MORE SOLVING EXPONENTIAL EQUATIONS

Note Title 9/27/2011

RECALL: WE CAN SOLVE EXPONENTIAL EQUATIONS BY TAKING THE LOG OF BOTH SIDES AND FOLLOWING OUR LOG LAWS.

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

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

$$x+1 = 0.5$$

$$x = -0.5$$

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

LETS CHANGE THE EQUATION SO THAT THE BASES ARE EQUAL.

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

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

$$2(x+1) = 1$$

$$2x+2 = 1$$

$$2x = -1$$

$$x = -1/2$$

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

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

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

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

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

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

OR

CHANGE THE BASE

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

$$3x+1 = 6x$$

$$1 = 3x$$

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

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

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

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

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

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

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

H/W Pg 149 # 1 A, C, E # 2A, 3A

5-8 A, C, E # 9