

EQUAZIONI ESPONENZIALI

136 $3^{x+1} = 27$

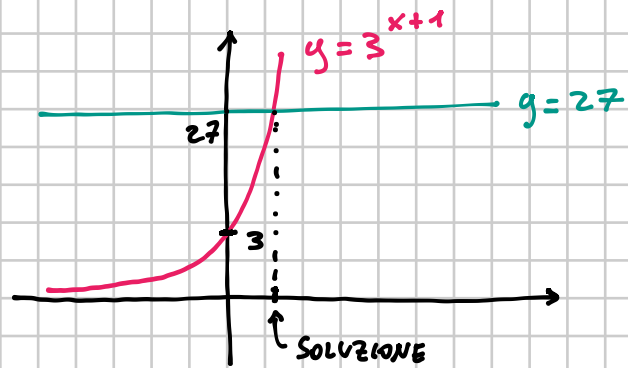
[2]

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

$$x+1 = 3$$

$$\boxed{x = 2}$$

LEGITO
PERCHÉ
 $y = 3^x$ È
INIETTIVA



143 $5^x = \frac{1}{25} \cdot \sqrt{5}$

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

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

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

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

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

157 $9^{x+2} = \sqrt[3]{3^{x+7}}$

[-1]

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

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

$$2x+4 = \frac{x+7}{3}$$

$$6x+12 = x+7$$

$$5x = -5$$

$$\boxed{x = -1}$$

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$$3 \cdot 5^x + 5^{x+1} = 8 \cdot 5^3$$

[3]

$$3 \cdot 5^x + 5^x \cdot 5^1 = 8 \cdot 5^3$$

$$5^x (3 + 5) = 8 \cdot 5^3$$

$$5^x \cdot \cancel{8} = \cancel{8} \cdot 5^3$$

$$5^x = 5^3 \Rightarrow \boxed{x = 3}$$

$$a^m \cdot a^m = a^{m+m}$$

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$$\frac{2^x \cdot 2^{x+1} \cdot 2^{x+2}}{8 \cdot 2^{x+3}} = \sqrt[5]{4} \cdot \sqrt[3]{2}$$

$$\left[\frac{28}{15} \right]$$

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

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

$$2^{3x-x-3} = 2^{\frac{6+5}{15}}$$

$$2x-3 = \frac{11}{15}$$

$$2x = \frac{11}{15} + 3$$

$$2x = \frac{56}{15}$$

$$\boxed{x = \frac{28}{15}}$$

184 $7^{x+1} = 3^{x+1}$

[-1]

$$\frac{7^{x+1}}{3^{x+1}} = 1$$

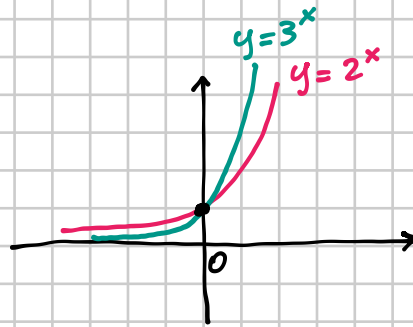
$$\left(\frac{7}{3}\right)^{x+1} = \left(\frac{7}{3}\right)^0 \Rightarrow x+1=0$$

$$\boxed{x = -1}$$

OSSERVAZIONE

$$a^x = b^x \text{ se } x=0$$

$$(a, b > 0)$$



185 $21 \cdot 3^x - 2^{x+3} = 3^{x+1}$

[-2]

$$7 \cdot 3 \cdot 3^x - 3^{x+1} = 2^{x+3}$$

$$7 \cdot 3^{x+1} - 3^{x+1} = 2^{x+3}$$

$$3^{x+1} \cdot (7-1) = 2^{x+3}$$

$$6 \cdot 3^{x+1} = 2^{x+3}$$

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

$$3^{x+2} = 2^{x+2} \Rightarrow x+2=0$$

$$\boxed{x = -2}$$

$$2^{x+2} - 4 \cdot 5^{x+2} = 25 \cdot 5^x - 4 \cdot 2^x$$

[-3]

$$2^{x+2} + 4 \cdot 2^x = 25 \cdot 5^x + 4 \cdot 5^{x+2}$$

$$2^x \cdot 2^2 + 4 \cdot 2^x = 25 \cdot 5^x + 4 \cdot 5^x \cdot 5^2$$

$$2^x (2^2 + 4) = 5^x (25 + 4 \cdot 5^2)$$

$$2^x \cdot 8 = 5^x \cdot 125$$

$$2^x \cdot 2^3 = 5^x \cdot 5^3$$

$$2^{x+3} = 5^{x+3} \Rightarrow x+3=0$$

$$x = -3$$

ATTENZIONE

$$2^{x+1} = 0$$

IMPOSSIBILE!

$$2^x > 0 \quad \forall x \in \mathbb{R}$$

$$3^{x-2} = -3$$

IMPOSSIBILE!

$$3^x > 0 \quad \forall x \in \mathbb{R}$$

$$2^{2x} - 2^{x+1} - 8 = 0$$

$$(2^x)^2 - 2^x \cdot 2 - 8 = 0$$

$$2^x = t$$

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

$$(t-4)(t+2) = 0$$

$$\begin{array}{l} \nearrow t = 4 \Rightarrow 2^x = 4 \quad 2^x = 2^2 \\ \searrow t = -2 \Rightarrow 2^x = -2 \text{ IMP.} \end{array}$$

$$\boxed{x = 2}$$

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

$$3^x = t$$

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

$$\text{C.E. } t \neq 1 \quad t \neq 5$$

$$2(t-5) = t-1$$

$$2t - 10 = t - 1$$

$$t = 9$$

$$3^x = 9$$

$$3^x = 3^2$$

$$\boxed{x = 2}$$