

Lezione 31
Equazioni frazionarie di 1° grado (Revisione)

$$\begin{aligned} \rightarrow a^2 - b^2 &= (a+b)(a-b) \\ \rightarrow (a-b)^2 &= a^2 - 2ab + b^2 \end{aligned}$$

$$\begin{aligned} \frac{5}{4x^2-4x+1} - \frac{1}{(2x+1)^2} - \frac{3}{(4x^2-1)^2} &= \frac{20x^2+27}{16x^4-8x^2+1} - \frac{1}{4x^2-1} \\ \frac{5}{(2x-1)^2} - \frac{1}{(2x+1)^2} - \frac{3}{[(2x+1)(2x-1)]^2} &= \frac{20x^2+27}{(4x^2-1)^2} - \frac{1}{(2x+1)(2x-1)} \\ \frac{5}{(2x-1)^2} - \frac{1}{(2x+1)^2} - \frac{3}{(2x+1)^2(2x-1)^2} &= \frac{20x^2+27}{[(2x-1)(2x+1)]^2} - \frac{1}{(2x+1)(2x-1)} \\ \frac{5}{(2x-1)^2} - \frac{1}{(2x+1)^2} - \frac{3}{(2x+1)^2(2x-1)^2} &= \frac{20x^2+27}{(2x-1)^2(2x+1)^2} - \frac{1}{(2x-1)(2x+1)} \\ \frac{5(2x+1)^2 - (2x-1)^2 - 3}{(2x-1)^2(2x+1)^2} &= \frac{20x^2+27 - (2x-1)(2x+1)}{(2x-1)^2(2x+1)^2} \end{aligned}$$

$$\begin{aligned} 5(2x+1)^2 - (2x-1)^2 - 3 &= 20x^2+27 - (2x-1)(2x+1) \\ 5(4x^2+1+4x) - (4x^2-4x-1) - 3 &= 20x^2+27 - (4x^2-1) \\ 20x^2+5+20x-4x^2-1+4x-3 &= 20x^2+27-4x^2+1 \end{aligned}$$

$$24x + 1 = 28$$

$$\begin{aligned} 24x &= 27 \\ \frac{24x}{24} &= \frac{27}{24} \\ x &= \frac{27}{24} \end{aligned}$$

$$\Rightarrow x = \frac{9}{8}$$

C.E.

$2x-1 \neq 0$
 $x \neq \frac{1}{2}$

$2x+1 \neq 0$
 $x \neq -\frac{1}{2}$

accettabile

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

$$\frac{x-2}{x+5} - \frac{3}{x-2} - 1 > 0$$

$$\frac{(x-2)(x-2) - 3(x+5) - (x+5)(x-2)}{(x+5)(x-2)} > 0$$

$$\frac{x^2 + 4 - 4x - 3x - 15 - (x^2 - 2x + 5x - 10)}{(x+5)(x-2)} > 0$$

$$\frac{x^2 + 4 - 4x - 3x - 15 - x^2 + 2x - 5x + 10}{(x+5)(x-2)} > 0$$

$$\frac{-10x - 1}{(x+5)(x-2)} > 0$$

MULTIPLICO PER -1

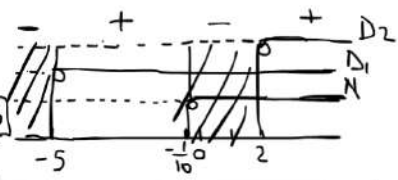
$$\frac{(10x+1)}{(x+5)(x-2)} < 0$$

N $10x+1 > 0$

$10x > -1$
 $x > -\frac{1}{10}$

D₁ $x+5 > 0 \Rightarrow x > -5$

D₂ $x-2 > 0 \Rightarrow x > 2$



$$x < -5 \vee -\frac{1}{10} < x < 2$$

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

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

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

$$\frac{1 - 4x + 3x^2 - 3(x^2 - 3x + 2x - 6)}{(x+2)(x-3)} < 0$$

$$\frac{1 - 4x + 3x^2 - 3x^2 + 9x - 6x + 18}{(x+2)(x-3)} < 0$$

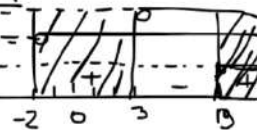
$$\frac{-x + 19}{(x+2)(x-3)} < 0$$

$$\frac{x - 19}{(x+2)(x-3)} > 0$$

$$N \quad x - 19 > 0 \Rightarrow x > 19$$

$$D_1 \quad x + 2 > 0 \Rightarrow x > -2$$

$$D_2 \quad x - 3 > 0 \Rightarrow x > 3$$



$$\boxed{-2 < x < 3 \vee x > 19}$$

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

$$\frac{x-1}{x} + \frac{x+1}{x-1} - \frac{3}{1} + \frac{2}{x(x-1)} < 0$$

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

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

$$\frac{-x^2 + 2x + 3}{x(x-1)} < 0 \quad \frac{x^2 - 2x - 3}{x(x-1)} > 0$$

$$\frac{(x+1)(x-3)}{x(x-1)} > 0$$

$$N_1 \quad x+1 > 0 \Rightarrow x > -1$$

$$N_2 \quad x-3 > 0 \Rightarrow x > 3$$

$$D_1 \quad x > 0$$

$$D_2 \quad x-1 > 0 \Rightarrow x > 1$$

$$\begin{aligned} x^2 - 2x - 3 &= \\ &= (x+2)(x-5) \\ &= (x+1)(x-3) \end{aligned}$$

$p = -3$
 $s = -2$
 $1 \cdot 3$



$$x < -1 \vee 0 < x < 1 \vee x > 3$$