

Math 111 – Lab #6/ More on Logarithms Name: _____

You are encouraged to work together, however each student must hand in their own lab. If you do not finish during class, you may hand this in at the beginning of next class. **Remember to show any work! (100 pts)**

1. Describe using words the relationship between the functions $f(x) = e^x$ and $g(x) = \ln x$. (4 points)

2. Given that $f(x) = 4^{2x}$, $g(x) = 3 - e^x$ and $h(x) = \log_4 x$ evaluate the following using your calculator. Round to 4 decimal places: (16 points)

a. $f\left(\frac{\pi}{2}\right) \approx$

b. $g(\sqrt{3}) \approx$

c. $(f + g)(3) \approx$

d. $h(67) \approx$

3. Evaluate the following logarithms using the Properties and Laws of Logarithms. (20 points) (Show at least one intermediate step for each)

a. $\log_4 16^{100} =$

b. $\log_3 \sqrt{27} =$

c. $4^{\log_4 23} =$

d. $\log_3 567 - \log_3 63 =$

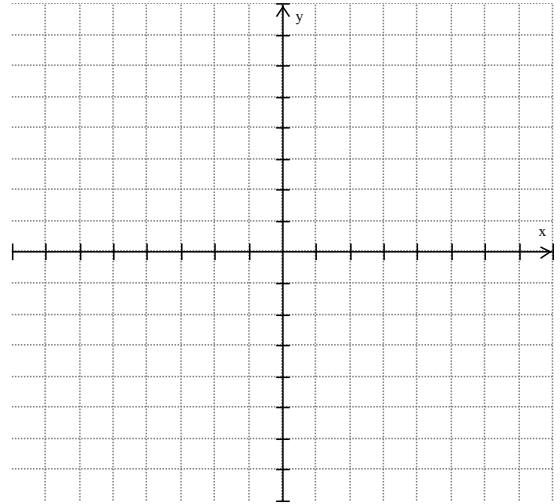
4. Use your calculator to sketch a graph of the function $(x) = 3 - \ln(x - 2)$.

(20 points)

a. What is the domain and range of this function?

b. What is the asymptote?

c. If $g(x) = \ln x$, describe the transformations used to transform the graph of g into the graph of f .



5. Solve the following exponential and logarithmic equations without your calculator. That means you will have an exact solution. Show NEAT work on a separate paper and attach it to this one. Write your answers in the space provided. Round any decimals to 4 places.

(35 points)

a. $5^{x+3} = 29$

$x =$ _____

b. $e^{2x} - 4e^x - 12 = 0$

$x =$ _____

c. $\frac{16}{1+3e^{-0.25x}} = 3$

$x =$ _____

d. $8^{\frac{x}{3}} = 2$

$x =$ _____

e. $6^x = 2^{2x+5}$

$x =$ _____

f. $\ln(10 + x) - 3 = 8$

$x =$ _____

g. $\log_5(x + 4) = 2$

$x =$ _____

6. Solve the following exponential equation by graphing it on your calculator. Round your answer to 4 decimal places. (5 points) $3^{2x-1} = 30$

$x =$ _____