

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

contenuto nel rettangolo $\begin{cases} -a \leq x \leq +a \\ -b \leq y \leq +b \end{cases}$

interseca gli assi in quattro punti:
 $(\pm a; 0)$ $(0; \pm b)$ detti vertici

è simmetrica rispetto agli assi coordinati.

Ha i fuochi sull'asse x $F_{1,2}(\pm c; 0)$
 $b^2 = a^2 - c^2$

Eccentricità $e = \frac{c}{a} = \frac{\text{semiasse focale}}{\text{semiasse maggiore}} < 1$

L'asse x è l'asse focale

Semiasse focale = c

$$PF_1 = \sqrt{(x+c)^2 + y^2}$$

$$PF_2 = \sqrt{(x-c)^2 + y^2}$$

$$\sqrt{(x+c)^2 + y^2} + \sqrt{(x-c)^2 + y^2} = 2a$$

$$(x+c)^2 + y^2 + (x-c)^2 + y^2 + 2\sqrt{[(x+c)^2 + y^2][(x-c)^2 + y^2]} = 4a^2$$

$$x^2 + c^2 + y^2 + x^2 + c^2 + y^2 + 2\sqrt{(x^2 + y^2 + c^2 + 2cx)(x^2 + y^2 + c^2 - 2cx)} = 4a^2$$

$$x^2 + c^2 + y^2 + \sqrt{(x^2 + y^2 + c^2)^2 - 4c^2x^2} = 2a^2$$

$$\sqrt{(x^2 + y^2 + c^2)^2 - 4c^2x^2} = 2a^2 - (x^2 + y^2 + c^2)$$

$$\cancel{(x^2 + y^2 + c^2)^2} - \cancel{4c^2x^2} = \cancel{4a^4} + \cancel{(x^2 + y^2 + c^2)^2} - \cancel{4a^2(x^2 + y^2 + c^2)}$$

$$2x^2 - 2c^2x^2 + 2y^2 + 2c^2 - 2a^4 = 0$$

$$x^2(2 - c^2) + 2y^2 = 2a^2(2 - c^2)$$

$$x^2 b^2 + 2y^2 = 2 \cdot b^2 \quad b^2 = a^2 - c^2$$

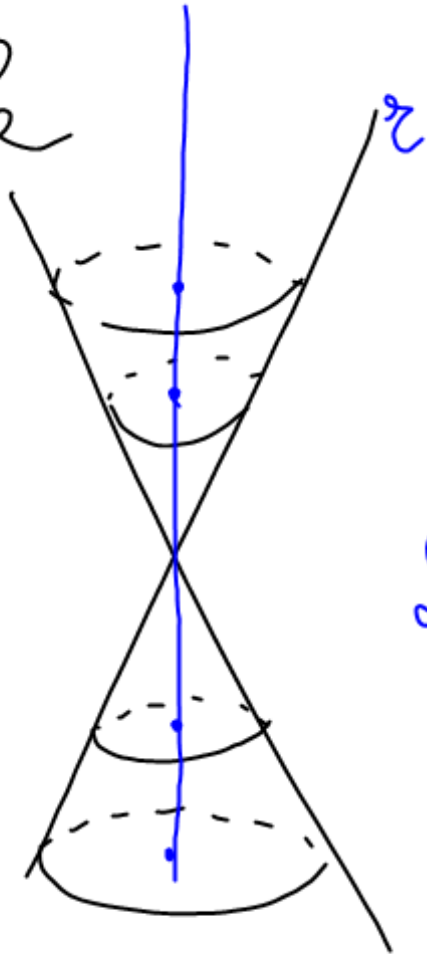
$$\frac{x^2 b^2}{2b^2} + \frac{2y^2}{2b^2} = 1$$

