

Departamento de Matemáticas $1^{\underline{0}}$ Bachillerato



9 - Ecuaciones exponenciales y logarítmicas

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(a) $10^{3-x} = 1$

Sol: [3]

(b) $5^{x+3} = 125$

Sol: [0]

(c) $5^{1-x^2} = \frac{1}{125}$

Sol: [-2, 2]

(d) $5^{x^2-5x+6} = 1$

Sol: [2, 3]

(e) $2^{1-x} = \frac{1}{8}$

Sol: [4]

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

Sol: [-1]

(g) $9^{x-1} = 3^{x+1}$

Sol: [3]

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

Sol: $\left[-\frac{2}{3} \right]$

(i) $8^{x-1} = 4^{3x+1}$

Sol: $\left[-\frac{5}{3} \right]$

(j) $5^{-x} = 0.04$

Sol: [2]

(k) $10^x \cdot 10^{-2x+7} = 100$

Sol: [5]

(1) $(3^x)^2 \cdot 3^x = 9^3$

Sol: [2]

(m) $\sqrt{2 \cdot \sqrt{2 \cdot \sqrt{2}}} = 2^x$

Sol: $\left[\frac{7}{8}\right]$

(n) $2^{x^2-5x} = 64^{-1}$

Sol: [2, 3]

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

Sol: $\left[-\frac{5}{4} \right]$

(o) $\sqrt[x]{216} = 6$

Sol: [3]

(p) $4^x - 2^x = 2$

Sol: [1]

(q) $5^x - 30 \cdot 5^x + 145 = 0$

Sol: [1]

(r) $2^{x-1} + 2^x + 2^{x+1} = 7$

Sol: [1]

 $2.\ p028e05$ - Resuelve las siguientes ecuaciones exponenciales:

(a)
$$3^{x+1} + 3^x + 3^{x-1} = 117$$

Sol: [3]

(b)
$$3^x + 3^{x-1} + 3^{x-2} + 3^{x-3} + 3^{x-4} = 363$$

Sol: [5]

(c)
$$2^{3x} - \frac{3}{2^{3x+2}} + 1 = 0$$

Sol: $\left[-\frac{1}{3} \right]$

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

Sol: [1, 2]

(e)
$$2^{x+1} + 4^x = 80$$

Sol: [3]

(f)
$$2^{2x} - 3 \cdot 2^{x+1} + 8 = 0$$

Sol: [1, 2]

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

Sol: [1, 2]

(h)
$$2^{2x} - 10 \cdot 2^x + 16 = 0$$

Sol: [1, 3]

(i)
$$16^x - 4^x = 240$$

Sol: [2]

(i)
$$9^x - 6 \cdot 3^{x+1} + 81 = 0$$

Sol: [2]

(k)
$$3^{x+2} + 9^{x+1} = 810$$

Sol: [2]

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

Sol: [2]

(m)
$$3^{x+1} + 3^{x-2} = \frac{15}{3^{x-1}} + \frac{247}{3^{x-2}}$$

Sol: [3]

(n)
$$4^{2x} + 16 \cdot 4^{-2x} - 10 = 0$$

Sol: $\begin{bmatrix} \frac{1}{4}, & \frac{3}{4} \end{bmatrix}$

3. p028e06 - Resuelve los siguientes sistemas:

(a)
$$\begin{cases} 3^x = 3^y \\ 4^x \cdot 4^y = 256 \end{cases}$$

Sol: $[\{x:2, y:2\}]$

(b)
$$\begin{cases} 2^{x+2y} = 32\\ 2^{3x-5y} = 16 \end{cases}$$

Sol: $[\{x:3, y:1\}]$

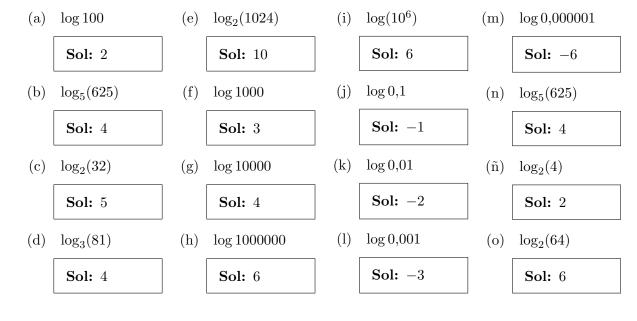
(c)
$$\begin{cases} 5^x = 5^y \cdot 625 \\ 2^x \cdot 2^y = 256 \end{cases}$$

Sol: $[\{x:6, y:2\}]$

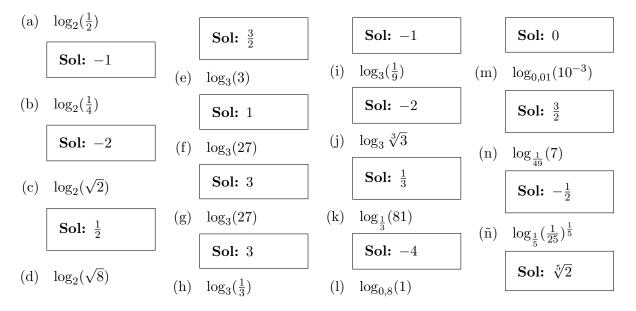
(d)
$$\begin{cases} 2^x + 2^y = 24\\ 2^{x+y} = 128 \end{cases}$$

