

3) Responder: para cuales valores de x se cumple cada igualdad?

a)  $12 \cdot 3^{2x} = 8748$

$$3^{2x} = \frac{8748}{12} \Rightarrow 3^{2x} = 729$$

$$3^{2x} = 3^6$$

$$2x = 6 \Rightarrow x = \frac{6}{2}$$

$$x = 3$$

$$\begin{array}{r|l} 729 & 3 \\ 243 & 3 \\ 81 & 3 \\ 27 & 3 \\ 9 & 3 \\ 3 & 3 \\ 1 & \end{array}$$
$$729 = 3^6$$

b)  $\sqrt[x]{3^{(x+6)}} = \sqrt[x-1]{3^{2x}}$

$$\left[ 3^{(x+6)} \right]^{\frac{1}{x}} = \left[ 3^{2x} \right]^{\frac{1}{x-1}} \Rightarrow \text{propiedades de potencia de potencia.}$$

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

$$\Rightarrow \frac{x+6}{x} = \frac{2x}{x-1} \Rightarrow$$

$$\Rightarrow (x-1)(x+6) = 2x^2$$

$$x^2 + 6x - x - 6 = 2x^2 \Rightarrow x^2 - 2x^2 + 5x - 6 = 0$$

$$|-x^2 + 5x - 6 = 0| \text{ ecuación cuadrática !!!}$$

$$a = -1$$

$$b = 5$$

$$c = -6$$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_1 = 2$$

$$x_2 = 3$$

$$c) 3 + \log_3 (x+2) = 5$$

$$\log_3 (x+2) = 5 - 3$$

$$\log_3 (x+2) = 2 \quad \text{por definici3n} \Rightarrow$$

$$\Rightarrow 3^2 = x+2$$

$$9 - 2 = x \Rightarrow \boxed{x = 7}$$

$$d) 3 + \log_3 (x+2)^2 = 5$$

$$\log_3 (x+2)^2 = 5 - 3$$

$$\log_3 (x+2)^2 = 2$$

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

$$\Rightarrow 3 - 2 = x \Rightarrow \boxed{x = 1}$$

(4)

$$\log_5 (\log_3 (x)) = 1$$

por definición  $5^1 = \log_3 (x)$

$$\log_3 (x) = 5$$

por definición  $\Rightarrow 3^5 = x$

$$x = 243$$

5) Calcular el valor de  $k$ , en cada uno de los siguientes casos:

a)  $\log_k(36) + \log_k(6) = 1$

$$\log_k(36 \times 6) = 1$$

$$\log_k(216) = 1$$

y por definición de logaritmo  $\Rightarrow$

$$\Rightarrow k^1 = 216 \Rightarrow \boxed{k = 216}$$

b)  $\log_3 k - \log_3 2 - 4 = 0$

→ Cambio a base 10

$$\frac{\log(k)}{\log(3)} - \frac{\log(2)}{\log(3)} - \frac{4}{1} = 0$$

$$\frac{\log(k) - \log(2) - 4 \log(3)}{\log(3)} = 0$$

$$\log(k) - \log(2) - 4 \log(3) = 0$$

$$\log(k) = \log(2) + 4 \log(3)$$

$$\log(k) = \log(2 \times 3^4)$$

$$k = 2 \times 3^4$$

$$k = 2 \times 81 \Rightarrow \boxed{k = 162}$$

(6) Resolver las sig. ecuaciones

a)  $5^{2x} + 25^x = 250$

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

$$\cancel{2} \cdot 5^{2x} = \cancel{2} \cdot 5^3$$

$$\begin{array}{r|l} 250 & 2 \\ 125 & 5 \\ 25 & 5 \\ 5 & 5 \\ 1 & \end{array}$$

$$250 = 2 \cdot 5^3$$

$$2x = 3 \Rightarrow$$

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

b)  $2^{(x+2)} + 2^{(x+1)} + 2^x = \frac{7}{8}$

$$2^x \cdot 2^2 + 2^x \cdot 2^1 + 2^x = \frac{7}{8}$$

$$2^x (2^2 + 2^1 + 1) = \frac{7}{8}$$

$$2^x (7) = \frac{7}{8} \Rightarrow 2^x = \frac{\cancel{7}}{8 \cdot \cancel{7}} \Rightarrow 2^x = \frac{1}{8}$$

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

$$x = -3$$