

$$2) \log(x-2) + \log(x-3) = 1 - \log 5$$

Todos los log al mismo miembro para aplicar propiedades:

$$\log(x-2) + \log(x-3) + \log 5 = 1$$

Prop. suma:

$$\log[(x-2)(x-3) \cdot 5] = 1$$

Definición:

$$10^1 = (x-2)(x-3) \cdot 5$$

$$\cancel{5} \cdot (x-2)(x-3) = \cancel{10} / 2$$

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

$$x^2 - 5x + 4 = 0$$

$$x = \frac{5 \pm \sqrt{25-16}}{2} = \frac{5 \pm 3}{2} \begin{cases} 4 \\ 1 \end{cases}$$

• Comp  
•  $x=4$

$$\bullet \log(4-2) + \log(4-3) = \log 2 + \log 1$$

$$\bullet 1 - \log 5 = \log 10 - \log 5 = \log \frac{10}{5} = \log 2 \quad \text{F. S.}$$

•  ~~$x=1$~~  NO SOL.

$$\log(1-2) + \log(1-3) \quad \cancel{\neq}$$

$$b) \frac{1}{2} \log(3x+5) + \frac{1}{2} \log x = 1$$

Quito denominadores, haciéndolo común:

$$\frac{\log(3x+5)}{2} + \frac{\log x}{2} = \frac{2}{2}$$

$$\log(3x+5) + \log x = 2$$

Prop. suma:

$$\log[(3x+5) \cdot x] = 2$$

Definición:

$$10^2 = (3x+5) \cdot x$$

$$3x^2 + 5x = 100$$

$$3x^2 + 5x - 100 = 0$$

$$x = \frac{-5 \pm \sqrt{25 + 1200}}{6} = \frac{-5 \pm 35}{6} \begin{cases} 5 \\ -\frac{40}{6} = -\frac{20}{3} \end{cases}$$

Comp  
•  $x=5$

$$\begin{aligned} \frac{1}{2} \log(3 \cdot 5 + 5) + \frac{1}{2} \log 5 &= \frac{1}{2} \log 20 + \frac{1}{2} \log 5 = \\ &= \log[20^{1/2}] + \log[5^{1/2}] = \log \sqrt{20} + \log \sqrt{5} = \\ &= \log(\sqrt{20} \cdot \sqrt{5}) = \log \sqrt{100} = \log 10 = 1 \quad \underline{\underline{SI}} \end{aligned}$$

•  ~~$x = -\frac{20}{3}$  No SOL.~~

$$\frac{1}{2} \log \left[ 3 \cdot \left( -\frac{20}{3} \right) + 5 \right] + \frac{1}{2} \log \left( -\frac{20}{3} \right) \quad \cancel{A}$$

$$c) 2 \log x - 3 \log 2 = \log(x+6)$$

Propiedad de los exponentes:

$$\log x^2 - \log 2^3 = \log(x+6)$$

Prop. resta:

$$\log\left(\frac{x^2}{8}\right) = \log(x+6)$$

Igualo argumentos:

$$\frac{x^2}{8} = x+6$$

$$x^2 = 8x + 48$$

$$x^2 - 8x - 48 = 0$$

$$x = \frac{8 \pm \sqrt{64 + 192}}{2} = \frac{8 \pm 16}{2} \begin{array}{l} 12 \\ -4 \end{array}$$

Cmp

$$\boxed{x=12}$$

$$\bullet 2 \log 12 - 3 \log 2 = \log 12^2 - \log 2^3 = \log \frac{144}{8} = \log 18$$

$$\bullet \log(12+6) = \log 18 \Rightarrow \underline{SI}$$

~~$x = -4$  No sol.~~

$$\bullet 2 \log(-4) - 3 \log 2 \quad \cancel{\neq}$$

$$d) \log_3(x-9) - \log_3 x = 1$$

Prop. resta:

$$\log_3\left(\frac{x-9}{x}\right) = 1$$

Definición:

$$3^1 = \frac{x-9}{x}$$

$$3 = \frac{x-9}{x}$$

$$3x = x-9$$

$$2x = -9$$

$$x = -\frac{9}{2}$$

Comprobación.  ~~$x = -\frac{9}{2}$~~

$$\cdot \log_3\left(-\frac{9}{2}-9\right) - \log_3\left(-\frac{9}{2}\right) \neq$$

↓

La ec. no tiene solución.