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$$3^{x+2} = 2^{2x+4}$$

$$3^x \cdot 3^2 = 2^{2x} \cdot 2^4$$

$$\frac{3^x}{2^{2x}} = \frac{2^4}{3^2} \leftarrow 2^4 = (2^2)^2$$

$$\frac{3^x}{4^x} = \frac{4^2}{3^2}$$

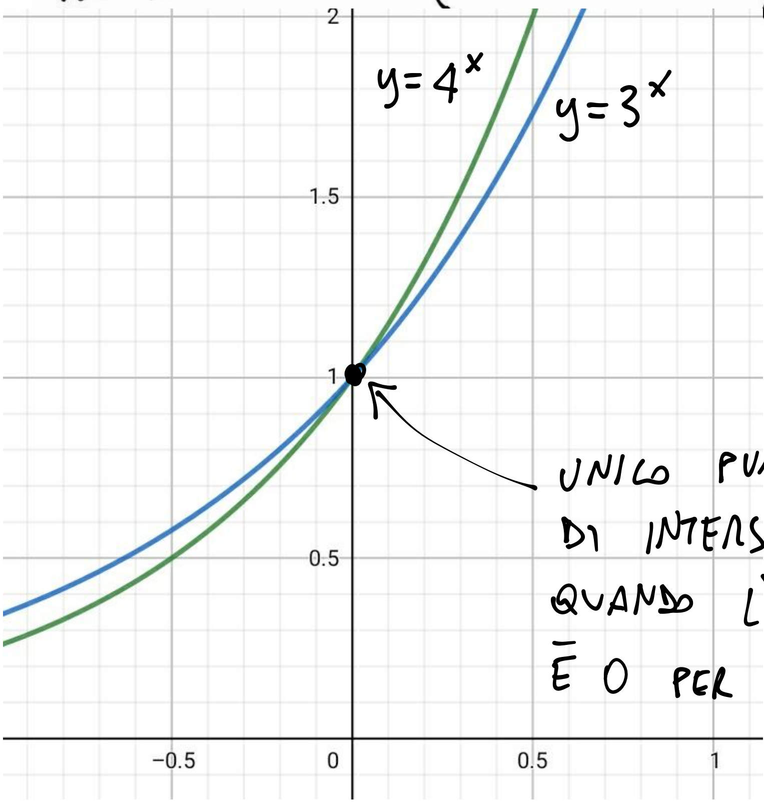
$$\left(\frac{3}{4}\right)^x = \left(\frac{3}{4}\right)^{-2} \Rightarrow \boxed{x = -2}$$

MODO ALTERNATIVO

$$3^{x+2} = 2^{2x+4} \Rightarrow 3^{x+2} = 2^{2(x+2)}$$

$$\Rightarrow 3^{x+2} = 4^{x+2}$$

I grafici delle funzioni $y = 3^x$ e $y = 4^x$ si intersecano (cioè sono "uguali") solo per $x = 0$



UNICO PUNTO DI INTERSEZIONE, QUANDO L'ESPONENTE È 0 PER ENTRAMBI

$$x + 2 = 0$$

$$\Downarrow$$

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

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$$16^x - 3\cdot 2^{2x+1} + 8 = 0$$

$$16 = 4^2$$

$$2^{2x} = (2^2)^x = 4^x$$

$$4^x = t$$

$$4^{2x} - 3\cdot 2^{2x}\cdot 2^1 + 8 = 0$$

$$(4^x)^2 - 6\cdot 4^x + 8 = 0$$

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

$$(t-4)(t-2) = 0 \quad \nearrow t = 4 \quad \searrow t = 2$$

$$t = 4 \Rightarrow 4^x = 4 \Rightarrow x = 1$$

$$t = 2 \Rightarrow 4^x = 2 \Rightarrow 4^x = 4^{\frac{1}{2}} \Rightarrow x = \frac{1}{2}$$

$$\boxed{x = 1 \ \vee \ x = \frac{1}{2}}$$

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$$\frac{\sqrt{3^x}}{\sqrt{3^{x+1}}\cdot 9^{x+2}} = \frac{1}{9}$$

$$\frac{\sqrt{3^x}}{\underbrace{\sqrt{3^x\cdot 3}}_{\sqrt{3^{x+1}}}\cdot 3^{2(x+2)}} = \frac{1}{9} \rightsquigarrow \frac{3^{\frac{x}{2}}}{3^{\frac{x+1}{2}}\cdot 3^{2x+4}} = \frac{1}{9}$$

$$\frac{3^{\frac{x}{2}}}{3^{\frac{x+1}{2}} \cdot 3^{2x+4}} = \frac{1}{9}$$

$$3^{\frac{x}{2} - \frac{x+1}{2} - (2x+4)} = 3^{-2}$$

$$a^x \cdot a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

$$\frac{a^x}{a^y \cdot a^z} = a^{x-y-z}$$

$$\frac{x}{2} - \frac{x+1}{2} - (2x+4) = -2$$

$$\frac{\cancel{x} - \cancel{x} - 1 - 2(2x+4)}{\cancel{2}} = \frac{-4}{\cancel{2}}$$

$$-1 - 4x - 8 = -4$$

$$-4x = 5$$

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

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$$\frac{5^{x+2}\cdot 25^{1-x}}{125^{x}}=\frac{1}{5}$$

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

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

$$x+2+2-2x-3x=-1$$

$$-4x=-5$$

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

n° 119

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

$3\sqrt{2^x \cdot 2^2} = 2^x + 2^x \cdot 2^{-1}$ $\quad t = 2^x$

$3\sqrt{t \cdot 2^2} = t + t \cdot 2^{-1}$

$6\sqrt{t} = t + \frac{1}{2}t$

$2 \cdot 6\sqrt{t} = \frac{3}{\cancel{2}}t \cdot \cancel{2}$

$12\sqrt{t} = 3t$

$4\sqrt{t} = t$ ELEVO AL QUADRATO

$16t = t^2$

$t^2 - 16t = 0$

$t(t-16) = 0$

$t = 0$ N.A. PERCHÈ $t = 2^x > 0$

$t = 16$ $\quad 2^x = 16$

$2^x = 2^4 \longrightarrow \boxed{x = 4}$

n° 127

$$\begin{cases} 2x+y=3 \\ 2^{x-y}=64 \end{cases} \quad \begin{cases} y=-2x+3 \\ 2^{x-(-2x+3)}=2^{6} \end{cases} \quad \begin{cases} y=-2x+3 \\ x+2x-3=6 \end{cases} \quad \begin{cases} — \\ 3x=9 \end{cases}$$

$$\begin{cases} — \\ x=3 \end{cases} \quad \begin{cases} y=-6+3 \\ — \end{cases} \quad \begin{cases} y=-3 \\ x=3 \end{cases} \quad (3,-3)$$