

SOL. ^u SCHEDA $\boxed{N^{\circ} 11}$

1) F $|\frac{7}{2}| = \frac{7}{2}$ F $|- \frac{8}{11}| = \frac{8}{11}$ V $|- \frac{3}{5}| = \frac{3}{5}$

F $|\frac{7}{2}a| = \begin{cases} \frac{7}{2}a & a \geq 0 \\ -\frac{7}{2}a & a < 0 \end{cases}$ quindi $|\frac{7}{2}a| = \frac{7}{2}a \iff a \geq 0$

2) $|- \frac{7}{2} + \frac{4}{5}| = |- \frac{27}{10}| = \frac{27}{10}$ $|(\sin(\frac{2}{3}\pi))^3| = |(\frac{\sqrt{3}}{2})^3| = |\frac{3}{8}\sqrt{3}| = \frac{3}{8}\sqrt{3}$

$|3^{-3} \tan(\frac{5}{4}\pi)| = |\frac{1}{27}| = \frac{1}{27}$



$|\frac{4}{7} \cos(\frac{7}{4}\pi) - \sqrt{2}| = |\frac{4}{7} \frac{\sqrt{2}}{2} - \sqrt{2}| = |-\frac{5}{7}\sqrt{2}| = \frac{5}{7}\sqrt{2}$

3) $|\frac{6}{7}x - \frac{5}{2}| = \begin{cases} \frac{6}{7}x - \frac{5}{2} & \text{se } \frac{6}{7}x - \frac{5}{2} \geq 0 \\ -\frac{6}{7}x + \frac{5}{2} & \text{se } \frac{6}{7}x - \frac{5}{2} < 0 \end{cases} = \begin{cases} \frac{6}{7}x - \frac{5}{2} & \text{se } x \geq \frac{35}{12} \\ -\frac{6}{7}x + \frac{5}{2} & \text{se } x < \frac{35}{12} \end{cases}$

$|-x| = \begin{cases} -x & \text{se } -x \geq 0 \\ -(-x) & \text{se } -x < 0 \end{cases} = \begin{cases} -x & \text{se } x \leq 0 \\ x & \text{se } x > 0 \end{cases}$

4) $|x| = \frac{2}{5} \iff x = \pm \frac{2}{5}$ $|x| = -\frac{2}{5}$ IMPOSSIBILE

$|-x| = 5 \iff -x = 5 \text{ o } -x = -5 \iff x = -5 \text{ o } x = 5 \iff x = \pm 5$

oppure usando la proprietà $|-x| = |x| \forall x$

$|-x| = 5 \iff |x| = 5 \iff x = \pm 5$

$|\frac{7}{5} - 4x| = \frac{1}{2} \iff \frac{7}{5} - 4x = \frac{1}{2} \text{ o } \frac{7}{5} - 4x = -\frac{1}{2} \iff x = \frac{9}{40} \text{ o } x = \frac{19}{40}$

$(-5)^3 |\frac{3}{2} - \frac{1}{2}x| = -25x \iff -125 |\frac{3}{2} - \frac{1}{2}x| = -25x \iff |\frac{3}{2} - \frac{1}{2}x| = \frac{x}{5}$

cond $\boxed{\frac{x}{5} \geq 0}$ affinché possano esserci delle sol. ^{ui}

$\iff \begin{cases} x \geq 0 \\ \frac{3}{2} - \frac{1}{2}x = \frac{1}{5}x \text{ o } \frac{3}{2} - \frac{1}{2}x = -\frac{x}{5} \end{cases} \iff \begin{cases} x \geq 0 \\ x = \frac{15}{7} \text{ o } x = 5 \end{cases} \iff x = \frac{15}{7} \text{ o } x = 5$

