

# Ecuaciones Exponenciales

## Trabajemos en Clase

10)  $8^{4x-3} = 16^{2x-\frac{1}{4}}$

Solución

$$\begin{array}{r|l} 8 & 2 \\ 4 & 2 \\ 2 & 2 \\ 1 & 1 \end{array} \left. \vphantom{\begin{array}{r|l} 8 \\ 4 \\ 2 \\ 1 \end{array}} \right\} 2^3$$

$$\begin{array}{r|l} 16 & 2 \\ 8 & 2 \\ 4 & 2 \\ 2 & 2 \\ 1 & 1 \end{array} \left. \vphantom{\begin{array}{r|l} 16 \\ 8 \\ 4 \\ 2 \\ 1 \end{array}} \right\} 2^4$$

Reemplazando:

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

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

$$2^{12x-9} = 2^{8x-1}$$

$$\hookrightarrow 12x-9 = 8x-1$$

$$12x-8x = -1+9$$

$$4x = +8$$

$$x = \frac{8}{4}$$

$$\underline{x=2}$$

11)  $3^{4^x} = 81^{16}$

Solución

$$\begin{array}{r|l} 81 & 3 \\ 27 & 3 \\ 9 & 3 \\ 3 & 3 \\ 1 & 1 \end{array} \left. \vphantom{\begin{array}{r|l} 81 \\ 27 \\ 9 \\ 3 \\ 1 \end{array}} \right\} 3^4$$

Reemplazando:

$$3^{4^x} = (3^4)^{16}$$

$$3^{4^x} = 3^{4 \times 16}$$

$$16 = 4^2$$

Reemplazando:

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

$$3^{4^x} = 3^{4^{1+2}}$$

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

$$\hookrightarrow \underline{x=3}$$

12)  $27^9 = 3^{x+2}$

Solución

$$\begin{array}{r} 27 \overline{) 3} \\ 9 \overline{) 3} \\ 3 \overline{) 3} \\ 1 \end{array} \left. \vphantom{\begin{array}{r} 27 \\ 9 \\ 3 \\ 1 \end{array}} \right\} 3$$

Reemplazando:

$$(3^3)^9 = 3^{x+2}$$

$$3^{3 \times 9} = 3^{x+2}$$

$$3^{27} = 3^{x+2}$$

$$\begin{array}{c|c} 9 & 3 \} 3^2 \\ 3 & 3 \} 3^2 \\ 1 & \end{array}$$

Reemplazando:

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

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

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

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

$$3^{1 \times 2x+4} = 3^{x+7}$$

$$3^{2x+4} = 3^{x+7}$$

$$3^{1+2x+4} = 3^{x+7}$$

$$3^{2x+5} = 3^{x+7}$$

$$3^{5+2x} = 3^{x+7}$$

$$5+2x = x+7$$

$$2x - x = 7 - 5$$

$$x = 2$$