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$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 \qquad e=\frac{\sqrt{5}}{5} \qquad a=4 \text{ SEMIASSE MINORE}$$

$$e=\frac{c}{b} \qquad e=\sqrt{\frac{b^2-a^2}{b}} \qquad \frac{\sqrt{5}}{5}=\sqrt{\frac{b^2-a^2}{b}}$$

$$\left(\frac{\sqrt{5}}{5}\right)^2=\left(\sqrt{\frac{b^2-(4)^2}{b}}\right)^2 \qquad \frac{\cancel{5}^{1}}{\cancel{25}\,5}=\frac{b^2-16}{b^2}$$

$$b^2=5b^2-80$$

$$4b^2=80 \qquad b^2=20 \qquad b=\pm\sqrt{20}=2\sqrt{5}$$

$$\frac{x^2}{16}+\frac{y^2}{20}=1$$

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$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 \qquad V(0;3)$$

$F_1(-c,0)$ — Fuochi sull'asse x distanti

$F_2(c;0)$ — $\frac{18}{5}\cdot\sqrt{5}$ dalla retta di eq

$y=3x \; (r)$

$$d(r,F_1)=d(r,F_2)=\frac{18}{5}\sqrt{5}$$

$$d(r,F_2)=\frac{18}{5}\sqrt{5} \qquad d(P;r)=\frac{|ax_P+by_P+c|}{\sqrt{a^2+b^2}}$$

$$y-3x=0$$

$$\frac{|y_{F_2}-3x_{F_2}|}{\sqrt{1^2+(-3)^2}}=\frac{18}{5}\sqrt{5} \qquad \frac{|0-3c|}{\sqrt{10}}=\frac{18}{5}\cdot\sqrt{5}$$

$$|-3c|=\frac{18}{5}\sqrt{50} \qquad |-3c|=\frac{18}{\cancel{5}}\cdot\cancel{5}\sqrt{2}$$

$$|-3c|=18\sqrt{2} \qquad -3c=\pm 18\sqrt{2}$$

$$\cancel{3}c=\mp \overset{6}{\cancel{18}}\sqrt{2} \qquad c=\mp 6\sqrt{2}$$

$$F_1(-6\sqrt{2};0) \qquad F_2(6\sqrt{2};0)$$

$$V(0;3)$$

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 \qquad a>b \qquad c^2=a^2-b^2 \qquad \boxed{72=a^2-b^2}$$

$$\cancel{\frac{0}{a^2}}+\frac{9}{b^2}=1 \qquad b^2=9$$

$$\begin{cases} b^2=9 \\ a^2-b^2=72 \end{cases} \qquad \begin{cases} b^2=9 \\ a^2-9=72 \end{cases}$$

$$\begin{cases} b^2=9 \\ a^2=81 \end{cases} \qquad \frac{x^2}{81}+\frac{y^2}{9}=1$$

$$x^2+9y^2=81$$

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$9x^2+y^2=6y$ $\qquad$ $9x^2+y^2-6y=0$

