

Ecuaciones exponenciales: soluciones

Mr. Neeman, 11A. 2 de noviembre, 2011.

Soluciones de la tarea

$$\#1. \sqrt{2^x} = 4^{2x-2}$$

$$2^{\frac{x}{2}} = 2^{4x-4}$$

$$\frac{x}{2} = 4x - 4$$

$$4 = \frac{7x}{2}$$

$$x = \frac{8}{7}$$

$$\#2. 9^{\frac{x^2}{2}+2} = 3^{4x}$$

$$3^{x^2+4} = 3^{4x}$$

$$x^2 + 4 = 4x$$

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

$$(x-2)^2 = 0$$

$$x = 2$$

$$\#3. (\sqrt{5})^{-2x} = (\sqrt[3]{5})^{x+3}$$

$$5^{-x} = 5^{\frac{x+3}{3}}$$

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

$$-3x = x+3$$

$$-3 = 4x$$

$$x = -\frac{3}{4}$$

$$\#4. \frac{1}{5^{2x}} = 5^x$$

$$5^{-2x} = 5^x$$

$$-2x = x$$

$$3x = 0$$

$$x = 0$$

$$\#5. \frac{2}{3} \left(\frac{9}{4}\right)^{2x} = \frac{4}{9}$$

$$\left(\frac{9}{4}\right)^{-\frac{1}{2}} \left(\frac{9}{4}\right)^{2x} = \left(\frac{9}{4}\right)^{-1}$$

$$\left(\frac{9}{4}\right)^{2x-\frac{1}{2}} = \left(\frac{9}{4}\right)^{-1}$$

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

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

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

De otro modo:

$$\log_{\frac{9}{4}} \left(\frac{2}{3} \left(\frac{9}{4} \right)^{2x} \right) = \log_{\frac{9}{4}} \left(\frac{4}{9} \right)$$

$$\log_{\frac{9}{4}} \left(\frac{2}{3} \left(\frac{9}{4} \right)^{2x} \right) = -1$$

$$\log_{\frac{9}{4}} \left(\frac{2}{3} \right) + \log_{\frac{9}{4}} \left(\frac{9}{4} \right)^{2x} = -1$$

$$-\frac{1}{2} + 2x \log_{\frac{9}{4}} \left(\frac{9}{4} \right) = -1$$

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

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

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

$$\#6. 5(3^x) = 9^x - 4(3^x)$$

$$9(3^x) = 9^x$$

$$3^2(3^x) = 3^{2x}$$

$$3(2+x) = 3^{2x}$$

$$2+x = 2x$$

$$x = 2$$