

Logaritmo: 7391

$$a) \log_4 16 = x \Rightarrow 4^x = 16$$

$$16 = 4^2$$

$$4^x = 4^2$$

$$x = 2$$

$$b) \log_3 \frac{1}{9} = x \Rightarrow 3^x = \frac{1}{9}$$

$$9 = 3^2 \Rightarrow \frac{1}{9} = 3^{-2}$$

$$3^x = 3^{-2}$$

$$x = -2$$

$$c) \log_{81} 3 = x \Rightarrow 81^x = 3$$

$$81 = 3^4$$

$$(3^4)^x = 3$$

$$3^{4x} = 3^1$$

$$4x = 1$$

$$x = \frac{1}{4}$$

$$7391 a) \log_2 \sqrt{2} = x \Rightarrow 2^x = \sqrt{2}$$

$$x = \frac{1}{4}$$

207/217

$$137) a) \log_2 \sqrt{2} = x \Rightarrow 2^x = \sqrt{2}$$

$$\sqrt{2} = 2^{\frac{1}{2}}$$

$$2^x = 2^{\frac{1}{2}}$$

$$x = \frac{1}{2}$$

$$\log_2 \sqrt{2} = \frac{1}{2}$$

$$b) \log_3 \sqrt[4]{9} = x \Rightarrow (\sqrt[3]{9})^x = 9$$

$$\sqrt[3]{9} = 9^{\frac{1}{3}}$$

$$9^{\frac{x}{3}} = 9^2$$

$$\frac{x}{3} = 2$$

$$x = 6$$

$$c) \log_{100} \sqrt[3]{10} = x \Rightarrow 100^x = \sqrt[3]{10}$$

$$100 = 10^2$$

$$\sqrt[3]{10} = 10^{\frac{1}{3}}$$

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

$$2x = \frac{1}{3} \Rightarrow x = \frac{1}{6}$$

208/217

$$139) a) \log_{100} 0,001 = \log_{10^2} 10^{-3} = \frac{-3}{2} = -\frac{3}{2}$$

$$179) a) \log_{100} 0,001 = \log_{10^2} 10^{-3} = \frac{-3}{2} = -\frac{3}{2}$$

$$\log_{1,5} \frac{9}{5} = 2 \log_{1,5} \frac{2}{3}$$

$$\log_{1,25} 0,64 = \log_{1,25} (1,25^{-2}) = -2$$

$$S = -\frac{3}{2} + (-2) - (-2)$$

$$S = -\frac{3}{2} - 2 + 2$$

$$S = -\frac{3}{2}$$

$$b) S = \log_8 \sqrt{2} + \log_{\sqrt{2}} 8 - \log_{\sqrt{2}} \sqrt{8}$$

$$\log_8 \sqrt{2} = \log_8 2^{1/2} = \frac{1}{2} = \frac{1}{6}$$

$$\log_{\sqrt{2}} 8 = \frac{\log_2 8}{\log_2 \sqrt{2}} = \frac{3}{1/2} = 6$$

$$\log_{\sqrt{2}} \sqrt{8} = \frac{\log_2 2^{3/2}}{\log_2 2^{1/2}} = \frac{3/2}{1/2} = 3$$

$$S = \frac{1}{6} + 6 - 3$$

$$S = \frac{1}{6} + 3$$

$$S = \frac{7}{6} + \frac{18}{6} \quad S = \frac{25}{6}$$

$$190) S = \log_4 (\log_3 9) + \log_2 (\log_8 3) + \log_{16} (\log_{10} 3)$$

$$S = \frac{7}{6} + \frac{18}{6} \quad S = \frac{25}{6}$$

209/217

$$740 | S \Rightarrow \log_4(\log_3 9) + \log_2(\log_3 3) + \log_{10}(\log_{10} 32)$$

$$\log_3 9 \quad \log_3 9 = \log_3(3^2) = 2$$

$$9 = 3^2 \quad \log_4(\log_3 9) = \log_4 2$$

$$81 = 3^4 \quad \log_8 3 = \log_{3^2} 3 = \frac{1}{2}$$

$$\log_2(\log_8 3) = \log_2 \frac{1}{2}$$

$$\log \frac{1}{2} = \log(2^{-1}) = -1$$

$$\log_{16} 32 = \log_{2^4} 2^5 = \frac{5}{4} \quad \log_{10}(\log_{10} 32) = \log_{10} \frac{5}{4}$$

$$\log_{10} \frac{5}{4} = \frac{\log_{10}(5/4)}{\log_{10}(4/5)} \quad S = \log_4 2 + (-1) + (-1)$$

$$\log_{10} \frac{5}{4} = \log 5 - \log 4 \quad \log_4 2 = \frac{1}{2}$$

$$\log \frac{4}{5} = \log 4 - \log 5 \quad S = \frac{1}{2} - 2 - 1$$

$$\log_{10} \frac{5}{4} = \frac{\log 5 - \log 4}{\log 4 - \log 5} = -1 \quad S = \frac{1}{2} - 3$$

