Assignment 4D-1

Use the change-of-base formula to evaluate the logarithm.

1. $\log_3 30 = \frac{\log 30}{log3} = 3.096$
2. $\log_7 30 = \frac{\log 30}{\log 7} = 1.748$
3. $\log_{0.5} 15 = \frac{\log 15}{\log 0.5} = \mathbf{-3.907}$
4. $\log_{0.2} 20 = \frac{\log 20}{\log \mathbf{0.2}} = \mathbf{-1.861}$

Solve each equation algebraically. Get a numerical approximation for your solution and check it by substitution.

5. $5^x = 512$

$$\boldsymbol{x = \log_5 512 = \frac{\log 512}{\log 5}}$$

$$\mathbf{3.876}$$

6. $3^{5x} = 100$

$$5x = \log_3 100$$

$$x = \frac{\log_3 100}{5}$$

$$\mathbf{0.838}$$

7. $e^x = 217.5$

$$x = ln(217.5)$$

$$5.382$$

$2.5^x = 300$

$$\boldsymbol{x = log_{2.5} 300 = \frac{\log 300}{\log 2.5}}$$

$$\mathbf{6.225}$$

8. $4(5^x) = 210$

$$\mathbf{5^x = \frac{210}{4}}$$

$$\boldsymbol{x = log_5 \left(\frac{105}{2}\right)}$$

$$\mathbf{2.461}$$

9. $4^{x+1} - 2 = 10$

$$\mathbf{4^{x+1} = 12}$$

$$\boldsymbol{x = \log_4 12 - 1}$$

$$\mathbf{0.792}$$

The formula for interest that is *compound continuously* is $A = Pe^{rt}$, where A=final amount, P=starting amount, r=interest rate(as a decimal), and t=time in years.
Find the missing variable.

10. $A = \$200, P = \$100, r = 2.3\%$ $\quad 200 = 100e^{.023t}$ $\quad t = \frac{ln(2)}{.023} \approx 30.149$

11. $A = \$3000, P = \$100, t = 30$ $\quad 3000 = 100e^{30r}$ $\quad r = \frac{ln(30)}{30} \approx 0.113 = 11.3\%$