

$$1. \quad 32^x + 2^{5x+1} + 5 \cdot 2^{5x-1} = 88$$

$$2^{5x} + 2 \cdot 2^{5x} + 5 \cdot \frac{2^{5x}}{2} = 88$$

$$2^{5x} + 2 \cdot 2^{5x} + \frac{5}{2} \cdot 2^{5x} = 88$$

$$2^{5x} \left(1 + 2 + \frac{5}{2} \right) = 88$$

$$2^{5x} \cdot \frac{11}{2} = 88$$

$$2^{5x} = 88 \cdot \frac{2}{11}$$

$$2^{5x} = 16$$

$$2^{5x} = 2^4$$

$$5x = 4$$

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

$$2. \quad 8^{2x} + 2^{3(x+1)} = 20$$

$$2^{6x} + 8 \cdot 2^{3x} - 20 = 0$$

$$\text{Pongo: } 2^{3x} = t$$

$$t^2 + 8t - 20 = 0$$

$$t_{1,2} = \frac{-4 \pm \sqrt{16 + 20}}{1} \begin{cases} 2 \\ -10 \end{cases}$$

$$t = 2 \Rightarrow 2^{3x} = 2 \Rightarrow 2^{3x} = 2^1 \Rightarrow 3x = 1 \Rightarrow$$

$$x = \frac{1}{3}$$

$$t = -10 \Rightarrow 2^{3x} = -10 \Rightarrow \text{imp.}$$

$$3. \quad 6^{3x-2} \geq \left(\frac{1}{7} \right)^{-3x+2}$$

$$6^{3x-2} \cdot \left(\frac{1}{7} \right)^{3x-2} \geq 1$$

$$\left(\frac{6}{7} \right)^{3x-2} \geq 1$$

$$\left(\frac{6}{7} \right)^{3x-2} \geq \left(\frac{6}{7} \right)^0$$

$$3x - 2 \leq 0$$

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

$$4. \quad 6^x > 7 \cdot 36^x + 6^{x+1}$$

$$6^x - 7 \cdot 6^{2x} - 6 \cdot 6^x > 0$$

$$-7 \cdot 6^{2x} - 5 \cdot 6^x > 0$$

$$7 \cdot 6^{2x} + 5 \cdot 6^x < 0$$

imp.

$$5. \quad \log_{3/4} (3x - 18) - \log_{3/4} (2x + 1) = \log_{3/4} (5 - x)$$

$$\text{c.a.: } \begin{cases} 3x - 18 > 0 \\ 2x + 1 > 0 \\ 5 - x > 0 \end{cases}$$

$$\begin{cases} x > 6 \\ x > -\frac{1}{2} \\ x < 5 \end{cases}$$

imp.

6. $\ln(14 + 2x) = 2 \ln(x + 3)$

$$c.a.: \begin{cases} 14 + 2x > 0 \\ x + 3 > 0 \end{cases} \quad \begin{cases} x > -7 \\ x > -3 \end{cases} \quad c.a.: x > -3$$

$$\ln(14 + 2x) = \ln(x + 3)^2 \quad 14 + 2x = (x + 3)^2$$

$$x^2 + 6x + 9 - 14 - 2x = 0 \quad x^2 + 4x - 5 = 0$$

$$x_{1,2} = \frac{-2 \pm \sqrt{4 + 5}}{1} \begin{cases} 1 \\ -5 \end{cases} \quad \text{non acc. per c.a.} \quad \boxed{x = 1}$$

7. $\log_3(3x - 1) - \log_3(x + 2) = 2$

$$c.a.: \begin{cases} 3x - 1 > 0 \\ x + 2 > 0 \end{cases} \quad \begin{cases} x > \frac{1}{3} \\ x > -2 \end{cases} \quad c.a.: x > \frac{1}{3}$$

$$\log_3(3x - 1) = \log_3(x + 2) + \log_3 9 \quad \log_3(3x - 1) = \log_3[9(x + 2)]$$

$$3x - 1 = 9(x + 2) \quad 3x - 1 = 9x + 18$$

$$-6x = 19 \quad x = -\frac{19}{6} \text{ non accettabile per c.a.} \Rightarrow \boxed{imp.}$$

8. $\ln x^6 - 5 > \ln x$

$$c.a.: x > 0 \quad 6 \ln x - 5 > \ln x$$

$$5 \ln x > 5 \quad \ln x > 1 \quad \boxed{x > e}$$

9. $\log_{\frac{5}{3}}(x^2 - 1) - \log_{\frac{5}{3}}(x - 2) > 1$

$$c.a.: \begin{cases} x^2 - 1 > 0 \\ x - 2 > 0 \end{cases} \quad \begin{cases} x < -1 \vee x > 1 \\ x > 2 \end{cases} \quad c.a.: x > 2$$

$$\log_{\frac{5}{3}}(x^2 - 1) > \log_{\frac{5}{3}}(x - 2) + \log_{\frac{5}{3}} \frac{5}{3} \quad \log_{\frac{5}{3}}(x^2 - 1) > \log_{\frac{5}{3}} \left[\frac{5}{3}(x - 2) \right]$$

$$x^2 - 1 > \frac{5}{3}(x - 2) \quad 3x^2 - 3 > 5(x - 2)$$

$$3x^2 - 5x + 7 > 0 \quad x_{1,2} = \frac{5 \pm \sqrt{25 - 84}}{6} \quad \Delta < 0 \Rightarrow \forall x \in R$$

$$\begin{cases} \forall x \in R \\ x > 2 \end{cases} \Rightarrow \boxed{x > 2}$$