

EXPONENCIALES

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

Solución

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

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

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

$$x+3+2x = 3x+x-1 \rightarrow 3x+3 = 4x-1 \rightarrow +x = +4$$

$$\boxed{x=4}$$

② $5^{x+1} \cdot 25^x \cdot \sqrt{5^x} = \left(\frac{1}{5}\right)^x$

Solución

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

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

$$x+1+2x+\frac{x}{2} = -x \rightarrow 2x+2+4x+x = -2x \rightarrow 9x = -2 \rightarrow \boxed{x = \frac{-2}{9}}$$

③ $3^{x+1} \cdot \frac{9^x}{3} = \sqrt[3]{3^x} \cdot 9^{x-1}$

Solución

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

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

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

$$x+1+2x-1 = \frac{x}{3}+2x-2 \rightarrow 3x+\cancel{3}+6x-\cancel{3} = x+6x-6 \rightarrow$$

$$\rightarrow 3x+6x-6x = x = -6 \rightarrow 2x = -6 \rightarrow \boxed{x = -3}$$

④ $\begin{cases} 2^{x+1} \cdot \sqrt{2^y} = 8 \\ 3^{x+2} \cdot 9^{y+1} = 27 \end{cases}$

Solución

$$2^{x+1} \cdot 2^{\frac{y}{2}} = 2^3 \quad \left| \quad 2^{x+1+\frac{y}{2}} = 2^3 \right.$$

$$3^{x+2} \cdot (3^2)^{y+1} = 3^3 \quad \left| \quad 3^{x+2+2y+2} = 3^3 \right.$$

$$2x+2+y = 6$$

$$x+2y = -1$$

$$\begin{cases} x+y = 4 \\ -x-2y = 1 \end{cases}$$

$$\hline -y = 5 \rightarrow \boxed{y = -5}$$

$$\left| \begin{cases} x+1+\frac{y}{2} = 3 \\ x+2+2y+2 = 3 \end{cases} \right.$$

$$\left| \begin{cases} x+1+\frac{y}{2} = 3 \\ x+2+2y+2 = 3 \end{cases} \right.$$

$$x+y = 4$$

$$x-5 = 4$$

$$\boxed{x=9}$$

$$\textcircled{5} \quad 3^{2x+2} \cdot 6^x = 9^{x-1} \cdot 2^x$$

Solucian

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

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

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

$$2x+2+x = 2x-2 \rightarrow 2x+x-2x = -2-2 \rightarrow \boxed{x = -4}$$

$$\textcircled{6} \quad 5^{x+2} \cdot \sqrt[3]{5^{x-1}} \cdot 25^x = 1$$

Solucian

$$5^{x+2} \cdot 5^{\frac{x-1}{3}} = 5^{2x} = 5^0$$

$$5^0 = 1$$

$$5^{x+2 + \frac{x-1}{3} + 2x} = 5^0$$

$$x+2 + \frac{x-1}{3} + 2x = 0 \rightarrow 3x+6 + x-1 + 6x = 0$$

$$\rightarrow 10x = -5 \rightarrow x = -\frac{5}{10} \rightarrow \boxed{x = -\frac{1}{2}}$$

$$\textcircled{7} \quad \begin{cases} 2^{x+y} \cdot \sqrt[3]{4^y} = 1 \\ \frac{3^x}{9} \cdot \sqrt{3^{y+1}} = 27 \end{cases}$$

$$2^0 = 1$$

Solucian

$$\begin{cases} 2^{x+y} \cdot (2^{2y})^{\frac{1}{3}} = 2^0 \\ \frac{3^x}{3^2} \cdot 3^{\frac{y+1}{2}} = 3^3 \end{cases} \quad \left| \quad \begin{cases} 2^{x+y} \cdot 2^{\frac{2y}{3}} = 2^0 \\ 3^{x-2} \cdot 3^{\frac{y+1}{2}} = 3^3 \end{cases} \right.$$

$$\begin{cases} 2^{x+y + \frac{2y}{3}} = 2^0 \\ 3^{x-2} \cdot 3^{\frac{y+1}{2}} = 3^3 \end{cases} \quad \left| \quad \begin{cases} x+y + \frac{2y}{3} = 0 \\ x-2 + \frac{y+1}{2} = 3 \end{cases} \right.$$

$$3x+3y+2y=0 \quad \left| \quad 3x+5y=0 \quad \left| \quad \begin{cases} -3x-5y=0 \\ 10x+5y=45 \end{cases} \right. \right.$$

$$2x-4+y+1=6 \quad \left| \quad 2x+y=9 \quad \left| \quad \begin{array}{l} 7x=45 \\ \boxed{x = \frac{45}{7}} \end{array} \right. \right.$$

$$2x+y=9 \rightarrow \frac{90}{7} + y = 9 \rightarrow y = 9 - \frac{90}{7} = \frac{-21}{7}$$

$$\boxed{y = -\frac{21}{7}}$$