$(y)^2+2(y)(-3)+(-3)^2-(-3)^2$

$(y-3)^2-9$

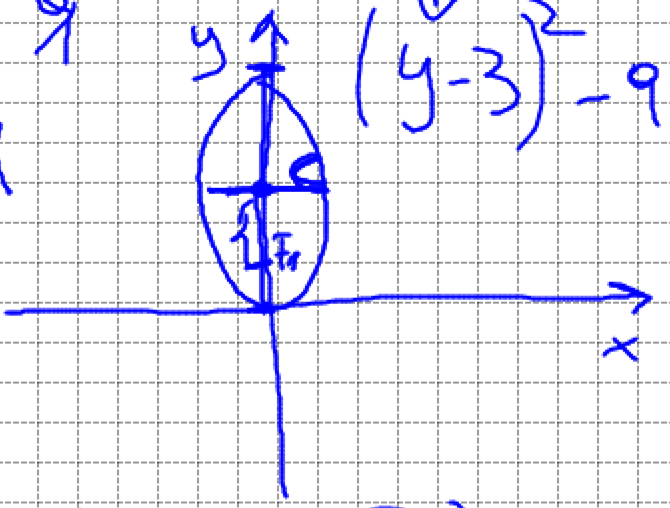
$9x^2+(y-3)^2-9=0$

$\frac{9x^2}{9}+\frac{(y-3)^2}{9}=\frac{9}{9}$

$x^2+\frac{(y-3)^2}{9}=1$

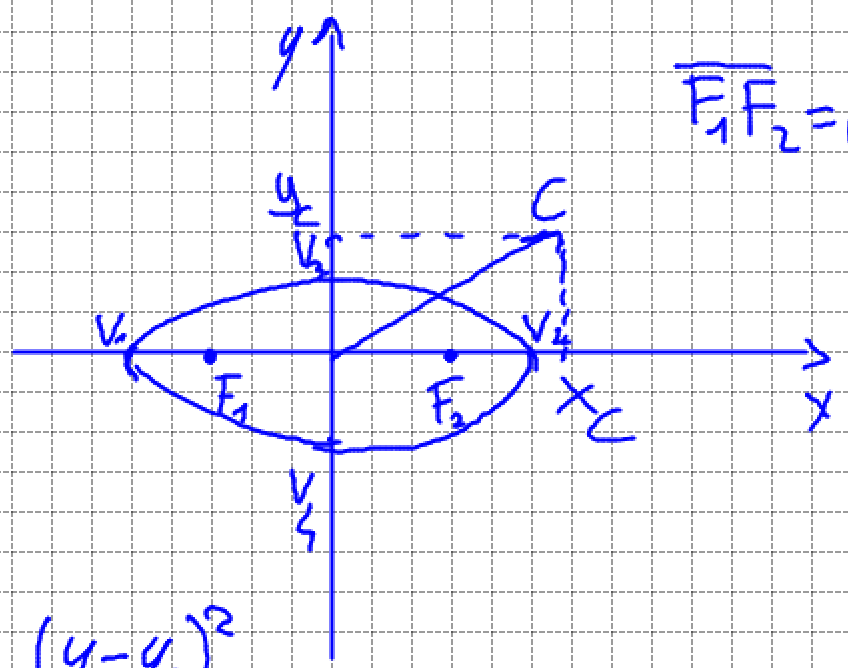
$c=\sqrt{9-1}=\sqrt{8}$

$c=2\sqrt{2}$




$F_1(0;3-2\sqrt{2})$ $\qquad$ $F_2(0;3+2\sqrt{2})$

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ $\qquad$ $F_1(c;0)$ $\quad$ $F_2(-c,0)$




$\overline{F_1F_2}$ = distanza focale

$\frac{(x-x_c)^2}{a^2}+\frac{(y-y_c)^2}{b^2}=1$

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$a=?$

$b=?$

Circonferenza con $C(0;0)$ e $r=1$ si trasforma nell'ellisse di eq $4x^2+16y^2=16$ attraverso questa dilatazione:

$$D\begin{cases} x'=ax \\ y'=by \end{cases}$$

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

$$\begin{cases} x' = ax \\ y' = by \end{cases} \qquad ax - x' = 0 \to x = \frac{x'}{a}$$

$$y = \frac{y'}{b}$$

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

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

$$b = 1$$

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$$y = -1 + \sqrt{16x - 4x^2} \qquad \sqrt{16x - 4x^2} = y + 1$$

$$D: \begin{cases} {}^{4}\cancel{16}x - \cancel{4}x^2 \geq 0 \\ y + 1 \geq 0 \end{cases} \quad \begin{cases} 4x - x^2 \geq 0 \to x^2 - 4x = 0 \\ y \geq -1 \end{cases}$$

$$x(x-4) = 0 \to x = 0, \; x = 4 \qquad D: \begin{cases} y \geq -1 \\ 0 \leq x \leq 4 \end{cases}$$

$$\begin{cases} 0 \leq x \leq 4 \\ y \geq -1 \\ 16x - 4x^2 = (y+1)^2 \to 16x - 4x^2 = y^2 + 1 + 2y \end{cases}$$

$$+4x^2 - 16x + y^2 + 2y + 1 = 0 \qquad \frac{(x - x_c)^2}{a^2} + \frac{(y - y_c)^2}{b^2} = 1$$