$|3x - 8| = |2(2x - 1) - 3/2| \iff 3x - 8 = 4x - \frac{7}{2} \text{ o } 3x - 8 = -4x + \frac{7}{2}$
 $4x - 2 - 3/2 \iff x = -\frac{9}{2} \text{ o } 7x = \frac{23}{2} \iff x = -\frac{9}{2} \text{ o } x = \frac{23}{14}$

$$5) |1-x| \leq \frac{2}{3} \Leftrightarrow \begin{cases} 1-x \leq \frac{2}{3} \\ 1-x \geq -\frac{2}{3} \end{cases} \Leftrightarrow \begin{cases} x \geq \frac{1}{3} \\ x \leq \frac{5}{3} \end{cases} \Leftrightarrow x \in \left[\frac{1}{3}, \frac{5}{3}\right]$$

$$|6x| \geq 3 \Leftrightarrow 6|x| \geq 3 \Leftrightarrow |x| \geq \frac{1}{2} \Leftrightarrow x \leq -\frac{1}{2} \text{ o } x \geq \frac{1}{2}$$

$$|x^2 + 5x| \leq 0 \Leftrightarrow |x^2 + 5x| = 0 \Leftrightarrow x^2 + 5x = 0 \Leftrightarrow x(x+5) = 0 \Leftrightarrow x = 0 \text{ o } x = -5$$

$|a| < 0$ mai $|a| = 0 \Leftrightarrow a = 0$

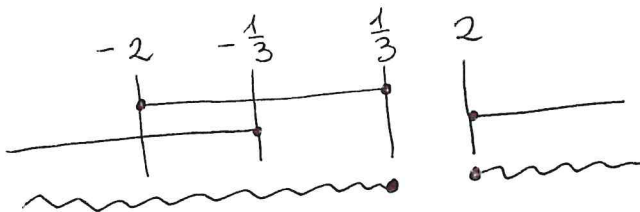
$$|4 - 6x^2| \geq 10x \Leftrightarrow 4 - 6x^2 \geq 10x \text{ o } 4 - 6x^2 \leq -10x$$

$$\Leftrightarrow 6x^2 + 10x - 4 \leq 0 \text{ o } 6x^2 - 10x - 4 \geq 0$$

$$3x^2 + 5x - 2 = 0 \quad x_1 = -2$$

$$x_{1,2} = \frac{-5 \pm 7}{6} \Rightarrow x_2 = \frac{1}{3}$$

$$\Leftrightarrow -2 \leq x \leq \frac{1}{3} \text{ o } (x \leq -\frac{1}{3} \text{ o } x \geq 2)$$



$$S: x \in]-\infty, \frac{1}{3}] \cup [2, +\infty[$$

$$5 - 3|-3x+1| \geq 0 \Leftrightarrow |-3x+1| \leq \frac{5}{3} \Leftrightarrow \begin{cases} -3x+1 \leq \frac{5}{3} \\ -3x+1 \geq -\frac{5}{3} \end{cases}$$

$$\Leftrightarrow \begin{cases} 3x \geq -\frac{2}{3} \\ 3x \leq \frac{8}{3} \end{cases} \Leftrightarrow \begin{cases} x \geq -\frac{2}{9} \\ x \leq \frac{8}{9} \end{cases} \Leftrightarrow -\frac{2}{9} \leq x \leq \frac{8}{9}$$

6) a) $|x| > x \Leftrightarrow x > x \text{ o } x < -x \Leftrightarrow \text{IMPOSS} \text{ o } 2x < 0$
 $\Leftrightarrow \boxed{x < 0}$

b) $3|x+1| < (x+1)^2 \Leftrightarrow \begin{cases} 3(x+1) < (x+1)^2 \\ 3(x+1) > -(x+1)^2 \end{cases} \Leftrightarrow \begin{cases} x^2 - x - 2 > 0 \\ x^2 + 5x + 4 > 0 \end{cases}$

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

$$S: x \in]-\infty, -4[\cup]2, +\infty[$$

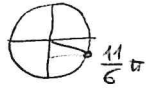
c) $|x+5| = x-3 \Leftrightarrow \begin{cases} x-3 \geq 0 \\ x+5 = x-3 \text{ o } x+5 = 3-x \end{cases} \Leftrightarrow \begin{cases} x \geq 3 \\ 2x = -2 \end{cases} \Leftrightarrow \begin{cases} x \geq 3 \\ x = -1 \end{cases}$ *Nesuna Sol. ue*