$$S = \frac{1}{2} - \frac{6}{2}$$

$$S = -\frac{5}{2}$$

210/217

$$744 | a, 3^{\log_3 2}$$

$$744 | a | 3^{\log_3 2}$$

$$a^{\log_3 a^b} = b - 3^{\log_3 2} = 2$$

$$b) 4^{\log_2 3}$$

$$4^{\log_2 3} = (2^2)^{\log_2 3}$$

$$2^{2 \cdot \log_2 3} = 2^{\log_2 3^2} = 3$$

$$2^{\log_2 3^2} = 3^2 = 9 - 4^{\log_2 3} = 9$$

$$c) 5^{\log_2 5^2}$$

$$\log_2 5^2 = \log_5 2$$

$$\log_5 2 = \frac{\log_2 2}{2}$$

$$5^{\log_2 5^2} = 5^{\frac{\log_2 5^2}{2}}$$

$$\sqrt{5^{\log_2 5^2}} = \sqrt{2}$$

$$5^{\log_2 5^2} = \sqrt{2}$$

$$746 | A = 5^{\log_2 5^2} | 1^3 (\sqrt{\quad})^3$$

$$\begin{array}{l|l}
 796 / A = 5^{\log_2 5^2} & A^3 = (\sqrt{2})^3 \\
 \log_2 5^2 = \frac{\log_2 5^2}{2} & A^3 = 2^{\frac{3}{2}} \\
 A = 5^{\frac{\log_2 5^2}{2}} & A^3 = 2\sqrt{2} \\
 5^{\log_2 5^2} = 2 & A^3 = 2\sqrt{2} \\
 A = 2^{\frac{1}{2}} = \sqrt{2} &
 \end{array}$$

$$\begin{array}{l}
 797 / 4^{\log_2 A} + 2A - 2 = 0 \\
 4 = 2^2 \Rightarrow 4^{\log_2 A} = (2^2)^{\log_2 A} \\
 4^{\log_2 A} = 2^{2 \log_2 A} \mid 2^{2 \log_2 A} = A^2 \\
 A^2 + 2A - 2 = 0 \mid A = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \begin{array}{l} a = 1 \\ b = 2 \\ c = -2 \end{array} \\
 \Delta = b^2 - 4ac = 2^2 - 4(1)(-2) \\
 \Delta = 4 + 8 = 12 \\
 A = \frac{-2 \pm \sqrt{12}}{2(1)} \quad A = \frac{-2 \pm 2\sqrt{3}}{2} \quad A = -2 + \sqrt{3}
 \end{array}$$

$$799 /$$

2(1)

2

11-1+03

212/217

759/

a) $\log_5 \left(\frac{5a}{bc} \right)$ → Properties products

$$\log_5(5a) - \log_5(bc)$$

$$(\log_5 5 + \log_5 a) - (\log_5 b + \log_5 c)$$

$$(1 + \log_5 a) - (\log_5 b + \log_5 c)$$

$$1 + \log_5 a - \log_5 b - \log_5 c$$

$$b) \log_3 \left(\frac{ab^2}{c} \right)$$

$$\log_3 \left(\frac{ab^2}{c} \right) = \log_3(ab^2) - \log_3 c$$

$$\log_3 a + \log_3 b^2 - \log_3 c$$

$$\log_3 a + 2 \log_3 b - \log_3 c$$

213/217

$$759/a) \log_2 a + \log_2 b - \log_2 c$$

$$75) a) \log_2 a + \log_2 b - \log_2 c$$

$$\log_b x + \log_b y = \log_b (x \cdot y)$$

$$\log_b x - \log_b y = \log_b \left(\frac{x}{y} \right)$$

$$\log_2 a + \log_2 b = \log_2 (a \cdot b)$$

$$\log_2 (a \cdot b) - \log_2 c = \log_2 \left(\frac{a \cdot b}{c} \right)$$

$$\log \left(\frac{a \cdot b}{c} \right)$$

$$b) 2 \log a - \log b - 3 \log c$$

$$n \log_b x = \log_b (x^n)$$

$$2 \log a = \log a^2 = \log b = \log \frac{1}{b}$$

$$\log a^2 + \log \frac{1}{b} + \log c^{-3}$$

$$\log \left(a^2 \cdot \frac{1}{b} \cdot c^{-3} \right)$$

$$\log \left(\frac{a^2}{bc^3} \right)$$

$$\log \left(\frac{a^2}{bc^3} \right)$$

$$76) \log \left(\frac{729}{10} \right)$$

$$769 / \log\left(\frac{125}{\sqrt[5]{2}}\right)$$

$$\log\left(\frac{a}{b}\right) = \log a - \log b$$

$$\log\left(\frac{125}{\sqrt[5]{2}}\right) = \log 125 - \log \sqrt[5]{2}$$

$$125 = 5^3$$

$$\log 10 = 1$$

$$\log a^b = b \log a$$

$$\log 125 = \log 5^3 = 3 \log 5$$

$$\log 5 = 1 - 0,3010 = 0,6990$$

$$\log 125 = 3 \times 0,6990 = 2,097$$

$$\sqrt[5]{2} = 2^{1/5} \quad \log \sqrt[5]{2} = \log 2^{1/5} = \frac{1}{5} \log 2$$

$$\log \sqrt[5]{2} = \frac{1}{5} \times 0,3010 = 0,0602$$

$$\log 125 - \log \sqrt[5]{2} = 2,097 - 0,0602 = \boxed{2,0368}$$

$$778) \sum \log_{11} 27 = a \text{ calcule o valor de } 76$$

118 If $\log_{11} 27 = a$, calculate $\log_6 76$

$$a = \frac{\log 27}{\log 11}$$

$$\log 27 = \log(3^3) = 3 \log 3$$

$$\log 11 = \log(2^3 \cdot 3) = 3 \log 2 + \log 3$$

$$a = \frac{3 \log 3}{3 \log 2 + \log 3} \quad \bigg| \quad \log_6 76 = \frac{\log 76}{\log 6}$$

$$\log_6 76 = \frac{4 \log 2}{\log 2 + \log 3}$$

$$a = \frac{3 \log 3}{3 \log 2 + \log 3}$$

$$a = \frac{3x}{2+x}$$

$$x = \frac{4}{1+x}$$

$$x = \frac{2a}{3-a}$$

$$x = \frac{4}{1 + \frac{2a}{3-a}}$$

$$x = \frac{4(3-a)}{3-a+2a}$$

$$x = \frac{12-4a}{3+a}$$