

BE - Precalc | TUESDAY 12-1-09

① SOLVE $5^{x-1} = 2^x$

$$\log(5)^{x-1} = \log(2)^x$$

$$(x-1) \log 5 = x \log 2$$

$$(x-1)(.6990) = x(.3010)$$

$$.699x - .699 = .301x$$

$$-.301x + .699 \quad -.301x + .699$$

$$\frac{.398x}{.398} = \frac{.699}{.398}$$

$$x = 1.7563$$

CK $5^{(1.7563-1)} \stackrel{?}{=} 2^{1.7563}$

$$5^{.7563} \stackrel{?}{=} 3.3783$$

$$3.3886 \approx 3.3783 \checkmark$$

Homework Review: Pg. 730 #5-7, 8, 9, 11-14.

$$\begin{aligned}\textcircled{5} \log 80,000 &= \log 8 + \log 10,000 \\ &= .9031 + 4 = \boxed{4.9031}\end{aligned}$$

$$\begin{aligned}\textcircled{6} \log 0.003 &= \log 3 + \log 10^{-3} \\ &= .4771 + (-3) = \boxed{-2.5229}\end{aligned}$$

$$\begin{array}{r} 3.0000 \\ - .4771 \\ \hline 2.5229 \end{array}$$

$$\begin{aligned}\textcircled{7} \log .0081 &= \log 81 + \log 10^{-4} \\ &= \log 3^4 + (-4) \\ &= 4 \log 3 - 4 \\ &= 4(.4771) - 4 = \boxed{-2.0916}\end{aligned}$$

$$\textcircled{8} \log 424 = \boxed{2.6274}$$

$$\textcircled{9} \text{Antilog } 4.8740 = 10^{4.8740} = \boxed{74,816.95}$$

$$\textcircled{11} \log_{12} 18 = \frac{\log 18}{\log 12} = \frac{1.2553}{1.07918} = \boxed{1.1632}$$

$$\text{CK: } 12^{1.1632} = ?$$

$$12^{1.1632} = 18.001 \checkmark$$

$$(12) \log_8 15 = \frac{\log 15}{\log 8} = \frac{1.1761}{.9031} = \boxed{1.3023}$$

$$(13) 2.2^{x-5} = 9.32$$

$$\log (2.2)^{x-5} = \log 9.32$$

$$(x-5) \log (2.2) = \log 9.32$$

$$x-5 = \frac{\log 9.32}{\log 2.2} = \frac{.9694}{.3424} = 2.8312$$

$$x = 5 + 2.8312 \therefore \boxed{x = 7.8312}$$

CK $2.2^{(7.8312-5)} \stackrel{?}{=} 9.32$

$$9.32 \stackrel{?}{=} 9.32 \checkmark$$

$$(14) 6^{x-2} = 4^x$$

$$(x-2) \log 6 = x \log 4$$

$$x-2 = x \frac{\log 4}{\log 6} = x \left(\frac{.6021}{.7782} \right)$$

$$1x - 2 = .7737x$$

$$-.7737x \quad -.7737x$$

$$.2263x = 2$$

$$\therefore x = \frac{2}{.2263} \therefore \boxed{x = 8.84}$$

Ch 11-6 NATURAL LOGARITHMS

logarithms to base e

Symbol $\Rightarrow \ln X$ read, the NATURAL log of X .

$$\ln 1 = ?$$

$$e^? = 1 \Rightarrow \ln 1 = 0$$

$$\ln e = ?$$

$$e^? = e \Rightarrow \ln e = 1$$

ⓔ Use $\ln$ & the change of base formula to find:

$$\log_6 14 = ?$$

$$\frac{\ln 14}{\ln 6} = \frac{2.6391}{1.7918} = \boxed{1.4729}$$

$$\underline{\underline{\text{CK}}} \quad 6^{1.4729} \stackrel{?}{=} 13.9997 \quad \checkmark$$

Ex 4
Pg 734

Solve using NATURAL logarithms

$$3^{2x} = 7^{x-1}$$

$$\ln(3^{2x}) = \ln(7^{x-1})$$

$$2x \ln 3 = (x-1)(\ln 7)$$

$$2 \cdot x \cdot 1.0986 = (x-1)(1.9459)$$

$$\begin{aligned} 2.1972x &= 1.9459x - 1.9459 \\ -1.9459x &\quad -1.9459x \end{aligned}$$

$$\begin{array}{r} .2513x = \quad -1.9459 \\ \hline .2513 \quad \quad .2513 \end{array}$$

$$x = -7.7433$$

Homework: Pg 735 #5, 7, 9, 15