

1. Risolvi le seguenti disequazioni:

$$\frac{2-x}{3} - \frac{1}{2}x < \frac{x+1}{5}$$

$$\frac{1}{x-1} > \frac{2}{x^2-1}$$

$$x^3 - x^2 - 12x < 0$$

$$\frac{x+3}{x-3} + \frac{3x-1}{x} < \frac{(2x+1)(2x-1)}{x^2-3x}$$

2. Risolvi il seguente sistema di disequazioni:

$$\begin{cases} \frac{(2x-5)^2}{2} - \frac{(3x-5)^2}{3} \geq \frac{1}{6} \\ \frac{x}{x+1} < 1 \\ \frac{5x-1}{5} - \frac{x-5}{3} > \frac{3}{10} \end{cases}$$

3. Si vuole suddividere in due parti un segmento AB lungo 30 cm, prendendo un punto P su di esso in modo tale che il rapporto tra i due segmenti AP e PB sia minore di 5. Come si può scegliere il punto P ?

Soluzione

4. Risolvi le seguenti disequazioni:

$$\frac{2-x}{3} - \frac{1}{2}x < \frac{x+1}{5};$$

m.c.m. = 30.

$$10 \cdot (2-x) - 15x < 6(x+1);$$

$$20 - 10x - 15x < 6x + 6;$$

$$-10x - 15x - 6x < +6 - 20;$$

$$-31x < -14;$$

$$31x > 14;$$

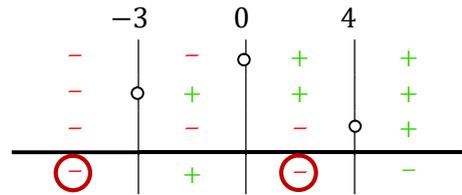
$$x > \frac{14}{31}.$$

$$x^3 - x^2 - 12x < 0;$$

$$x \cdot (x^2 - x - 12) < 0;$$

$$x \cdot (x+3) \cdot (x-4) < 0 \quad \left| \begin{array}{l} x > 0 \\ x+3 > 0 \\ x-4 > 0 \end{array} \right.$$

$$\left| \begin{array}{l} x > 0 \\ x > -3 \\ x > 4 \end{array} \right.$$



$$x < -3 \vee 0 < x < 4$$

$$\frac{1}{x-1} > \frac{2}{x^2-1}$$

C.E.: $x \neq \pm 1$; *m.c.m.* = $(x+1)(x-1)$

$$\frac{1}{x-1} - \frac{2}{(x+1)(x-1)} > 0;$$

$$\frac{x+1-2}{(x+1)(x-1)} > 0;$$

$$\frac{x-1}{(x+1)(x-1)} > 0;$$

$$\frac{1}{x+1} > 0;$$

$$x+1 > 0;$$

$$x > -1 \quad x \neq 1.$$

$$\frac{x+3}{x-3} + \frac{3x-1}{x} < \frac{(2x+1)(2x-1)}{x^2-3x};$$

C.E.: $x \neq 0 \wedge x \neq 3$ *m.c.m.* = $x(x-3)$

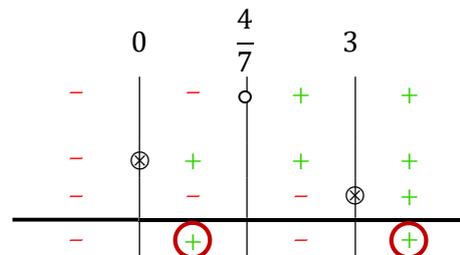
$$\frac{x+3}{x-3} + \frac{3x-1}{x} - \frac{4x^2-1}{x \cdot (x-3)} < 0;$$

$$\frac{x \cdot (x+3) + (x-3) \cdot (3x-1) - (4x^2-1)}{x \cdot (x-3)} < 0;$$

$$\frac{x^2 + 3x + 3x^2 - x - 9x + 3 - 4x^2 + 1}{x \cdot (x-3)} < 0;$$

$$\frac{-7x+4}{x \cdot (x-3)} < 0;$$

$$\frac{7x-4}{x \cdot (x-3)} > 0 \quad \left| \begin{array}{l} 7x-4 > 0 \\ x > 0 \\ x-3 > 0 \end{array} \right. \quad \left| \begin{array}{l} x > \frac{4}{7} \\ x > 0 \\ x > 3 \end{array} \right.$$



$$0 < x < \frac{4}{7} \vee x > 3$$

5. Risolvi il seguente sistema di disequazioni:

$$\begin{cases} \frac{(2x-5)^2}{2} - \frac{(3x-5)^2}{3} \geq \frac{1}{6} \\ \frac{x}{x+1} < 1 \\ \frac{5x-1}{5} - \frac{x-5}{3} > \frac{3}{10} \end{cases}$$

