LOGARITMOS

Problema 38:

Resolver la siguiente ecuación

$$log5 - 1 = \log(x - 3) - \frac{1}{2}(log3x + 1)$$

Solución Problema 38:

$$log5 - 1 = \log(x - 3) - \frac{1}{2}(log3x + 1)$$

$$log5 - log10 = \log(x - 3) - \log(3x + 1)^{\frac{1}{2}}$$

$$log\frac{5}{10} = log\frac{x - 3}{(3x + 1)^{\frac{1}{2}}}$$

$$\frac{5}{10} = \frac{x - 3}{(3x + 1)^{\frac{1}{2}}}$$

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

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

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

$$3x + 1 = 4(x - 3)^2$$

$$3x + 1 = 4(x^2 + 9 - 6x)$$

$$3x + 1 = 4x^2 + 36 - 24x$$

$$4x^2 - 27x + 35 = 0$$

$$x = \frac{27 \pm \sqrt{729 - 560}}{8} = \frac{27 \pm \sqrt{169}}{8} = \frac{27 \pm 13}{8} =$$

$$\boldsymbol{x_1} = \frac{27 + 13}{8} = \frac{40}{8} = \textbf{5 solución válida}$$

$$\boldsymbol{y_2} = \frac{27 - 13}{8} = \frac{14}{8} = \frac{7}{4} \textbf{ solución no válida}$$