

$$ES.1) \text{ domf} = \begin{cases} -13x - 3x^2 - 4 \geq 0 \\ x^2 - 4 \neq 0 \end{cases} \Leftrightarrow \begin{cases} 3x^2 + 13x + 4 \leq 0 \\ x \neq \pm 2 \end{cases} \quad x_{1,2} = \frac{-13 \pm \sqrt{169 - 48}}{6} = \frac{-13 \pm 11}{6}$$

$$x_1 = -4 \\ x_2 = -\frac{1}{3}$$

$$\begin{cases} -4 \leq x \leq -\frac{1}{3} \\ x \neq \pm 2 \end{cases} \quad \text{domf} = [-4, -2[ \cup ]-\frac{1}{3}, 2[$$

$f(-2) = \sqrt{10} - \frac{\text{sen}(-2)}{0} = \text{IMPOSSIBILE}$  : infatti  $-2 \notin \text{domf}$ .

ES2) a)  $\sqrt{x+4} = 5 > 0 \Leftrightarrow \begin{cases} x+4 \geq 0 \text{ c.e.} \\ x+4 = 25 \end{cases} \Leftrightarrow \begin{cases} x \geq -4 \\ x = 21 \end{cases} \Leftrightarrow \boxed{x = 21}$

$\sqrt{3x-2} = -3 < 0$  IMPOSS. nessuna sol.<sup>ue</sup>

$\sqrt{x^2-5} = 2 > 0 \Leftrightarrow \begin{cases} x^2-5 \geq 0 \text{ c.e.} \\ x^2-5 = 4 \end{cases} \Leftrightarrow \begin{cases} x \leq -\sqrt{5} \text{ o } x \geq \sqrt{5} \\ x^2 = 9 \end{cases}$

$\Leftrightarrow \begin{cases} x \leq -\sqrt{5} \text{ o } x \geq \sqrt{5} \\ x = \pm 3 \end{cases} \Leftrightarrow \boxed{x = \pm 3}$

$\sqrt{5-x^2} = 3 \Leftrightarrow \begin{cases} 5-x^2 \geq 0 \text{ c.e.} \\ 5-x^2 = 9 \end{cases} \Leftrightarrow \begin{cases} -\sqrt{5} \leq x \leq \sqrt{5} \\ x^2 = -4 \text{ IMPOSS.} \end{cases} \quad \text{nessuna}$

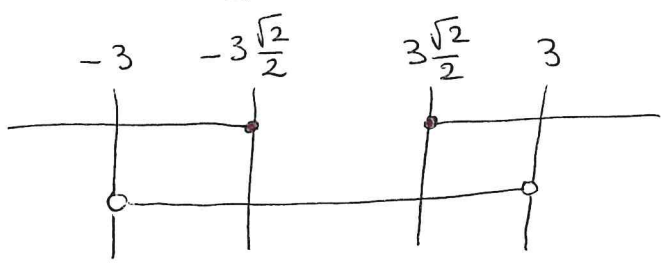
ades! b)  $\sqrt{3x+4} = 2+x \Leftrightarrow \begin{cases} 3x+4 \geq 0 \text{ c.e.} \\ 2+x \geq 0 \text{ (altrim } S = \emptyset) \\ 3x+4 = (2+x)^2 \end{cases} \Leftrightarrow \begin{cases} x \geq -\frac{4}{3} \\ x \geq -2 \\ x^2+4x+4 = 3x+4 \end{cases} \Leftrightarrow \begin{cases} x \geq -\frac{4}{3} \\ x \geq -2 \end{cases}$

$\Leftrightarrow \begin{cases} x \geq -\frac{4}{3} \\ x^2+x=0 \\ x(x+1)=0 \end{cases} \Leftrightarrow \begin{cases} x \geq -\frac{4}{3} \\ x=0 \text{ o } x=-1 \end{cases} \quad \text{S } x=0 \text{ o } x=-1$

ES.3) a)  $\sqrt{2x^2-9} < 3 \Leftrightarrow \begin{cases} 2x^2-9 \geq 0 \\ 3 > 0 \\ 2x^2-9 < 9 \end{cases} \Leftrightarrow \begin{cases} x^2 \geq \frac{9}{2} \\ \text{s.vera} \\ x^2 < 9 \end{cases}$

