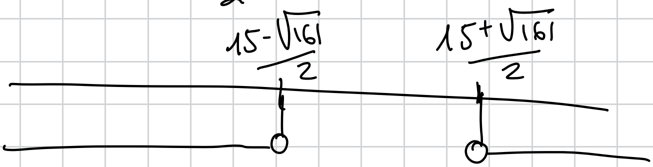
$x^2-15x+16>0$ $\quad a>0$

$$\left(-x^2-15x+16>0 \xrightarrow{a} x^2+15x-16<0\right)$$

$$\Delta = b^2-4ac = (-15)^2-4\cdot1\cdot16 = 161>0$$

$$x_{1,2} = -\frac{b\pm\sqrt{\Delta}}{2a} = \frac{15\pm\sqrt{161}}{2\cdot1} \begin{cases} \frac{15+\sqrt{161}}{2} \\ \frac{15-\sqrt{161}}{2} \end{cases}$$

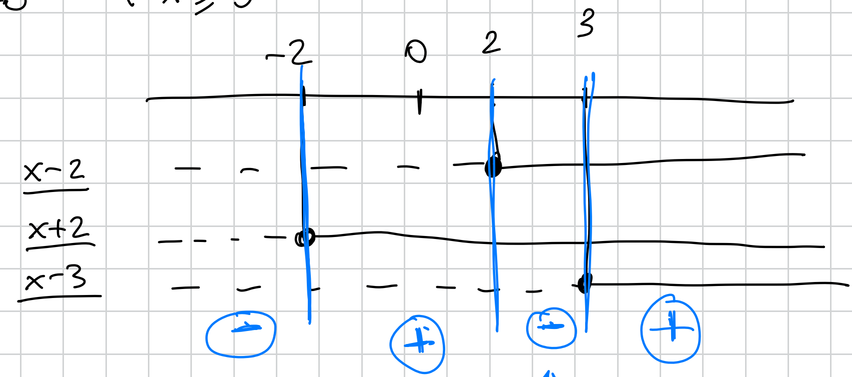
$$x<\frac{15-\sqrt{161}}{2}, \qquad x>\frac{15+\sqrt{161}}{2}$$



$(x-2)(x+2)(x-3) < 0$

Studiare il segno dei polinomi

$$\begin{cases} x-2 \geq 0 \\ x+2 \geq 0 \\ x-3 \geq 0 \end{cases} \qquad \begin{cases} x \geq 2 \\ x \geq -2 \\ x \geq 3 \end{cases}$$



