

$$y = \log_3 (3x^2 + 2x - 1)$$

$$3x^2 + 2x - 1 > 0$$

$$\Delta = 1 + 3 = 4 \quad x = \frac{-1 \pm 2}{3} \rightarrow \begin{cases} x < -1 \\ x > \frac{1}{3} \end{cases}$$

$$x < -1 \vee x > \frac{1}{3}$$

Eq. Logaritme

$$\log_2 \left(\frac{5}{4}x - 1 \right) = -2$$

Det. le condizioni di esistenza

$$\text{C.E. } \frac{5}{4}x - 1 > 0 ; \frac{5}{4}x > 1$$

$$x > \frac{4}{5}$$

$$\frac{5}{4}x - 1 = 2^{-2}$$

$$\frac{5}{4}x - 1 = \frac{1}{4} \quad ; \quad 5x = 1 + \frac{1}{4} \quad | \quad x = 1 \text{ acc.}$$

$$\log_{\frac{1}{2}}(x^2 - 8) + 3 = 0$$

$$\text{C.E. } x^2 - 8 > 0 \quad | \quad x < -2\sqrt{2} \vee x > 2\sqrt{2}$$

$$\log_{\frac{1}{2}}(x^2 - 8) = -3$$

$$x^2 - 8 = \left(\frac{1}{2}\right)^{-3}; \quad x^2 - 8 = 8. \quad x^2 = 16$$

$$x = \pm 4$$

acc.

$$\log_a A(x) = b$$

$$\text{C.E. } A(x) > 0$$

$$A(x) = a^b$$

$$\log_5 x + \log_5 3 = \log_5 6$$

C.E. $x > 0$

$$\log_5 3x = \log_5 6$$

$$3x = 6 \quad ; \quad x = 2 \text{ acc.}$$

$$\log(x-1) + \log(x-3) = \log 8$$

$$\begin{aligned} C.E. \quad & \left. \begin{array}{l} x-1 > 0 \\ x-3 > 0 \end{array} \right\} \begin{array}{l} x > 1 \\ x > 3 \end{array} \quad \underline{x > 3} \end{aligned}$$

$$\log(x-1)(x-3) = \log 8$$

$$x^2 - 4x + 3 = 8$$

$$x^2 - 4x - 5 = 0$$

$$(x-5)(x+1) = 0$$

$$x = -1 \quad ; \quad x = 5$$

non acc.

$$\log(2x^2 + 5x - 3) - \log(x+3) = \log(4-x)$$

C.E. $\begin{cases} 2x^2 + 5x - 3 > 0 \\ x > -3 \\ x < 4 \end{cases}$ $\Delta = 25 + 24 = 49$
 $x = \frac{-5 \pm 7}{4} \Rightarrow \frac{1}{2}, -3$

$$\begin{cases} x < -3 \vee x > \frac{1}{2} \\ x > -3 \\ x < 4 \end{cases}$$

A horizontal number line with tick marks at -3, $\frac{1}{2}$, and 4. There are three open circles on the line at these points. The regions to the left of -3 and to the right of $\frac{1}{2}$ are shaded with dots, indicating they satisfy the inequality $x < -3 \vee x > \frac{1}{2}$. The region between -3 and $\frac{1}{2}$ is unshaded, indicating it does not satisfy the inequality.

$$C.E. = (\frac{1}{2}, 4)$$

$$\log \frac{2x^2 + 5x - 3}{x+3} = \log(4-x)$$

$$\frac{2x^2 + 5x - 3}{x+3} = 4-x$$

$$\frac{2(x - \frac{1}{2})(x + 3)}{\cancel{x+3}} = 4-x$$

$$2x - 1 = 4 - x \quad | \quad 3x = 5 \quad | \quad x = \frac{5}{3}$$

acc.

$$2 \log_2^2 x - 9 \log_2 x + 4 = 0$$

C.E. $x > 0$

$$\log_2 x = t$$

$$2t^2 - 9t + 4 = 0$$

$$\Delta = 81 - 32 = 49$$

$$t_{1,2} = \frac{9 \pm 7}{4} \rightarrow \begin{cases} 4 \\ \frac{1}{2} \end{cases}$$

$$\log_2 x = 4 \Rightarrow x = 2^4 = 16$$

$$\log_2 x = \frac{1}{2} \Rightarrow x = 2^{\frac{1}{2}} = \sqrt{2}$$

$$(\log x)^2 = (\log x) \cdot (\log x)$$

$$-\log_{\frac{1}{3}} 6 + \log_3(x+1) = \log_3(5^x)$$

$$\text{C.E. } \begin{cases} x > -1 \\ x > 0 \end{cases} \Rightarrow x > 0$$

$$-\frac{\log_3 6}{\log_3 \frac{1}{3}} + \log_3(x+1) = \log_3(5^x)$$

$$\log_3 6 + \log_3(x+1) = \log_3(5^x)$$

$$\log_3 6(x+1) = \log_3(5^x)$$

$$6x+6 = 5x ; \quad x = -6$$

non acc.

$$S = \emptyset$$

$$\log_2 x \leq \log_2 (3x-1)$$

$$C.E \left\{ \begin{array}{l} x > 0 \\ 3x-1 > 0 \end{array} \right\} \left\{ \begin{array}{l} x > 0 \\ x > \frac{1}{3} \end{array} \right\} \Rightarrow x > \frac{1}{3}$$

$$x \leq 3x-1 ; 2x \geq 1 ; x \geq \frac{1}{2}$$

$$\left\{ \begin{array}{l} x > \frac{1}{3} \\ x \geq \frac{1}{2} \end{array} \right\} \Rightarrow x \geq \frac{1}{2}$$

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

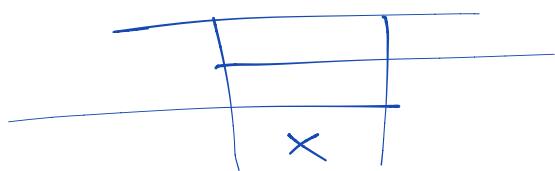
$$C.E. \quad \begin{cases} x > -3 \\ x > \frac{3}{2} \end{cases} \Rightarrow x > \frac{3}{2}$$

$$3+x > 2x-3$$

$$x < 6$$

$$\frac{3}{2} \qquad 6$$

$$\begin{cases} x > \frac{3}{2} \\ x < 6 \end{cases}$$



$$S = \left(\frac{3}{2}; 6\right)$$

$$3^x + 3^{x+1} + 3^{x+2} = 26$$

$$3^x(1+3+9) = 26$$

$$13 \cdot 3^x = 26$$

$$3^x = 2 \quad x = \log_3 2$$

$$3^{x+1} - 2 \cdot 3^x + 3^{x+2} = 5^{x-1}$$

$$3^x (3 - 2 + 9) = 5^{x-1}$$

$$10 \cdot 3^x = 5^{x-1}$$

$$2 \cdot 5 \cdot 3^x = 5^{x-1}$$

$$2 \cdot 3^x = 5^{x-2}$$

$$\log(2 \cdot 3^x) = \log(5^{x-2})$$

$$\log 2 + x \log 3 = (x-2) \log 5$$

$$\log 2 + \cancel{x \log 3} = \cancel{x \log 5} - 2 \log 5$$

$$x \log 3 - x \log 5 = -\log 2 - 2 \log 5$$

$$x(\log 3 - \log 5) = -2 \log 5 - \log 2$$

$$x = \frac{-2\log 5 - \log 2}{\log 3 - \log 5} =$$

$$= \frac{2\log 5 + \log 2}{\log 5 - \log 3} = \frac{\log 5^0}{\log 5^{1/3}}$$