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

Eq-
canonica
Ellisse

Circonfenza
Parabola
Ellisse
Iperbole

$e = 0$
 $e = 1$
 \Rightarrow CONICHE



1- hanno assi di simmetria

2- sono caratterizzate da un parametro detto eccentricità e

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

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

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

$$c^2 = 9 - 4 = 5 \quad c = \sqrt{5}$$

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

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

$$c^2 = 5 \quad c = +\sqrt{5}$$

$$a = 3 \quad b = 2$$

$$e = \frac{\sqrt{5}}{3} = 0,75$$

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

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

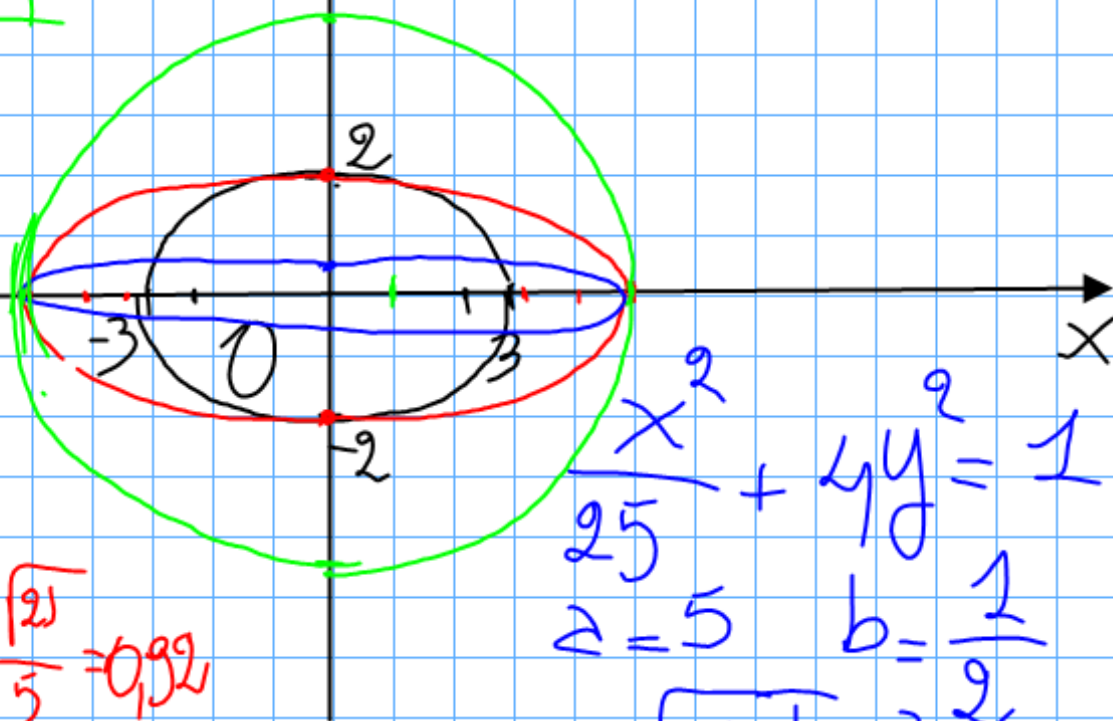
$$V_{1,2} (\pm a; 0)$$

$$V_{3,4} (0; \pm b)$$

$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$

$$a = 5 \quad b = 4$$

$$c = 3 \quad e = \frac{3}{5}$$



$$\frac{x^2}{25} + \frac{y^2}{4} = 1$$

$$c = \sqrt{21}$$

$$a = 5 \quad b = 2$$

$$e = \frac{\sqrt{21}}{5} = 0,99$$

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

$$a = 5 \quad b = 1$$

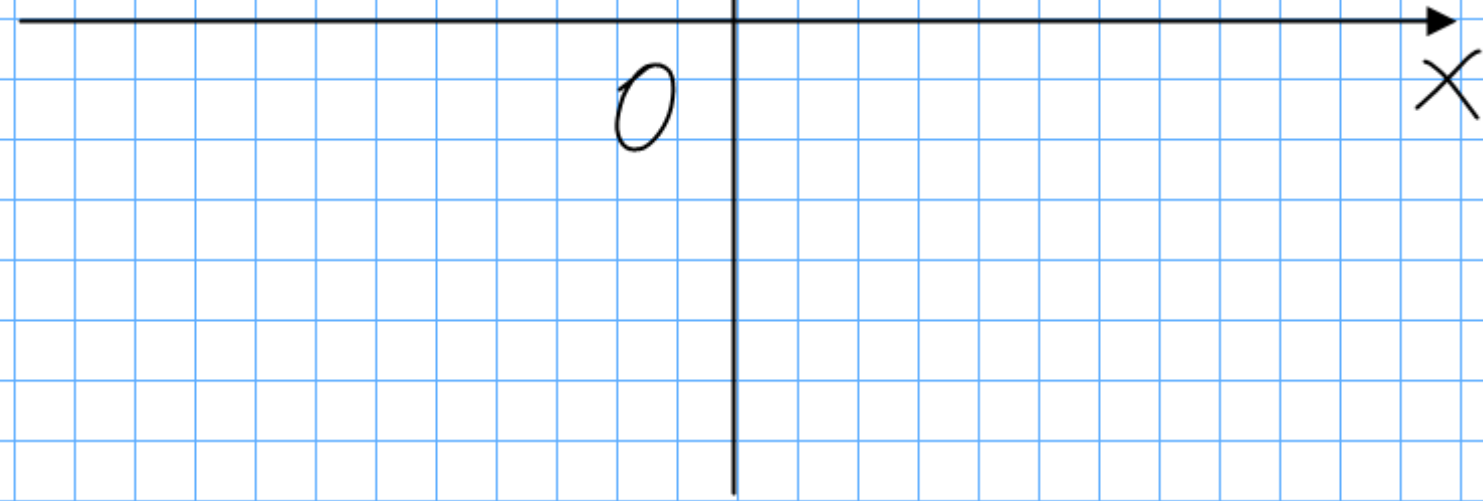
$$c = \sqrt{25 - 1} = \frac{24}{5} \quad e = \frac{3}{5}$$

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

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

y

$$e = \frac{c}{a}$$



0

x

m B |

