

$$1. \quad 6^{x-3} = \frac{1}{6^{x+5}}$$

$$6^{x-3} = 6^{-x-5} \qquad x - 3 = -x - 5 \qquad x = -1$$

$$2. \quad 16^{\frac{3+x}{x-1}} = 2^{10x}$$

$$2^{4 \cdot \frac{3+x}{x-1}} = 2^{10x} \qquad 4 \cdot \frac{3+x}{x-1} = 10x \qquad \frac{3+x}{x-1} = \frac{5}{2}x$$

$$6 + 2x - 5x^2 + 5x = 0 \qquad c.a.: x \neq 1 \qquad 5x^2 - 7x - 6 = 0$$

$$x_{1,2} = \frac{7 \pm \sqrt{49 + 120}}{10} \left\langle \begin{array}{l} 2 \\ -\frac{3}{5} \end{array} \right. \qquad x = 2 \qquad x = -\frac{3}{5}$$

$$3. \quad 2^{2x+1} - 9 \cdot 2^x + 4 = 0$$

$$2 \cdot 2^{2x} - 9 \cdot 2^x + 4 = 0 \qquad \text{Pongo: } 2^x = t$$

$$2t^2 - 9t + 4 = 0 \qquad t_{1,2} = \frac{9 \pm \sqrt{81 - 32}}{4} \left\langle \begin{array}{l} 4 \\ \frac{1}{2} \end{array} \right.$$

$$2^x = 4 \quad \Rightarrow \quad x = 2 \qquad 2^x = \frac{1}{2} \quad \Rightarrow \quad x = -1$$

$$4. \quad 4^x - 5 \cdot 2^x + 4 > 0 \qquad \text{Pongo } 2^x = t$$

$$t^2 - 5t + 4 > 0 \qquad t_{1,2} = \frac{5 \pm \sqrt{25 - 16}}{2} \left\langle \begin{array}{l} 4 \\ 1 \end{array} \right.$$

$$t < 1 \vee t > 4 \qquad x < 0 \vee x > 2$$

$$5. \quad \frac{36 - 6^x}{2^x - 1} \geq 0$$

$$N \geq 0: \quad 36 - 6^x \geq 0 \quad 6^x \leq 36 \quad x \leq 2$$

$$D > 0: \quad 2^x - 1 > 0 \quad x > 0 \qquad 0 < x \leq 2$$

$$6. \quad \ln(5x + 2) = -1$$

$$c.a.: 5x + 2 > 0 \qquad x > -\frac{2}{5}$$

$$5x + 2 = e^{-1} \qquad x = \frac{1}{5e} - \frac{2}{5}$$

$$7. \log_3 27 - \log_2 8 + 3 \log_4 (x - 2) - 3 \log_4 (3x + 2) = 0$$

$$c.a.: \begin{cases} x - 2 > 0 \\ 3x + 2 > 0 \end{cases} \quad \begin{cases} x > 2 \\ x > -\frac{2}{3} \end{cases} \quad x > 2$$

$$3 - 3 + 3 \log_4 (x - 2) - 3 \log_4 (3x + 2) = 0$$

$$3 \log_4 (x - 2) = 3 \log_4 (3x + 2)$$

$$\log_4 (x - 2) = \log_4 (3x + 2)$$

$$-2x = 4$$

$$x - 2 = 3x + 2$$

$$x = -2$$

non accettabile

imp.

$$8. \log (2x - 1) + \log (5 - x) > \log (4x + 1)$$

$$\log (2x - 1)(5 - x) > \log (4x + 1)$$

$$\begin{cases} 4x + 1 > 0 \\ 2x - 1 > 0 \\ 5 - x > 0 \\ 10x - 2x^2 - 5 + x > 4x + 1 \end{cases} \quad \begin{cases} x > -\frac{1}{4} \\ x > \frac{1}{2} \\ x < 5 \\ 2x^2 - 7x + 6 < 0 \end{cases}$$

$$x_{1,2} = \frac{7 \pm \sqrt{49 - 48}}{4} \left\langle \begin{array}{l} 2 \\ \frac{3}{2} \end{array} \right.$$

$$\begin{cases} x > -\frac{1}{4} \\ x > \frac{1}{2} \\ x < 5 \\ \frac{3}{2} < x < 2 \end{cases}$$

$$\frac{3}{2} < x < 2$$

$$9. \log_{\frac{1}{3}} (x^2 + 3x) > \log_{\frac{1}{3}} 4$$

$$\begin{cases} x^2 + 3x > 0 \\ x^2 + 3x < 4 \end{cases}$$

$$\begin{cases} x < -3 \vee x > 0 \\ -4 < x < 1 \end{cases}$$

$$x_{1,2} = \frac{-3 \pm \sqrt{9 + 16}}{2} \left\langle \begin{array}{l} -4 \\ 1 \end{array} \right.$$

$$-4 < x < -3 \vee 0 < x < 1$$