

## Math 150 Week in Review 6 Problem Set

(Parts of Problems 4 and 6 were taken from *Precalculus: Functions and Graphs* by Swokowski/Cole)

1. Sketch graphs for the following exponential and logarithmic functions by using transformations. Find the domain, range, and asymptotes for each.

(a)  $f(x) = -\left(\frac{1}{4}\right)^{x+1} + 2$

(b)  $f(x) = \log_3(-x) - 1$

2. Find the domain of the logarithmic function  $f(x) = \log_2(x^2 - 9x + 18)$ .

3. Use the Laws of Logarithms to fully expand the following expressions.

(a)  $\ln\left(\frac{3x^5(x+2)^2}{\sqrt[4]{y}}\right)$

(b)  $(\log 4xy)^2 \log \sqrt[5]{7x+14}$

4. Use the Laws of Logarithms to combine the following expressions. Write as a single logarithm when possible.

(a)  $\frac{1}{3} \log(x-7) - 2 \log y - 5 \log(z^2 + 16)$

(b)  $\frac{2 \ln x - 4 \ln \frac{1}{y} - 3 \ln xy}{4 \ln x + \ln y}$

5. Evaluate the following logarithmic expressions.

(a)  $\log_3 \sqrt{27}$

(b)  $\log 10000 + \ln \frac{1}{e^5} + 4^{\log_4 7}$

(c)  $\log_4 5 - \log_4 80$

(d)  $\log_2 144 + \log_2 9 - \log_2 81$

(e)  $\log_3 7$

6. Solve the following equations for  $x$ .

(a)  $125^{4x+1} = 25$

(b)  $\log_x 8 = \frac{3}{4}$

(c)  $6^{3x-7} = 2$

(d)  $\ln(x+1) - \ln 4 = 3$

(e)  $2e^{-20x} = 3$

(f)  $\log_3(x-6) + \log_3(x+2) = 2$

(g)  $2^{2x+3} = 3^{x-2}$

(h)  $\log(x-4) - \log(3x-10) = \log\left(\frac{1}{x}\right)$

(i)  $e^{4x} - e^{2x} - 20 = 0$

(j)  $\log_3 x - \log_9(x+42) = 0$

7. (a) If \$2000 is invested in an account at an interest rate of 6%/yr compounded quarterly, how much is in the account after 21 months?  
 (b) When will the account have \$5000 in it?  
 (c) If interest was compounded continuously, how long would it take to have \$5000 in the account?