$$x^2 + 9y^2 = 36$$

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

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

2^2 2^2

$a > b \Rightarrow$ fuochi sono sull'asse x

$$c = \sqrt{a^2 - b^2} = \sqrt{36 - 4} = 4\sqrt{2}$$

$$V_{1,2} (\pm 6; 0) \quad V_{3,4} (0; \pm 2) \quad F_{1,2} (\pm 4\sqrt{2}; 0)$$

Semiasse maggiore = 6

" minore = 2

$$e = \frac{c}{a} = \frac{4\sqrt{2}}{6} = \frac{2\sqrt{2}}{3}$$

n 18

$$\frac{x^2}{3} + \frac{y^2}{4} = \frac{1}{2}$$

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

$$b^2 > a^2 \Rightarrow \text{fuochi sull'asse } y$$

$$c^2 = b^2 - a^2 = \frac{1}{2} \quad c = \frac{\sqrt{2}}{2}$$

$$V_{1,2} \left(\pm \sqrt{\frac{3}{2}}; 0 \right) \quad V_{3,4} \left(0; \pm \sqrt{2} \right)$$

semiasse maggiore $\sqrt{2}$
 || minore $\sqrt{\frac{3}{2}}$

$$e = \frac{1}{2}$$

$$m50 \quad \frac{x^2}{12} + \frac{y^2}{4} = 1 \quad y = mx - 4$$

$$\begin{cases} y = mx - 4 \\ \frac{x^2}{12} + \frac{y^2}{4} = 1 \end{cases}$$

$$x^2 + 3(mx - 4)^2 = 12$$

$$x^2 + 3m^2x^2 + 48 - 24mx - 12 = 0$$

$$x^2(1 + 3m^2) - 24mx + 36 = 0$$

$\Delta > 0$ retta secante

$\Delta = 0$ " ta

$\Delta < 0$ retta esterna

$$\frac{\Delta}{4} = 144m^2 - 36(1 + 3m^2) = 36m^2 - 36$$

$$\frac{\Delta}{4} = 0 \quad m^2 - 1 = 0 \quad m = \pm 1$$

$$\frac{\Delta}{4} > 0 \quad m < -1 \vee m > 1$$

$$\frac{\Delta}{4} < 0 \quad -1 < m < 1$$

n 53

$$9x^2 + 2y^2 = 54$$

P (-2; 3)

