

Section 5.5 : cont'd

Thursday, February 12, 2015
11:31 AM

$$\log_2 (x+1) + \log_2 (x-1) = 3$$

$$\log_2 (x+1)(x-1) = 3$$

$$x^2 - 1 = 2^3$$

$$x^2 - 1 = 8$$

$$x^2 = 9$$

$$x = \cancel{\pm 3}^{\text{-3 is ext}}$$

$$x = 3$$

$$\begin{aligned} \text{or } x^2 - 9 &= 0 \\ (x-3)(x+3) &= 0 \\ x &= \pm 3 \end{aligned}$$

check: $x=3$

$$\begin{aligned} \log_2 4 + \log_2 2 &= 3 \\ 2 + 1 &= 3 \quad \checkmark \end{aligned}$$

extraneous

$$\cancel{x = -3} \quad \log_2 \cancel{(-2)} + \log_2 \cancel{(-4)} = 3$$

$$\ln x - \ln (x-4) = \ln 3$$

$$\ln \left(\frac{x}{x-4} \right) = \ln 3$$

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

$$x = 3x - 12$$

if $\ln M = \ln N$
then
 $M = N$

$$12 = 2x$$

$$x = 6$$

$$\text{or } \{6\}$$

$$\text{check: } \ln 6 - \ln 2 = \ln 3 \quad \checkmark$$

$$\log_3 (1-x) + \log_3 (x+4) = \log_3 2 + \log_3 (1-2x)$$

$$\log_3 (1-x)(x+4) = \log_3 2(1-2x)$$

$$(1-x)(x+4) = 2(1-2x)$$

$$4 - 3x - x^2 = 2 - 4x$$

$$0 = x^2 - x - 2$$

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

$$x = -1, \cancel{2}$$

$$\{-1\}$$

$$\text{check } x = -1 \quad (x=2 \text{ is extraneous})$$

$$\log_3 2 + \log_3 3 = \log_3 2 + \log_3 3 \quad \checkmark$$

brain teasers:

$$\log_2 (\log_4 x) = 0$$

$$\log_4 x = 3^0$$

$$\log_4 x = 1$$

$$x = 4^1 = 4$$