$\Leftrightarrow \begin{cases} x \leq -\frac{3\sqrt{2}}{2} \text{ o } x \geq \frac{3\sqrt{2}}{2} \\ -3 < x < 3 \end{cases} \Leftrightarrow \begin{cases} x \leq -\frac{3\sqrt{2}}{2} \text{ o } x \geq \frac{3\sqrt{2}}{2} \\ -3 < x < 3 \end{cases}$

Essendo  $\frac{3\sqrt{2}}{2} < 3 \Leftrightarrow \frac{\sqrt{2}}{2} < 1 \Leftrightarrow \sqrt{2} < 2$  vero



$\text{S } x \in ]-3, -\frac{3\sqrt{2}}{2}] \cup [\frac{3\sqrt{2}}{2}, 3[$

⊙  $\sqrt{9x^2-4} > -1$  essendo  $-1 < 0$  è vera  
 $\forall x$  per cui  $9x^2-4 \geq 0$  cioè  $x^2 \geq \frac{4}{9}$

S'  $x \in ]-\infty, -\frac{2}{3}] \cup [\frac{2}{3}, +\infty[$

(con le proprietà  $\sqrt{9x^2-4} > -1 \Leftrightarrow \begin{cases} 9x^2-4 \geq 0 \\ -1 < 0 \\ \text{s. vera} \end{cases} \quad \text{o} \quad \begin{cases} 9x^2-4 \geq 0 \\ -1 \geq 0 \\ 9x^2-4 > 1 \end{cases} \rightarrow \text{IMPOSSIBILE}$ )

$\Rightarrow x \in ]-\infty, -\frac{2}{3}] \cup [\frac{2}{3}, +\infty[ \quad \text{o} \quad x \in \emptyset$

b)  $\sqrt{\frac{x^2-4x}{5}} \leq 1 \Leftrightarrow \begin{cases} \frac{x^2-4x}{5} \geq 0 \\ 1 \geq 0 \\ \frac{x^2-4x}{5} \leq 1 \end{cases} \Leftrightarrow \begin{cases} x^2-4x \geq 0 \\ \text{s. vera} \\ x^2-4x \leq 5 \end{cases} \begin{cases} x(x-4) \geq 0 \\ x^2-4x-5 \leq 0 \end{cases}$

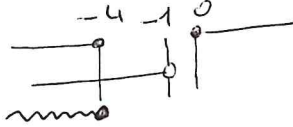
$\Rightarrow \begin{cases} x \leq 0 \quad \text{o} \quad x \geq 4 \\ (x+1)(x-5) \leq 0 \end{cases} \Leftrightarrow \begin{cases} x \leq 0 \quad \text{o} \quad x \geq 4 \\ -1 \leq x \leq 5 \end{cases} \quad \text{S' } x \in [-1, 0] \cup [4, 5]$

Svolgim. ad es. di e)

e)  $\sqrt{4x+x^2} > 1+x \Leftrightarrow \begin{cases} 4x+x^2 \geq 0 \\ 1+x < 0 \end{cases} \quad \text{o} \quad \begin{cases} 4x+x^2 \geq 0 \\ 1+x \geq 0 \\ 4x+x^2 > (1+x)^2 \end{cases}$

$\Rightarrow \begin{cases} x(x+4) \geq 0 \\ x < -1 \end{cases} \quad \text{o} \quad \begin{cases} x(x+4) \geq 0 \\ x \geq -1 \\ 4x+x^2 > 1+2x+x^2 \end{cases} \Rightarrow$

$\begin{cases} x \leq -4 \quad \text{o} \quad x \geq 0 \\ x < -1 \end{cases} \quad \text{o} \quad \begin{cases} x \leq -4 \quad \text{o} \quad x \geq 0 \\ x \geq -1 \\ 2x > 1 \end{cases} \Leftrightarrow x \leq -4 \quad \text{o} \quad \begin{cases} 1^{\text{a}} \text{ o } 2^{\text{a}} \quad x \geq 0 \\ x > \frac{1}{2} \end{cases}$



$\Leftrightarrow x \leq -4 \quad \text{o} \quad x \geq \frac{1}{2}$