$$x^2 \rightarrow x_0 x$$

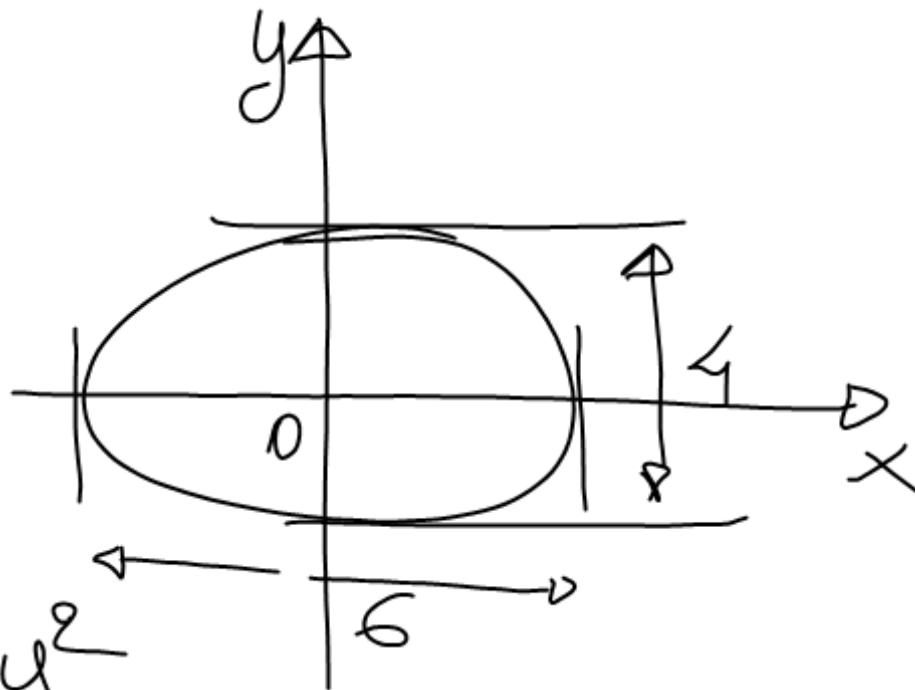
$$y^2 \rightarrow y_0 y$$

$$9 \cdot (-2x) + 2 \cdot 3y = 54$$

$$\frac{-18x + 6y = 54}{3}$$

$$-3x + y - 9 = 0$$

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

m 80]

$$V(\sqrt{10}; 0) \quad \text{tg } \omega \quad y = 6x - 20$$

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

$$\begin{cases} \frac{x^2}{10} + \frac{y^2}{b^2} = 1 & b^2 x^2 + 10 y^2 - 10 b^2 = 0 \end{cases}$$

$$\begin{cases} y = 6x - 20 & b^2 x^2 + 10(36x^2 + 400 - 240x) - 10b^2 = 0 \end{cases}$$

$$x^2(b^2 + 360) - 2400x + 4000 - 10b^2 = 0$$

$$\frac{\Delta}{4} = 0 \quad \cancel{1440000} - 4000b^2 + 10b^4 - \cancel{1440000} + 3600b^2 = 0$$

$$\cancel{10b^4} - 400b^2 = 0 \quad b^2 = 0 \quad \text{N.A.}$$

$$b^2(b^2 - 40) = 0 \quad \begin{cases} b^2 = 0 \\ b^2 = 40 \end{cases}$$

$$\frac{x^2}{10} + \frac{y^2}{40} = 1$$