Risolvo

$$\frac{(2x-5)^2}{2} - \frac{(3x-5)^2}{3} \geq \frac{1}{6};$$

$$3 \cdot (4x^2 + 25 - 20x) - 2 \cdot (9x^2 + 25 - 30x) \geq 1;$$

$$-6x^2 + 24 \geq 0;$$

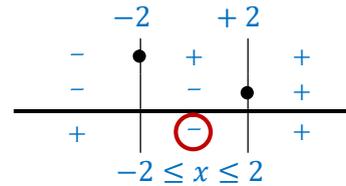
$$6x^2 - 24 \leq 0;$$

$$6(x+2)(x-2) \leq 0 \quad \left| \begin{array}{l} x+2 \geq 0 \\ x-2 \geq 0 \end{array} \right. \quad \left| \begin{array}{l} x \geq -2 \\ x \geq 2 \end{array} \right.$$

$$3 \cdot (2x-5)^2 - 2 \cdot (3x-5)^2 \geq 1;$$

$$12x^2 + 75 - 60x - 18x^2 - 50 + 60x - 1 \geq 0;$$

$$6(x^2 - 4) \leq 0;$$



Risolvo

$$\frac{x}{x+1} < 1;$$

$$C.E.: x \neq -1$$

$$\frac{x}{x+1} - 1 < 0;$$

$$\frac{x - (x+1)}{x+1} < 0;$$

$$\frac{x - x - 1}{x+1} < 0;$$

$$\frac{-1}{x+1} < 0;$$

$$\frac{1}{x+1} > 0;$$

$$x+1 > 0;$$

$$x > -1.$$

Risolvo

$$\frac{5x-1}{5} - \frac{x-5}{3} > \frac{3}{10};$$

$$6 \cdot (5x-1) - 10 \cdot (x-5) > 9;$$

$$30x - 6 - 10x + 50 > 9;$$

$$30x - 10x > 6 - 50 + 9;$$

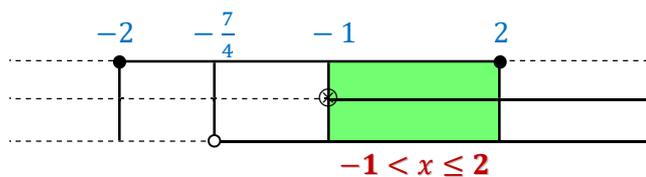
$$20x > -35;$$

$$x > -\frac{35}{20}$$

$$x > -\frac{7}{4}.$$

Ritornando al sistema si ottiene:

$$\begin{cases} -2 \leq x \leq 2 \\ x > -1 \\ x > -\frac{7}{4} \end{cases}$$



6. Si vuole suddividere in due parti un segmento AB lungo 30 cm, prendendo un punto P su di esso in modo tale che il rapporto tra i due segmenti AP e PB sia minore di 5. Come si può scegliere il punto P ?

Soluzione

Poniamo $\overline{AP} = x$, con $0 < x < 30$.

Di conseguenza si ha: $\overline{PB} = 30 - x$.

Il sistema che risolve il problema è quindi:
$$\begin{cases} \frac{x}{30-x} < 5 \\ 0 < x < 30 \end{cases}$$

Risolve

$$\frac{x}{30-x} < 5;$$

$$\frac{x - 150 + 5x}{30 - x} < 0;$$

$$\frac{x - 25}{30 - x} > 0$$

$$\frac{x}{30-x} - 5 < 0;$$

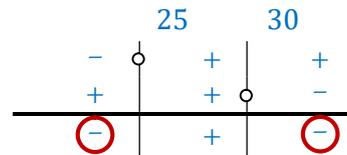
$$\frac{6x - 150}{30 - x} < 0;$$

$$\begin{array}{|l} x - 25 > 0 \\ 30 - x > 0 \end{array} \quad \begin{array}{|l} x > 25 \\ x < 30 \end{array}$$

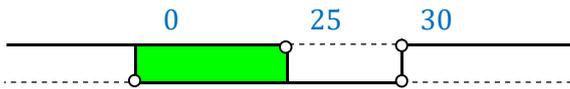


$$\frac{x - 5(30 - x)}{30 - x} < 0;$$

$$\frac{x - 25}{30 - x} < 0;$$



Ritornando al sistema si ottiene:
$$\begin{cases} x < 25 \vee x > 30 \\ 0 < x < 30 \end{cases}$$



Pertanto il punto P può essere scelto a una distanza da A compresa tra **0** e **25 cm**.