Sol: $[\{x:3, y:4\}, \{x:4, y:3\}]$

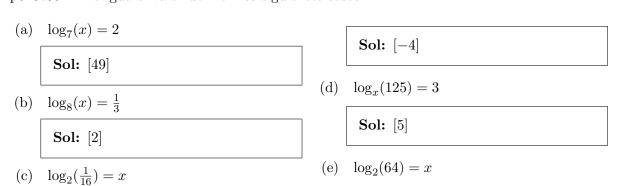
4. p028e07 - Calcula:



5. p028e07b - Calcula (continuación):

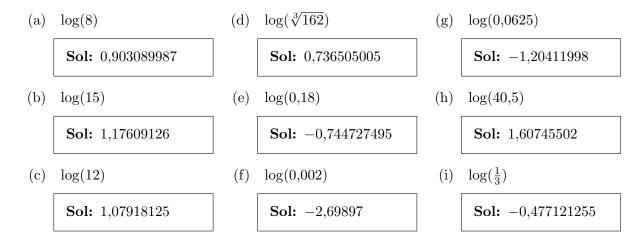


6. p028e08 - Averigua el valor de x en los siguientes casos:



(h) $\log_x(5) + 2$ **Sol:** [6] Sol: $\left\lceil \frac{\sqrt{5}}{5} \right\rceil$ (f) $\log_x(9) = 2$ $\log_{0,008}(625) = 2x$ (i) **Sol:** [3] **Sol:** $\left[-\frac{2}{3} \right]$ (g) $\log_2(x) = -3$ Sol: $\left[\frac{1}{8}\right]$ 7. p
028e09 - Sabiendo que log 2 = 0.301030, calcula (e) $\log(\frac{1}{16})$ (i) $\log(\sqrt[4]{\frac{1}{0.04}})$ (a) $\log(16)$ **Sol:** -1,20411998**Sol:** 1,20411998 **Sol:** 0,349485002 (b) $\log(64)$ (f) $\log(5)$ (j) $\log \sqrt[3]{0.002}$ **Sol:** 1,80617997 **Sol:** 0,698970004 **Sol:** -0.899656668(c) $\log(1024)$ $(g) \log(25)$ (k) $\log(0.025)$ **Sol:** 3,01029996 **Sol:** 1,39794001 **Sol:** -1,60205999 $\log(\frac{1}{2})$ (d) (h) $\log(0.0016)$ **Sol:** -2,79588002**Sol:** -0.752574989**Sol:** -0.3010299968. p028e10 - Sabiendo que log 3 = 0.477121, calcula (a) $\log(243)$ (c) $\log(0.003)$ (e) $\log(\sqrt[5]{0.81})$ **Sol:** 2,38560627 **Sol:** -2,52287875**Sol:** -0.0183029962(d) $\log(\sqrt[4]{0.03^3})$ $\log(0,0027)$ (f) $\log(\frac{1}{81})$ (b) **Sol:** −1,14215906 **Sol:** -1,90848502**Sol:** -2,56863624

9. p
028e11 - Sabiendo que log 2=0.301030 y que log 3=0.477121 averigua, sin calculadora:



10. p028e12 - Sabiendo que log 2 = 0.301030 y que log 3 = 0.477121 averigua, sin calculadora:

(a)
$$\log \frac{0,0027^3 \cdot \sqrt[4]{540}}{96 \cdot \sqrt[5]{51,84}}$$
 Sol: $-9,3480145$

11. p029e15 - Realiza las siguientes operaciones:

(a) $\log(x) - \log(3) = 2$

(a) $\log(4-\sqrt{6}) + \log(4+\sqrt{6})$ Sol: 1

Sol: 1

(b) $\frac{1}{2}\log(12-2\sqrt{11}) + \frac{1}{2}\log(12+2\sqrt{11})$ Sol: 0

Sol: 0

12. p029e18 - Averigua el valor de x en los siguientes casos:

- Sol: [300]

 (b) $\log 2 + \log x = 1$ Sol: [20]

 Sol: [5]

 (c) $5 \log x \log 32 = \log(\frac{x}{2})$ Sol: [6]

 Sol: [6]

 Sol: [8]

 Sol: [9]

 Sol: [100]

 Sol: [100]
- (d) $2\log x \log(x 16) = 2$ (g) $2\log(\frac{x}{2}) + 2\log(\frac{x}{3}) = 3\log(x) \log(\frac{32}{9})$ Sol: $\left[\frac{81}{8}\right]$

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

Sol: $\left[\frac{1}{3}, 3\right]$

(i) $\log(1250) - 2 = 2 - \log(2^{2-x})^{2+x}$

Sol: [-1, 1]

(j)
$$\log(x-1) - \log(\sqrt{5+x}) - \log(\sqrt{5-x}) =$$

0

Sol: [4]

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

Sol: $\left[\frac{5}{4}\right]$

 $13.\,$ p
029e 19 - Resuelve los siguientes sistemas de inecuaciones:

(a)
$$\begin{cases} \log x + \log y = 5 \\ \log x - \log y = 1 \end{cases}$$

Sol: $[\{x: 1000, y: 100\}]$

(b)
$$\begin{cases} 3\log x - 2\log y = 10\\ \log x + 3\log y = 7 \end{cases}$$

Sol: $[\{x: 10000, y: 10\}]$

(c)
$$\begin{cases} \log_2(x) + \log_2(x+y) = 4\\ x+y = 2 \end{cases}$$

Sol: $[\{x:8, y:-6\}]$