MORE SOLVING EXPONENTIAL EQUATIONS

Note Title 9/24/2010

RECALL: WE CAN SOLVE EXPONENTIAL EQUATION BY TAKING THE LOG OF BOTH SIDES AND FOLLOWING THE LOG RULES.

IE

$$9^{x+1} = 3$$

$$\frac{(x+1)\log 9}{\log 9} = \frac{\log 3}{\log 9}$$

$$x+1 = 0.5$$

$$-1 \qquad -1$$

$$x = -0.5$$

BUT HOW ABOUT THIS $9^{x+1} = 3$

LETS CHANGE THE EQUATION SO THAT THE BASES ARE EQUAL

IE $3^{2(x+1)} = 3$

SINCE THE BASES ARE EQUAL $\therefore$ THE EXPONENTS MUST ALSO BE EQUAL

$$\frac{2}{2}(x+1) = \frac{1}{2}$$

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

IE Solve $3^{3x+1} = 27^{2x}$

$(3x+1)\log 3 = 2x \log 27$

$3x\log 3 + 1\log 3 = 2x\log 27$

$-3x\log 3 \qquad\qquad -3x\log 3$

$\log 3 = 2x\log 27 - 3x\log 3$

$\dfrac{\log 3}{(2\log 27 - 3\log 3)} = x\dfrac{(2\log 27 - 3\log 3)}{(2\log 27 - 3\log 3)}$

$\frac{1}{3} = x$

WHAT ABOUT CHANGING THE BASES

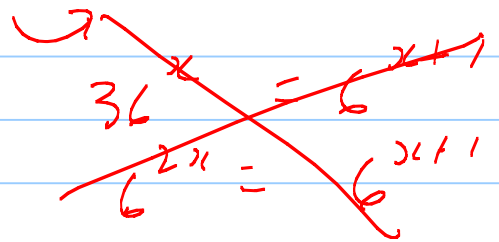
$$3^{3x+1} = 27^{2x}$$

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

$$3x+1 = 6x$$
$$-3x \qquad -3x$$

$$\frac{1}{3} = \frac{3x}{3}$$

IE SOLVE $2(18)^x = 6^{x+1}$



$$\log 2 + x \log 18 = (x+1)\log 6$$

$$\log 2 + x \log 18 = x \log 6 + \log 6$$

$$x \log 18 - x \log 6 = \log 6 - \log 2$$

$$x \frac{(\log 18 - \log 6)}{(\log 18 - \log 6)} = \frac{(\log 6 - \log 2)}{(\log 18 - \log 6)}$$

$$x = 1$$

HW Pg 149 1 A, C, E, 2A, 3A, 5-8 A, C, E

9