pg 885

#1 105

$$\log_x 9 = \frac{1}{2}$$

$$(x^{1/2})^2 = (9)^2 \rightarrow \sqrt{x}^2 = 9^2$$

$$x = 81$$

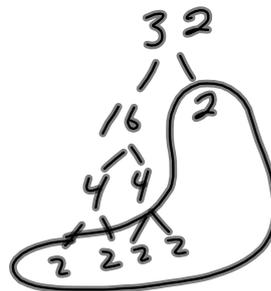#109　　　$$\log_{32} x = \frac{2}{5}$$

$$32^{2/5} = x$$

$$(32^{1/5})^2 = x$$

$$(2)^2 = x$$

$$4 = x$$

pg 884 #15

$$\log_4 \frac{1}{16} = x$$

$$\log_4 1 - \log_4 16 \leftarrow 4^2$$

$$0 - 2$$

$$4^x = \frac{1}{16} \rightarrow -2$$

$$-2$$

$$4^{-2} = \frac{1}{16}$$

pg884 # 36

$$6^{\log_6 13} = 13$$

Solve Exponential and Logarithmic Equations

ex 1) $4^{3x} = 16$ $4^{3x} = 16$

$4^{3x} = 4^2$ $\log 4^{3x} = \log 16$

$\dfrac{3x}{3} = \dfrac{2}{3}$ $\dfrac{3x \log 4}{3 \log 4} = \dfrac{\log 16}{3 \log 4}$

$x = 2/3$ $x = 2/3$

Solve $2^{x+5} = 16$

$\text{Log } 2^{(x+5)} = \text{Log } 16$

$\dfrac{(x+5)\text{Log}2}{\log 2} = \dfrac{\text{Log } 16}{\text{Log } 2}$

$x+5 = \dfrac{\text{Log}16}{\text{Log}2}$

$x = \dfrac{\text{Log}16}{\text{Log}2} - 5$

$x = -1$

Solve

#18 $\quad 5^{x+2} = 15$

$\quad Log\ 5^{x+2} = Log\ 15$

$(x+2) Log\ 5 = Log\ 15$

$\quad x+2 = \dfrac{Log\ 15}{Log\ 5}$

$\quad x = \dfrac{Log\ 15}{Log\ 5} - 2 \qquad x = -.317$

ex3 $e^{0.06x} = 1500$

$Ln\ e^{0.06x} = Ln\ 1500$

$0.06x\ Ln\ e = Ln\ 1500$

$0.06x = Ln\ 1500$

$X = \dfrac{Ln\ 1500}{0.06}$

$X = 121.887$

$\pi = 3.14\ldots$

$e = 2.718\ldots\ldots$

$Log_e = Ln$
         $\uparrow$

Natural Log

$Log_2 2 = 1$

$Log_e e = 1$

$Ln\ e = 1$

ex5)

a) $\log_4 (8x-6) = 3$

$4^{\log_4 (8x-6)} = 4^3$

$8x - 6 = 64$

$8x = 70$

$x = 35/4$

#42

$$e^{Ln\ (4x-2)} = e^3$$

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

$$\frac{4x}{4} = \frac{e^3 + 2}{4} \qquad (e^3 + 2)/4$$

$$x = \frac{e^3 + 2}{4}$$

α^6 $\text{Log } x + \text{Log}(x-3) = 1$

$\text{Log } (x)(x-3) = 10^1$

$x^2 - 3x = 10$

$x^2 - 3x - 10 = 0$

$(x-5)(x+2) = 0$

$\boxed{x = 5}$ $x = -2$

$\text{Log } 5 + \text{Log } (5-3) = 1$

$\text{Log}(5) + \text{Log } (2) = 1$

$\text{Log}_{10} 10 = 1$

$1 = 1 \checkmark$

$\text{Log}(-2)$

$$\text{Log}\ (-2) = x \qquad \text{Log}_{-3}\ 5 = x$$

$$10^x = -2 \qquad\qquad (-3)$$

#59 $\log_5(x+4) + \log_5(x-4) = \log_5 20$

$$\log_5(x+4)(x-4) = \log_5 20$$

$$(x+4)(x-4) = 20$$

$$x^2 - 16 = 20$$
$$+16 \qquad +16$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = \pm 6$$

$$\boxed{x = 6}$$

Solve

#63 $\log_2 (x-3) + \log_2 (x+3) = 4$

Homework
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