$$\boxed{x < -2, \quad 2 < x < 3}$$

$|3x-7|<2$

$|A|<n \quad \begin{cases} A<n \\ A>-n \end{cases}$

$\begin{cases} 3x-7<2 \\ 3x-7>-2 \end{cases}$

$3x-7<2$

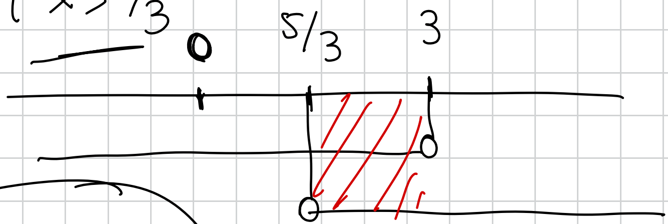
$-3x+7<2$

$+3x-7>-2$

$|x| \begin{cases} x, & x\geq 0 \\ -x, & x<0 \end{cases}$

$\begin{cases} 3x<9 \\ 3x>5 \end{cases}$

$\begin{cases} x<\frac{9}{3} \rightarrow x<3 \\ x>5/3 \end{cases}$

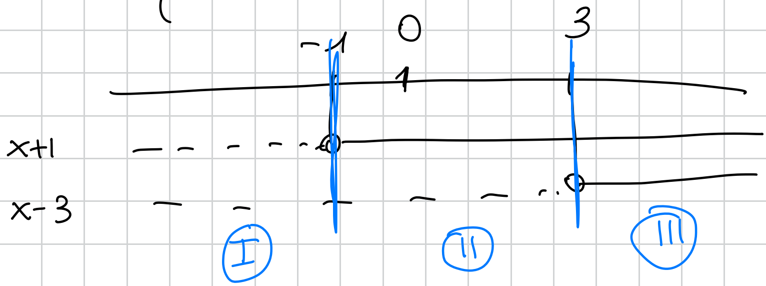


$5/3<x<3$

$|x+1| > |x-3|$ → Studio i segni dei valori assoluti

$$|x| \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$\begin{cases} x+1 > 0 \\ x-3 > 0 \end{cases} \rightarrow \begin{cases} x > -1 \\ x > 3 \end{cases}$$



I → $\underline{x < -1}$

$x+1 < 0 \longrightarrow |x+1| = -x-1$

$x-3 < 0 \longrightarrow |x-3| = -x+3$

$-x+1 > -x+3 \longrightarrow \boxed{\text{NO!}}$

II → $\underline{-1 < x < 3}$

$x+1 > 0 \rightarrow |x+1| = x+1$

$x-3 < 0 \rightarrow |x-3| = -x+3$

$x+1 > -x+3 \longrightarrow \boxed{x > 1}$

III → $\underline{x > 3}$

$x+1 > 0 \rightarrow |x+1| = x+1$

$x-3 > 0 \rightarrow |x-3| = x-3$

$x+1 > x-3 \longrightarrow \boxed{\text{NO!}}$

soluzione ⟶ $x > 1$

$$\left(\sqrt[3]{x^3+3x^2}\right) - x > 1$$

$$\sqrt[3]{x^3+3x^2} > 1 + x$$ → isolato la radice

$$\left(\cancel{\sqrt[3]{x^3+3x^2}}\right)^{\cancel{3}} > (1+x)^3$$

$$\cancel{x^3} + \cancel{3x^2} > 1 + 3x + \cancel{3x^2} + \cancel{x^3}$$

$$3x+1<0$$

$$3x < -1 \rightarrow x < -1/3$$

$$\left(3\sqrt{x-1}\right)+1>x$$

$$3\sqrt{x-1}>x-1 \rightarrow \sqrt{x-1}>\frac{x-1}{3}$$

$$x-1\geq 0$$
$$3\neq 0$$

$$\sqrt{A}>B \rightarrow \begin{cases}A\geq 0\\ B<0\end{cases} \cup \begin{cases}B\geq 0\\ A>B^2\end{cases}$$

$$\begin{cases}x-1\geq 0\\ \frac{x-1}{3}<0\end{cases} \cup \begin{cases}\frac{x-1}{3}\geq 0\\ x-1>\left(\frac{x-1}{3}\right)^2 \rightarrow \frac{(x-1)^2}{9}\end{cases}$$

$$\begin{cases}x\geq 1\\ x<1\end{cases} \cup \begin{cases}x\geq 1\\ x-1>\frac{x^2-2x+1}{9}\end{cases}$$

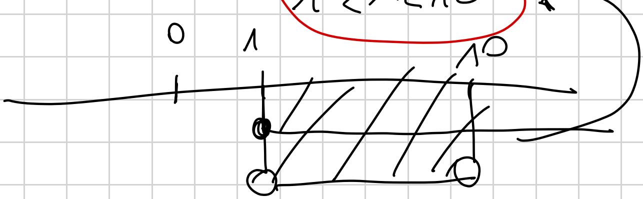
$$9x-9>x^2-2x+1$$
$$x^2-11x+10<0$$

$$\cancel{\begin{cases}x\geq 1\\ x<1\end{cases}} \cup \begin{cases}x\geq 1\\ x^2-11x+10<0\end{cases}$$

$$\Delta=b^2-4ac=(-11)^2-4\cdot 1\cdot 10=81>0$$

$$x_{1,2}=-\frac{b\pm\sqrt{\Delta}}{2a}=-\frac{-11\pm\sqrt{81}}{2}\quad\begin{matrix}10\\ 1\end{matrix}$$

$$1<x<10$$



$10^x > 25$

$\log_{10} 10^x > \log_{10} 25 \rightarrow x > \log_{10} 25$

$\left(\frac{1}{5}\right)^{\frac{x+4}{x}} > 25$

$0<a<1$

$\left(\frac{1}{5}\right)^{\frac{x+4}{x}} > 5^2 \rightarrow \left(\frac{1}{5}\right)^{-2}$

