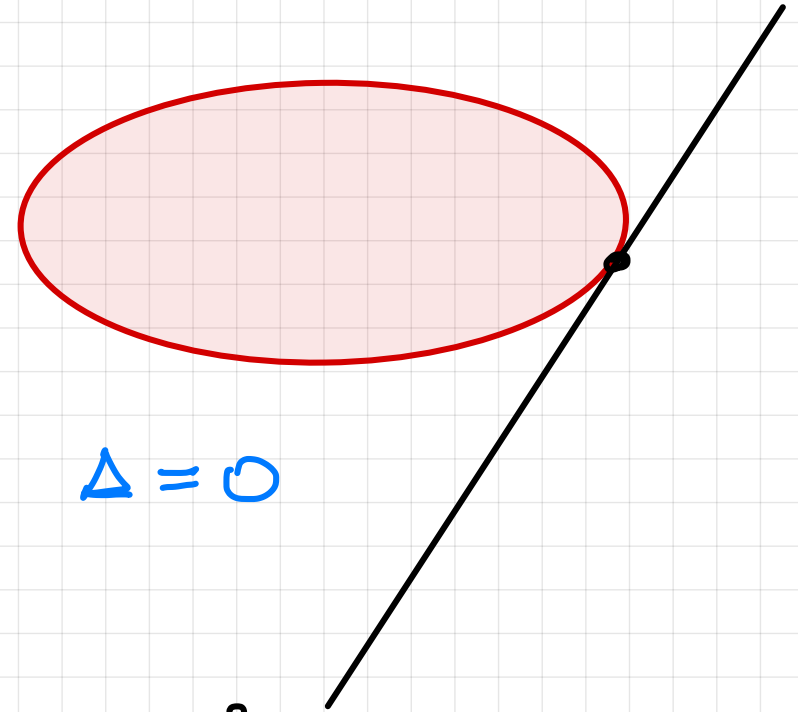
IN QUANTI MODI SI PUO' DISEGNARE UNA RETTA RISPETTO  
A UNA ELLISSE

ESTERNA



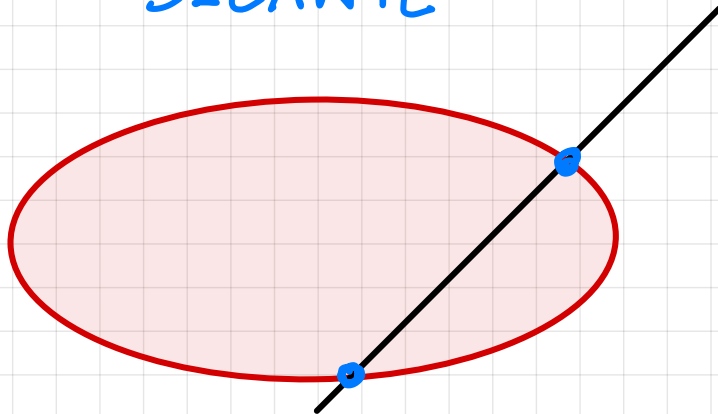
$$\Delta < 0$$

TANGENTE



$$\Delta = 0$$

SECANTE



$$\Delta > 0$$

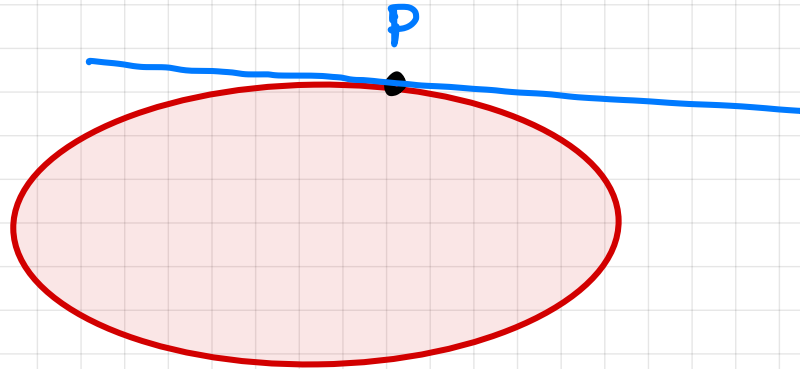
$$\begin{cases} \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \\ y = mx + q \end{cases}$$

