222 Trova per quali valori di k l'equazione $x^2 + 4y^2 - 6x + 2y + k = 0$ rappresenta un'ellisse non degenere.

$\left[k < \frac{37}{4}\right]$

$$x^2 - 6x + 4y^2 + 2y + k = 0$$

$$x^2 - 6x + 9 - 9 + 4y^2 + 2y + \frac{1}{4} - \frac{1}{4} + k = 0$$

$$(x-3)^2 + \left(2y + \frac{1}{2}\right)^2 - 9 - \frac{1}{4} + k = 0$$

$$(x-3)^2 + \left(2y + \frac{1}{2}\right)^2 = \underbrace{\frac{37}{4} - k}_{>0}$$

$$\frac{37}{4} - k > 0 \Rightarrow \boxed{k < \frac{37}{4}}$$

Determinare il DOMINIO della funzione e rappresentare il grafico

241 $y = -\frac{2}{3}\sqrt{-x^2+x} + 1$

DOMINIO: $-x^2+x \geq 0$ $x^2-x \leq 0$ $x(x-1) \leq 0$

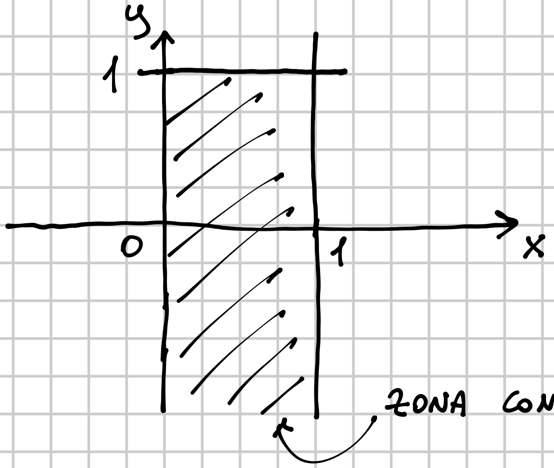
$0 \leq x \leq 1$

$D = [0,1]$

$y-1 = -\frac{2}{3}\sqrt{-x^2+x}$ $y-1 \leq 0$ perché $-\frac{2}{3}\sqrt{-x^2+x} \leq 0$

$\Downarrow$ per $x \in [0,1]$

$y \leq 1$



ZONA CONSENTITA AL GRAFICO

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

$-\frac{4}{9}(-x^2+x) + (y-1)^2 = 0$

$\frac{4}{9}(x^2-x) + (y-1)^2 = 0$

$\frac{4}{9}(\underbrace{x^2-x+\frac{1}{4}}_{(x-\frac{1}{2})^2}-\frac{1}{4}) + (y-1)^2 = 0$ $\frac{4}{9}(x-\frac{1}{2})^2 - \frac{1}{4}\cdot\frac{4}{9} + (y-1)^2 = 0$

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

$$\frac{4}{9}\left(x-\frac{1}{2}\right)^2+(y-1)^2=\frac{1}{9}$$

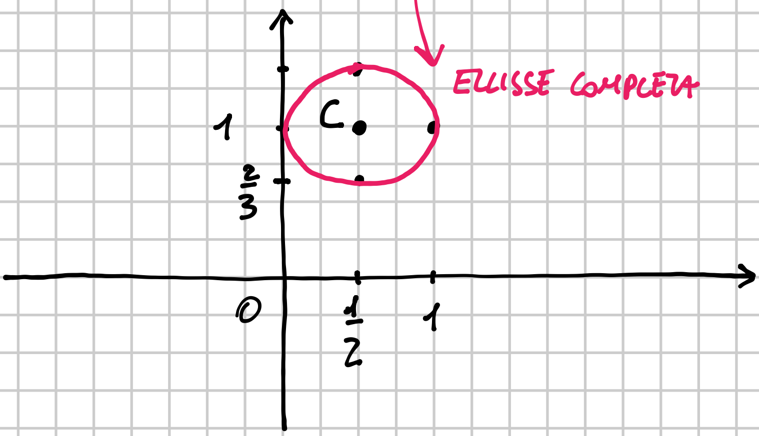
$$4\left(x-\frac{1}{2}\right)^2+9(y-1)^2=1$$

$$\frac{\left(x-\frac{1}{2}\right)^2}{\frac{1}{4}}+\frac{(y-1)^2}{\frac{1}{9}}=1$$

ELLISSE CON CENTRO $C\left(\frac{1}{2},1\right)$

SEMIASSI $a=\frac{1}{2}$ $b=\frac{1}{3}$

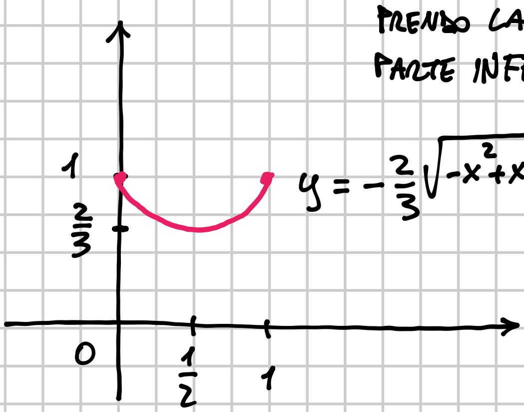
ELLISSE COMPLETA



$0 \le x \le 1 \qquad y \le 1$

$\Downarrow$

PRENDO LA PARTE INFERIORE



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