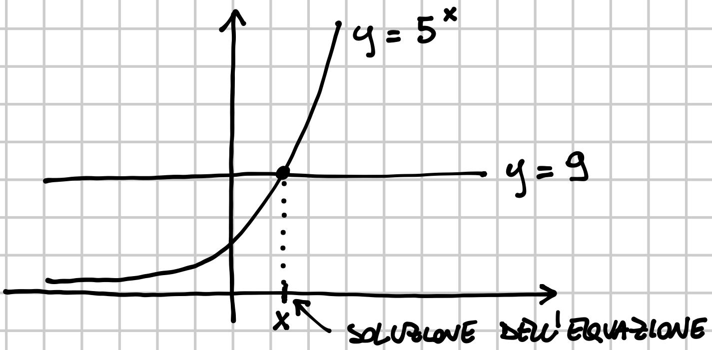
551 $5^x = 9$

$$x = \log_5 9 = \frac{\log 9}{\log 5}$$



556 $3 \cdot 2^x + 2^{x+1} = 19$ $\left[\frac{\log 19 - \log 5}{\log 2}\right]$

$$3 \cdot 2^x + 2 \cdot 2^x = 19$$

$$5 \cdot 2^x = 19$$

$$2^x = \frac{19}{5} \qquad x = \log_2 \frac{19}{5} = \frac{\log \frac{19}{5}}{\log 2} = \frac{\log 19 - \log 5}{\log 2}$$

596 $3^{x+1} - 2\cdot 3^{x} + 3^{x+2} = 5^{x-1}$ $\left[\dfrac{2\log 5 + \log 2}{\log 5 - \log 3}\right]$

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

$$3^x (3 - 2 + 9) = \frac{1}{5} \cdot 5^x$$

$$10 \cdot 3^x = \frac{1}{5} \cdot 5^x \quad \Rightarrow \quad \frac{3^x}{5^x} = \frac{1}{50} \qquad \left(\frac{3}{5}\right)^x = \frac{1}{50}$$

$$x = \log_{\frac{3}{5}} \frac{1}{50} = \frac{\log \frac{1}{50}}{\log \frac{3}{5}} = \frac{\overbrace{\log 1}^{0} - \log 50}{\log 3 - \log 5} = \frac{-\log 2 \cdot 5^2}{\log 3 - \log 5} =$$

$$= \frac{\log 2 + \log 5^2}{\log 5 - \log 3} = \frac{\log 2 + 2 \log 5}{\log 5 - \log 3}$$

604 $\dfrac{2}{25^x-1}+\dfrac{3}{4}=\dfrac{2}{5^x-1}$ $[\log_5 3]$

$(5^x)^2-1$

C.E. $5^x \neq 1 \Rightarrow x \neq 0$

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

$5^x=t$

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

$$\frac{8+3(t-1)(t+1)}{4\cancel{(t-1)}(t+1)}=\frac{8(t+1)}{4\cancel{(t-1)}(t+1)}$$

$\frac{\Delta}{4}=16+9=25$

$\cancel{8}+3t^2-3=8t+\cancel{8}$ $3t^2-8t-3=0$

$t=\dfrac{4\pm5}{3}=\begin{cases}-\dfrac{1}{3}\\ 3\end{cases}$

$5^x=-\dfrac{1}{3}$

IMPOSSIBILE

$5^x=3$

$\Downarrow$

$$\boxed{x=\log_5 3}$$

605 $4^x + 10^x = 25^x$ $\qquad\left[\log_{\frac{2}{5}} \frac{\sqrt{5}-1}{2}\right]$

$$(2^x)^2 + 2^x \cdot 5^x = (5^x)^2 \qquad \frac{(2^x)^2}{(5^x)^2} + \frac{2^x \cdot \cancel{5^x}}{(5^x)^{\cancel{2}}} = 1$$

DIVIDO ENTRAMBI I MEMBRI PER $(5^x)^2$

$$\left(\frac{2^x}{5^x}\right)^2 + \frac{2^x}{5^x} - 1 = 0 \qquad \left[\left(\frac{2}{5}\right)^x\right]^2 + \left(\frac{2}{5}\right)^x - 1 = 0 \qquad t = \left(\frac{2}{5}\right)^x$$

$$t^2 + t - 1 = 0$$

$$t = \frac{-1 \pm \sqrt{5}}{2} = \begin{cases} \frac{-1-\sqrt{5}}{2} \\ \frac{\sqrt{5}-1}{2} \end{cases}$$

$\frac{-1-\sqrt{5}}{2}$ NON ACC. (perché negativo)

$$\left(\frac{2}{5}\right)^x = \frac{\sqrt{5}-1}{2} \qquad \boxed{x = \log_{\frac{2}{5}} \frac{\sqrt{5}-1}{2}}$$

628 $\sqrt{5^{x-1}} < 9 \cdot 3^{2x}$ $\qquad\left[x > \frac{\log 5 + 4\log 3}{\log 5 - 4\log 3}\right]$

$$5^{\frac{x-1}{2}} < 9 \cdot 3^{2x}$$

$$5^{\frac{x}{2}} \cdot 5^{-\frac{1}{2}} < 9 \cdot (3^2)^x$$

$$\left(5^{\frac{1}{2}}\right)^x \cdot 5^{-\frac{1}{2}} < 9 \cdot (3^2)^x$$

$$\left(\frac{\sqrt{5}}{3^2}\right)^x < 9 \cdot 5^{\frac{1}{2}}$$

$$\left(\frac{\sqrt{5}}{9}\right)^x < 9\sqrt{5}$$

applico il $\log_{\frac{\sqrt{5}}{9}}$ e inverto la dis. perché $\frac{\sqrt{5}}{9} < 1$

$$x > \log_{\frac{\sqrt{5}}{9}} 9\sqrt{5} =$$

$$= \frac{\log 9\sqrt{5}}{\log \frac{\sqrt{5}}{9}} = \frac{\log 9 + \log\sqrt{5}}{\log\sqrt{5} - \log 9} =$$

$$= \frac{2\log 3 + \frac{1}{2}\log 5}{\frac{1}{2}\log 5 - 2\log 3} = \frac{4\log 3 + \log 5}{\log 5 - 4\log 3}$$

$$\boxed{x > \frac{4\log 3 + \log 5}{\log 5 - 4\log 3}}$$