

Risolvi le seguenti equazioni e disequazioni logaritmiche ed esponenziali:

1. $\sqrt[8]{3^{7x}} = 9^{x+1}$

$$3^{\frac{7x}{8}} = 3^{2(x+1)}$$

$$\frac{7x}{8} = 2x + 2$$

$$-\frac{9}{8}x = 2$$

$$x = -\frac{16}{9}$$

2. $\left(\frac{3}{7}\right)^{x+1} = \left(\frac{7}{3}\right)^{x+3}$

$$\left(\frac{3}{7}\right)^{x+1} = \left(\frac{3}{7}\right)^{-x-3}$$

$$x + 1 = -x - 3$$

$$x = -2$$

3. $(2^{-5+x})^{1-x} = 8$

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

$$(-5+x)(1-x) = 3$$

$$x^2 - 6x + 8 = 0$$

$$x_{1,2} = \frac{3 \pm \sqrt{9-8}}{1}$$

$$x_1 = 2 \quad \vee \quad x_2 = 4$$

4. $\frac{3^{x+1} \cdot 2^{2x+3}}{3^{-x-2}} = 1$

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

$$6^{2x+3} = 6^0$$

$$2x + 3 = 0$$

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

5. $25^x - 6 \cdot 5^x = -5$

Pongo: $5^x = t$

$$t^2 - 6t + 5 = 0$$

$$t_{1,2} = \frac{3 \pm \sqrt{9-5}}{1}$$

$$t_1 = 5$$

$$x_1 = 1$$

$$t_2 = 1$$

$$x_2 = 0$$

6. $2 \log x - \log(3x - 2) = 0$

$$C.E.: \begin{cases} x > 0 \\ 3x - 2 > 0 \end{cases} \quad x > \frac{2}{3}$$

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

$$x^2 = 3x - 2$$

$$x_{1,2} = \frac{-3 \pm \sqrt{9-8}}{2}$$

$$x_1 = -1 \quad \vee \quad x_2 = -2 \quad \text{entrambe non accettabili per c. e.} \quad \text{impossibile}$$

$$7. \frac{1}{2} \log_2 (x^2 - 4) = \frac{1}{2} + 2$$

$$\log_2 (x^2 - 4) = 5$$

$$x^2 - 4 = 32$$

$$x^2 = 36$$

$$x = \pm 6 \text{ acc.}$$

$$8. \frac{5^{3x-4}}{125^{1-x}} < \frac{1}{5^{x^2}}$$

$$\frac{5^{3x-4}}{5^{3(1-x)}} < 5^{-x^2}$$

$$5^{3x-4-3+3x} < 5^{-x^2}$$

$$6x - 7 < -x^2$$

$$x^2 + 6x - 7 < 0$$

$$x_{1,2} = \frac{-3 \pm \sqrt{9+7}}{1}$$

$$-7 < x < 1$$

$$9. \log_{\frac{1}{3}} (x+1) \geq -1$$

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

$$-1 < x \leq 2$$

$$10. \log_{\frac{2}{3}} (x+3) > \log_{\frac{2}{3}} 4 - \log_{\frac{2}{3}} x$$

$$C.E.: \begin{cases} x+3 > 0 \\ x > 0 \end{cases} \quad x > 0$$

$$\log_{\frac{2}{3}} (x+3) + \log_{\frac{2}{3}} x > \log_{\frac{2}{3}} 4$$

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

$$x^2 + 3x < 4$$

$$x_{1,2} = \frac{-3 \pm \sqrt{9+16}}{2}$$

$$-4 < x < 1$$

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

$$0 < x < 1$$

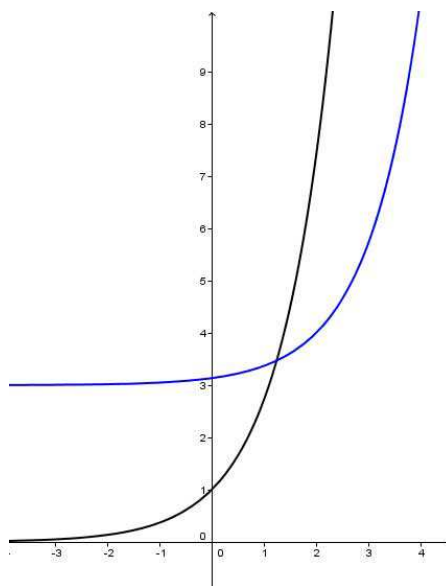
Traccia il grafico delle seguenti funzioni:

11. $y = e^{x-2} + 3$

$y = e^x$

Traslazione di vettore $\vec{v} (2; 3)$

$y = e^{x-2} + 3$



12. $y = \ln(x + 1)$

$y = \ln x$

Traslazione di vettore $\vec{v} (-1; 0)$

$y = \ln(x + 1)$