$a^x > a^4$

$x > 4$	$x < 4$
$a > 1$	$0 < a < 1$

← studio il segno

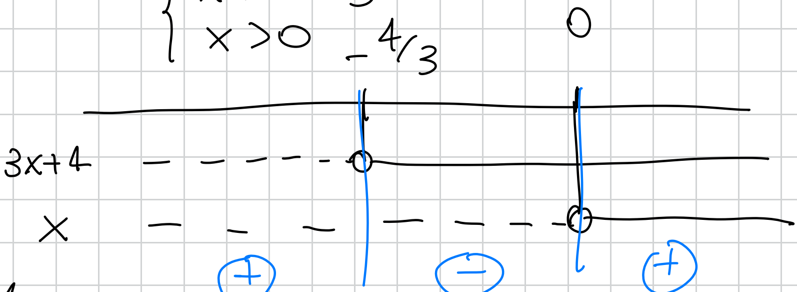
$\frac{x+4}{x} < -2$

$\frac{x+4}{x} + 2 < 0$

$\boxed{\frac{3x+4}{x} < 0}$

$$\begin{cases} 3x+4>0 \\ x>0 \end{cases}$$

$$\begin{cases} x>-4/3 \\ x>0 \end{cases}$$



$-\frac{4}{3} < x < 0$

$$\log_{10} x - 1 > \frac{2}{\log_{10} x}$$

$$\begin{cases} \log_{10} x \neq 0 \\ x > 0 \end{cases}$$

$x \neq 1, \ x > 0$

$$\log_{10} x - 1 - \frac{2}{\log_{10} x} > 0$$

$$\log_{10}^2 x - \log_{10} x - 2 > 0 \rightarrow t = \log_{10} x$$

$$t^2 - t - 2 > 0$$

$$\Delta = b^2 - 4ac = (-1)^2 - 4 \cdot 1(-2) = 9 > 0$$

$$t_{1,2} = -\frac{b \pm \sqrt{\Delta}}{2a} = -\frac{-1 \pm \sqrt{9}}{2} \begin{cases} -1 \\ 2 \end{cases}$$

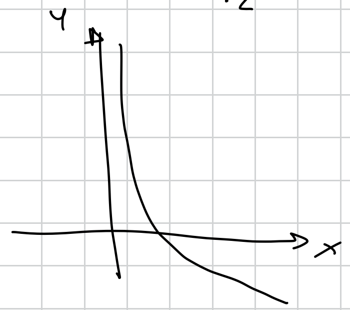
$t < -1, \ t > 2$

$\log_{10} x < -1, \ \log_{10} x > 2$

$\log_{10} x < \log_{10} 1/10, \ \log_{10} x > \log_{10} 100$

$x < \frac{1}{10}, \ x > 100$

$$\log_{1/2}(x^2+2) \le \log_{1/2}(x+1) + \log_{1/2}(x-2)$$



$\log_a$, $0<a<1$

$\forall x_1, x_2,\ x_1 < x_2$

$\Downarrow$

$f(x_1) > f(x_2)$

$$\log_{1/2}(x^2+2) \le \log_{1/2}(x+1)(x-2)$$

$$\begin{cases} x^2+2>0 \\ x+1>0 \\ x-2>0 \end{cases} \quad \begin{cases} x^2>-2,\ \forall x \\ x>-1 \\ x>2 \end{cases}$$

$\log_a b > \log_a c$

$a>1$
$b>c$

$0<a<1$
$b<c$

$$(x^2+2) \ge (x+1)(x-2)$$

$$\cancel{x^2}+2 \ge \cancel{x^2}-2x+x-2$$

$$\boxed{x \ge -4}$$