

291

$$25\left(\frac{1}{5}\right)^x + 5 - 2\left(\frac{1}{5}\right)^{-x} \leq 0$$

$$[x \geq 1]$$

$$t = \left(\frac{1}{5}\right)^x \Rightarrow \left(\frac{1}{5}\right)^{-x} = t^{-1} = \frac{1}{t}$$

$$25t + 5 - \frac{2}{t} \leq 0$$

$$\frac{25t^2 + 5t - 2}{t} \leq 0$$

perché $t > 0$

$$25t^2 + 5t - 2 \leq 0$$

$$\Delta = 25 + 200 = 225 = 15^2$$

$$t = \frac{-5 \pm 15}{50} = \begin{cases} -\frac{20}{50} = -\frac{2}{5} \\ \frac{10}{50} = \frac{1}{5} \end{cases}$$

$$-\frac{2}{5} \leq t \leq \frac{1}{5}$$

$$\begin{cases} t \geq -\frac{2}{5} \\ t \leq \frac{1}{5} \end{cases} \Rightarrow \begin{cases} \left(\frac{1}{5}\right)^x \geq -\frac{2}{5} \Rightarrow \forall x \in \mathbb{R} \\ \left(\frac{1}{5}\right)^x \leq \frac{1}{5} \Rightarrow x \geq 1 \end{cases}$$

$$\Rightarrow \boxed{x \geq 1}$$

ALTERNATIVA

$$25\left(\frac{1}{5}\right)^x + 5 - 2\left(\frac{1}{5}\right)^{-x} \leq 0$$

$$25 \cdot \frac{1}{5^x} + 5 - 2 \cdot 5^x \leq 0$$

$$t = 5^x$$

$$\frac{25}{t} + 5 - 2t \leq 0 \quad \frac{25 + 5t - 2t^2}{t} \leq 0 \quad -2t^2 + 5t + 25 \leq 0$$

$$2t^2 - 5t - 25 \geq 0$$

$$\Delta = 25 + 200 = 225 \quad t = \frac{5 \pm 15}{4} = \begin{cases} -\frac{5}{2} \\ 5 \end{cases}$$

$$t \leq -\frac{5}{2} \quad \vee \quad t \geq 5$$

$$5^x \leq -\frac{5}{2} \quad \vee \quad 5^x \geq 5$$

IMPOSS. \emptyset

$$x \geq 1$$

$$\Rightarrow \boxed{x \geq 1}$$

N

306

$$\frac{5^x - 125}{(1 - 2^x)(3^x - 3)} \geq 0$$

$$[x < 0 \vee 1 < x \leq 3]$$

 D_1 D_2

$$N > 0 \quad 5^x - 125 > 0 \quad 5^x > 5^3 \quad x > 3$$

$$D_1 > 0 \quad 1 - 2^x > 0 \quad -2^x > -1 \quad 2^x < 1 \quad x < 0$$

$$D_2 > 0 \quad 3^x - 3 > 0 \quad 3^x > 3 \quad x > 1$$

		0	1	3	
N	-	-	-	0	+
D_1	+	+	-	-	-
D_2	-	-	+	+	+
	(+)	+	+	(+)	0
		-			-

$$x < 0 \vee 1 < x \leq 3$$

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

$$\left[x < -\frac{3}{2} \right]$$

$$2^{2x+4} \cdot 3^x \cdot 3^{x+3} < 2$$

$$2^{2x+4} \cdot 3^{2x+3} < 2$$

$$\frac{2^{2x+4}}{2} \cdot 3^{2x+3} < 1$$

$$2^{2x+3} \cdot 3^{2x+3} < 1$$

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

$$6^{2x+3} < 6^0 \Rightarrow 2x+3 < 0 \Rightarrow \boxed{x < -\frac{3}{2}}$$