

EJERCICIOS DE ECUACIONES LOGARÍTMICAS

$$1 \quad 2 \log x - 3 + \log \frac{x}{10}$$

$$2 \quad \log(2x - 7) - \log(x - 1) = \log 5$$

$$3 \quad \log x + \log(x + 3) = 2 \log(x + 1)$$

$$4 \quad 4 \log \left(\frac{x}{5} \right) + \log \left(\frac{625}{4} \right) = 2 \log x$$

$$5 \quad 2 \log x - 2 \log(x + 1) = 0$$

$$6 \quad \log x = \frac{2 - \log x}{\log x}$$

$$7 \quad \log(25 - x^2) - 3 \log(4 - x) = 0$$

$$8 \quad \frac{\log(16 - x^2)}{\log(3x - 4)} = 2$$

$$9 \quad \frac{\log(35 - x^2)}{\log(5 - x)} = 3$$

$$10 \quad \log 2 + \log(11 - x^2) = 2 \log(5 - x)$$

$$11 \quad \log_5 x + \frac{\log_5 125}{\log_5 x} = \frac{7}{2}$$

SOLUCIONES

1

$$2 \log x = 3 + \log \frac{x}{10}$$

$$2 \log x = 3 + \log x - \log 10$$

$$\log x = 3 - 1 \quad \log x = 2 \quad x = 100$$

2

$$\lg(2x - 7) - \lg(x - 1) = \lg 5$$

$$\log \frac{2x - 7}{x - 1} = \log 5 \quad \frac{2x - 7}{x - 1} = 5 \quad \cancel{x - 1} \quad x = -\frac{2}{3}$$

3

$$\log x + \log(x + 3) = 2 \log(x + 1)$$

$$\log[x(x + 3)] = \log(x + 1)^2$$

$$x(x + 3) = (x + 1)^2$$

$$x^2 + 3x = x^2 + 2x + 1 \quad x = 1$$

4

$$4 \log \left(\frac{x}{5} \right) + \log \left(\frac{625}{4} \right) = 2 \log x$$

$$\log \left(\frac{x}{5} \right)^4 + \log \left(\frac{625}{4} \right) = \log x^2 \quad \log \left(\frac{x^4}{625} \cdot \frac{625}{4} \right) = \log x^2$$

$$\log \left(\frac{x^4}{4} \right) = \log x^2 \quad \frac{x^4}{4} = x^2 \quad x^4 - 4x^2 = 0$$

$$x = 0 \quad x = -2 \quad x = 2$$

5

$$2\log x - 2\log(x+1) = 0$$

$$\log x^2 - \log(x+1)^2 = \log 1$$

$$\log \frac{x^2}{(x+1)^2} = \log 1 \qquad \frac{x^2}{(x+1)^2} = 1$$

$$2x+1=0 \qquad x = -\frac{1}{2} \qquad \text{Sin solución}$$

6

$$\log x = \frac{2 - \log x}{\log x}$$

$$(\log x)^2 + \log x - 2 = 0 \qquad \log x = t$$

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

$$\log x = 1 \qquad x = 10$$

$$\log x = -2 \qquad x = 10^{-2} = \frac{1}{100}$$

7

$$\log(25 - x^3) - 3\log(4 - x) = 0$$

$$\log(25 - x^3) = \log(4 - x)^3 \qquad (25 - x^3) = (4 - x)^3$$

$$25 - x^3 = 64 - 48x + 12x^2 - x^3$$

$$12x^2 - 48x + 39 = 0 \qquad x = 2 \pm \frac{\sqrt{3}}{2}$$

8

$$\frac{\log(16 - x^2)}{\log(3x - 4)} = 2$$

$$\log(16 - x^2) = 2 \log(3x - 4)$$

$$\log(16 - x^2) = \log(3x - 4)^2 \quad (16 - x^2) = (3x - 4)^2$$

$$10x^2 - 24x - 0 \quad x = 0 \quad x = \frac{24}{10} = \frac{12}{5}$$

9

$$\frac{\log(35 - x^2)}{\log(5 - x)} = 3$$

$$\log(35 - x^2) = 3 \log(5 - x)$$

$$\log(35 - x^2) = \log(5 - x)^3 \quad (35 - x^2) = (5 - x)^3$$

$$x^2 - 5x + 6 = 0 \quad x = 2 \quad x = 3$$

10

$$\log 2 + \log(11 - x^2) = 2 \log(5 - x)$$

$$\log [2(11 - x^2)] = \log(5 - x)^2$$

$$2(11 - x^2) = (5 - x)^2$$

$$3x^2 - 10x + 3 = 0$$

$$x = 3 \quad 11 - 3^2 > 0 \quad 5 - 3 > 0$$

$$x = \frac{1}{3} \quad 11 - \left(\frac{1}{3}\right)^2 > 0 \quad 5 - \frac{1}{3} > 0$$

11

$$\log_5 x + \frac{\log_5 125}{\log_5 x} = \frac{7}{2}$$

$$(\log_5 x)^2 - \frac{7}{2} \log_5 x + \log_5 125 = 0$$

$$2(\log_5 x)^2 - 7\log_5 x + 6 = 0 \quad \log_5 x = t$$

$$2t^2 - 7t + 6 = 0 \quad t = 2 \quad t = \frac{3}{2}$$

$$\log_5 x = 2 \quad x = 25$$

$$\log_5 x = \frac{3}{2} \quad x = \sqrt{5^3} = 5\sqrt{5}$$