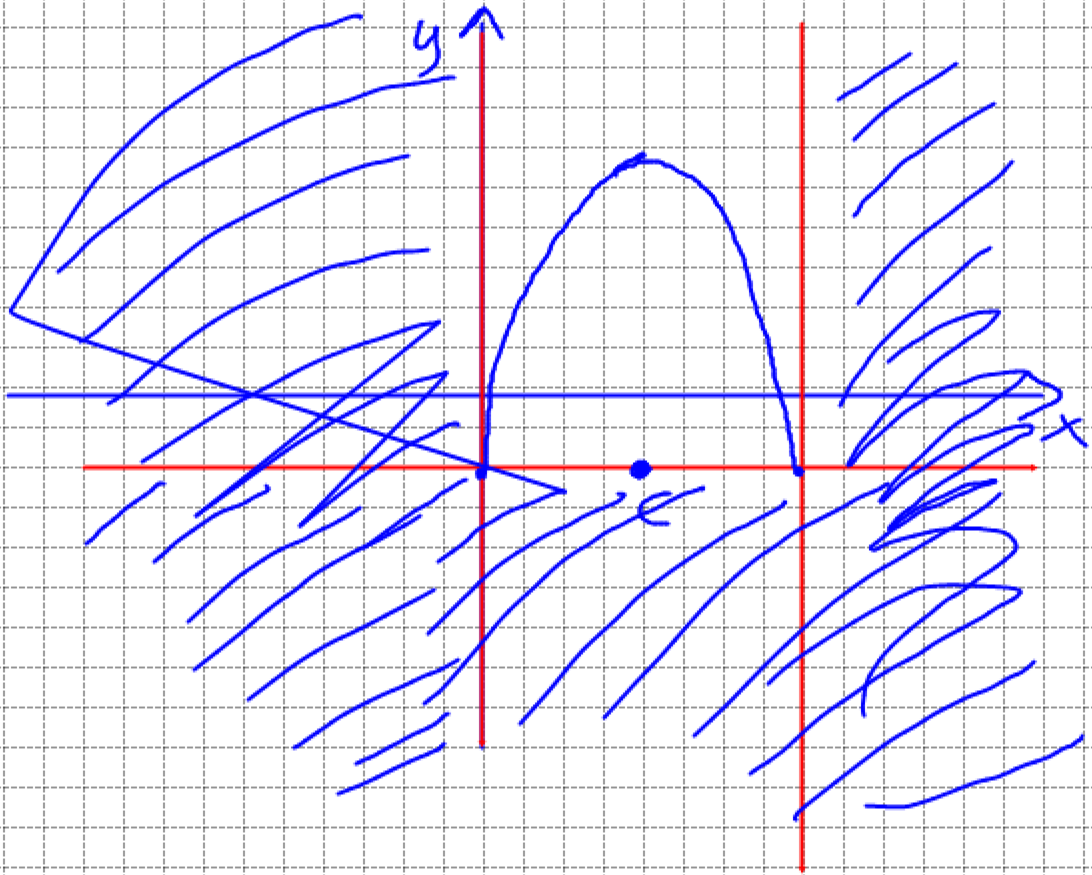
$$\underbrace{(2x)^2 + 2(2x)(-4) + (-4)^2}_{(2x-4)^2} - (-4)^2 + \overbrace{(y)^2 + 2(y)(1) + 1^2}^{(y+1)^2} - \cancel{1^2} + \cancel{1} = 0$$

$$(2x-4)^2 - 16 + (y+1)^2 = 0$$

$$(2x-4)^2 + (y+1)^2 = 16$$

$$[2(x-2)]^2 + (y+1)^2 = 16$$

$$4(x-2)^2 + (y+1)^2 = 16 \qquad \frac{(x-2)^2}{4} + \frac{(y+1)^2}{16} = 1$$



y
x
e