## FORMULA DI SDOPPIAMENTO (SE P È ELLISSE)

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

$P(x_0; y_0)$

$$\frac{xx_0}{a^2} + \frac{yy_0}{b^2} = 1$$



COME TROVO LA TANGENTE ALL' ELLISSE PER UN PUNTO ESTERNO

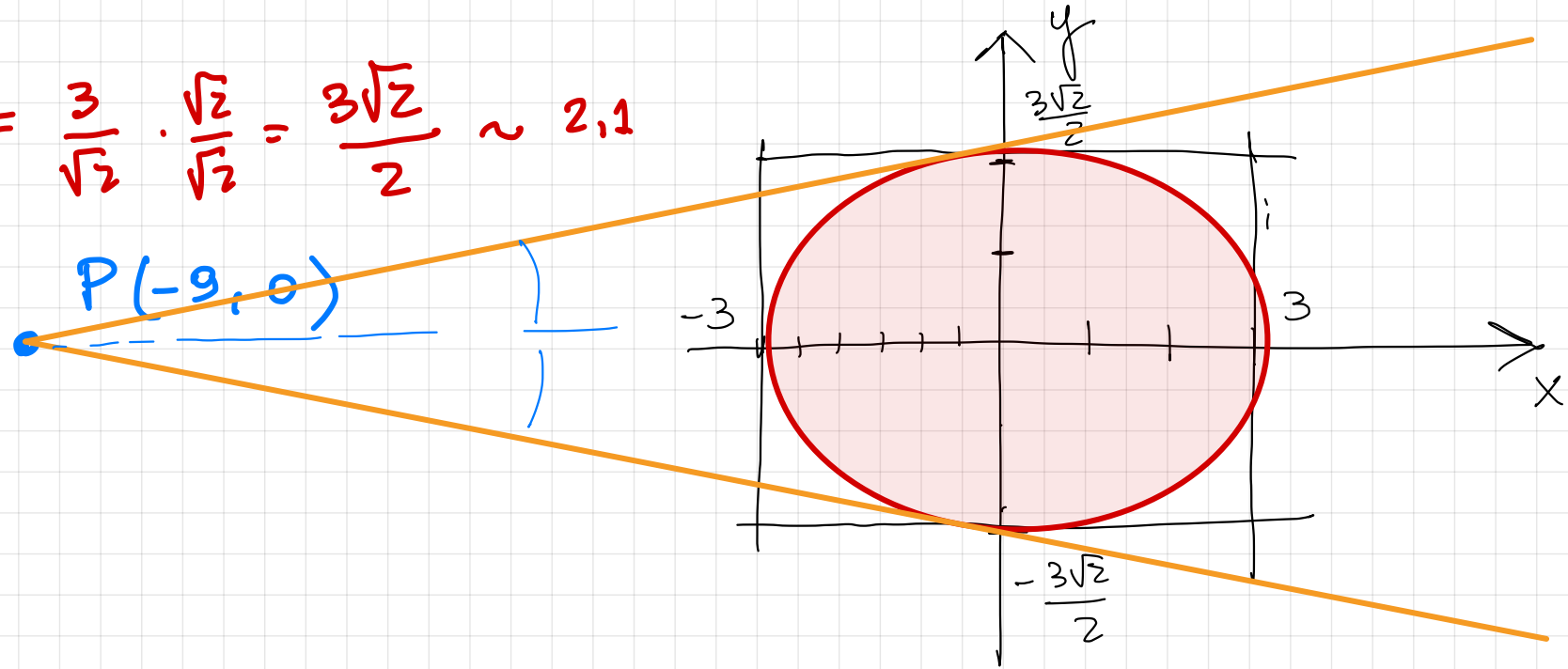
Determina le equazioni delle rette tangenti all'ellisse di equazione  $x^2 + 2y^2 = 9$ , condotte da  $P(-9; 0)$ .  $[x + 4y + 9 = 0; x - 4y + 9 = 0]$

ellisse  $x^2 + 2y^2 = 9 \quad \div 9$

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

$$\begin{aligned} a^2 &= 9 \\ b^2 &= \frac{9}{2} \end{aligned}$$

$$a = 3 ; \quad b = \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2} \sim 2,1$$



1) SCRIVO LA GENERICA RETTA PER P  $y - 0 = m(x + 9)$

$$y = mx + 9m$$

2) SISTEMA  $\begin{cases} y = mx + 9m \\ x^2 + 2y^2 = 9 \end{cases} = \begin{cases} y = mx + 9m \\ x^2 + 2(mx + 9m)^2 = 9 \end{cases}$

$$= \left\{ \begin{array}{l} \text{-----} \\ x^2 + 2(m^2 x^2 + 81 m^2 + 18 m^2 x) = 9 \end{array} \right. =$$

$$= \left\{ \begin{array}{l} \text{-----} \\ x^2 + 2m^2 x^2 + 162 m^2 + 36 m^2 x - 9 = 0 \end{array} \right.$$

$$x^2 (1 + 2m^2) + 36 m^2 x + 162 m^2 - 9 = 0$$

$$a = (1 + 2m^2) \quad b = 36 m^2 \quad c = (162 m^2 - 9)$$

$$\Delta = b^2 - 4ac = 0 \quad \text{CONDIZIONE DI TANGENZA}$$

$$(36 m^2)^2 - 4(1 + 2m^2)(162 m^2 - 9) = 0$$

$$\cancel{1296 m^4} - 648 m^2 + 36 - \cancel{1296 m^4} + 72 m^2 = 0$$

$$-576 m^2 + 36 = 0$$

$$m^2 = \frac{-36}{-576} = +\frac{1}{16}$$

$$m^2 = \frac{1}{16}$$

$$m_1 = \frac{1}{4}$$

$$m_2 = -\frac{1}{4}$$

3) SOSTITUISCO  $m$  NELLA RETTA  $y = mx + 9m$

$$m_1 = \frac{1}{4} \rightarrow y = \frac{1}{4}x + \frac{9}{4}$$

$$\rightarrow x - 4y + 9 = 0$$

$$m_2 = -\frac{1}{4} \rightarrow y = -\frac{1}{4}x - \frac{9}{4}$$

$$\rightarrow x + 4y + 9 = 0$$