

Problema 102 Halla las soluciones de:

$$3^{x^2+5x-4} \cdot 9^{2x+3} = 27^{x-1}$$

Solución:

$$3^{x^2+5x-4} \cdot 3^{2(2x+3)} = 3^{3(x-1)}$$

$$3^{x^2+5x-4+2(2x+3)} = 3^{3(x-1)}$$

$$x^2 + 5x - 4 + 4x + 6 = 3x - 3$$

$$x^2 + 6x + 5 = 0 \implies x = \frac{-6 \pm \sqrt{36 - 20}}{4}$$

$$x = \frac{-6 \pm 4}{2} \implies x = -1, x = -5$$

Problema 103 Halla las soluciones de:

$$3^{x^2+5x-4} \cdot 9^{2x+3} = 27^{x-1}$$

Solución:

$$3^{x^2+5x-4} \cdot 3^{2(2x+3)} = 3^{3(x-1)}$$

$$3^{x^2+5x-4+2(2x+3)} = 3^{3(x-1)}$$

$$x^2 + 5x - 4 + 4x + 6 = 3x - 3$$

$$x^2 + 6x + 5 = 0 \implies x = \frac{-6 \pm \sqrt{36 - 20}}{4}$$

$$x = \frac{-6 \pm 4}{2} \implies x = -1, x = -5$$

Problema 104 Calcular

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

Solución:

$$2 \cdot 3^{2x-1} + 3^{x+1} - 1 = 0 \implies \frac{2 \cdot 3^{2x}}{3} + 3 \cdot 3^x - 1 = 0 \implies 2 \cdot 3^{2x} + 9 \cdot 3^x - 3 = 0$$

Haciendo el cambio de variables $u = 3^x$ la ecuación quedará de la siguiente forma:

$$2u^2 + 9u - 3 = 0 \implies u = 0,3117376914, u = -4,811737691$$

Deshaciendo el cambio de variable tenemos que

$$u = 0,3117376914 = 3^x \implies \log 0,3117376914 = \log 3^x \implies$$

$$x \log 3 = \log 0,3117376914 \implies$$

$$x = \frac{\log 0,3117376914}{\log 3} = -1,060968632$$

En el otro caso, $u = -4,811737691 = 3^x$ no es posible obtener solución.

Problema 105

$$7^{2x-1} + 7^{x+1} - 1 = 0$$

Solución:

$$\frac{(7^x)^2}{7} + 7 \cdot 7^x - 1 = 0 \implies \frac{t^2}{7} + 7t - 1 = 0 \implies \begin{cases} t = 0,14244 \\ t = -49,14224 \end{cases}$$

$$\begin{cases} t = 0,14244 = 7^x \implies x = -1,0015 \\ t = -49,14224 = 7^x \implies \text{No Vale} \end{cases}$$

Problema 106

$$6^{2x-1} + 6^{x+1} - 1 = 0$$

Solución:

$$\frac{(6^x)^2}{6} + 6 \cdot 6^x - 1 = 0 \implies \frac{t^2}{6} + 6t - 1 = 0 \implies \begin{cases} t = 0,027764 \\ t = -36,02776 \end{cases}$$

$$\begin{cases} t = 0,027764 = 6^x \implies x = -2,0004 \\ t = -36,02776 = 6^x \implies \text{No Vale} \end{cases}$$

Problema 107

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

Solución:

$$3(3^x)^2 - \frac{3^x}{3} - 1 = 0 \implies 3t^2 - \frac{t}{3} - 1 = 0 \implies \begin{cases} t = 0,63557 \\ t = -0,524461 \end{cases}$$

$$\begin{cases} t = 0,63557 = 3^x \implies x = -0,41255 \\ t = -0,524461 = 3^x \implies \text{No Vale} \end{cases}$$

Problema 108

$$2^x - 2^{x+1} + 1 = 0$$

Solución:

$$2^x - 2 \cdot 2^x + 1 = 0 \implies t - 2t + 1 = 0 \implies t = 1$$

$$t = 2^x = 1 \implies x = 0$$

Problema 109

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

Solución:

$$\frac{(5^x)^2}{5} - 5^x + 1 = 0 \implies \frac{t^2}{5} - t + 1 = 0 \implies t^2 - 5t + 5 = 0$$

$$\begin{cases} t = 5^x = 3,618 \implies x = 0,714 \\ t = 5^x = 1,381 \implies x = 0,296 \end{cases}$$

Problema 110

$$2^x - 2^{x-1} - 1 = 0$$

Solución:

$$2^x - \frac{2^x}{2} - 1 = 0 \implies t - \frac{t}{2} - 1 = 0 \implies t = 2 \implies 2^x = 2 \implies x = 1$$