INFATIA DE $x = -1 \quad |4| = -4$ Falsa

d) $|3x-1| < \frac{5}{2} \Leftrightarrow \begin{cases} 3x-1 < \frac{5}{2} \\ 3x-1 > -\frac{5}{2} \end{cases} \Leftrightarrow \begin{cases} 3x < \frac{7}{2} \\ 3x > -\frac{3}{2} \end{cases} \Leftrightarrow \begin{cases} x < \frac{7}{6} \\ x > -\frac{1}{2} \end{cases} \Leftrightarrow -\frac{1}{2} < x < \frac{7}{6}$

$$4) a) (-3)^3 \mid 6x(-\frac{1}{2}) \mid = -9 \Leftrightarrow -27 \mid -3x \mid = -9$$

-3-



$$\Leftrightarrow \mid -3x \mid = \frac{1}{3} \Leftrightarrow -3x = \frac{1}{3} \quad \text{or} \quad -3x = -\frac{1}{3}$$

$$\Leftrightarrow x = -\frac{1}{9} \quad \text{or} \quad x = \frac{1}{9}$$

$$\text{oppure } \mid -3x \mid = \frac{1}{3} \Leftrightarrow \mid 3x \mid = \frac{1}{3} \Leftrightarrow 3 \mid x \mid = \frac{1}{3} \Leftrightarrow \mid x \mid = \frac{1}{9} \Leftrightarrow x = \pm \frac{1}{9}$$

$$\mid -a \mid = \mid a \mid \quad \mid ca \mid = \mid ca \mid$$

c > 0

b) poiché $\mid a \mid \leq 0 \Leftrightarrow a = 0$ la dis. è in realtà un'eq.

$$\mid (3x+5) \cdot (3x^3+x^2-2x) \cdot (x^2-\frac{9}{4}) \mid = 0 \Leftrightarrow (3x+5) \cdot (3x^3+x^2-2x) \cdot (x^2-\frac{9}{4}) = 0$$

$$\mid a \mid = 0 \Leftrightarrow a = 0$$

$$\text{eq. prodotto} \Leftrightarrow F_1 = 0 \quad \text{or} \quad F_2 = 0 \quad \text{or} \quad F_3 = 0$$

$$\Leftrightarrow x = -\frac{5}{3} \quad \text{or} \quad x \cdot (3x^2+x-2) = 0 \quad \text{or} \quad x = \pm \frac{3}{2}$$

$$(x+1)(3x-2)$$

$$\Leftrightarrow x = -\frac{5}{3} \quad \text{or} \quad (x=0 \quad \text{or} \quad x=-1 \quad \text{or} \quad x=\frac{2}{3}) \quad \text{or} \quad x = \pm \frac{3}{2}$$

$$S = \left\{ x = -\frac{5}{3}, x = 0, x = -1, x = \frac{2}{3}, x = \pm \frac{3}{2} \right\}$$

$$c) \mid 2x^2 - 5 \mid < 9x \Leftrightarrow \begin{cases} 2x^2 - 5 < 9x \\ 2x^2 - 5 > -9x \end{cases} \Leftrightarrow \begin{cases} 2x^2 - 9x - 5 < 0 \\ 2x^2 + 9x - 5 > 0 \end{cases}$$

$$\sigma = 0$$

$$\Leftrightarrow \begin{cases} -\frac{1}{2} < x < 5 \\ x < -5 \quad \text{or} \quad x > \frac{1}{2} \end{cases}$$

$$S = x \in]\frac{1}{2}, 5[$$

$$d) \left| -\frac{4x-8}{16} \right| \geq \frac{5}{4} \sqrt{\frac{1}{4}} = \frac{5}{8} \Leftrightarrow \mid 4x-8 \mid \geq 10 \Leftrightarrow 4x-8 \geq 10 \quad \text{or} \quad 4x-8 \leq -10$$

$$\Leftrightarrow 4x \geq 18 \quad \text{or} \quad 4x \leq -2$$

$$\Leftrightarrow x \geq \frac{9}{2} \quad \text{or} \quad x \leq -\frac{1}{2}$$

$$\Leftrightarrow x \leq -\frac{1}{2} \quad \text{or} \quad x \geq \frac{9}{2}$$