Review Exercises

Chapter 4 - Exponential and Logarithmic Functions

CALCULATOR INACTIVE.

1. Determine the domain of $f(x) = \log_5 \dfrac{x + 4}{x - 8}$

2. Solve each equation. Give exact answers.

   a. $36^{2x} = 6^{3x-4}$

   b. $\log_8 x + \log_8(x + 2) = 1$

   c. $e^{\ln 9x} = 72$

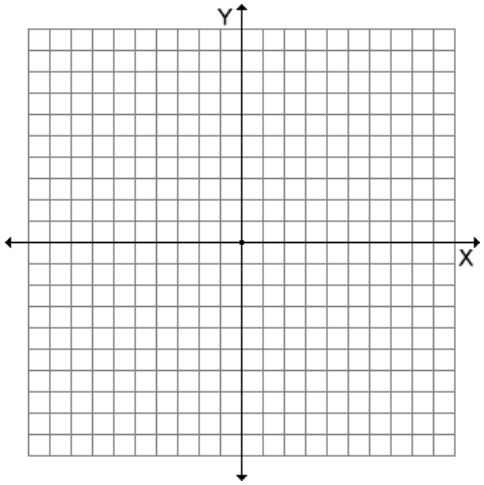
   d. $27^{x} = 3^{2x + 1}$

3. Express as a single logarithm. **Simplify as much as possible**.
   $4\log x + 2\log 3 - 2\log x$

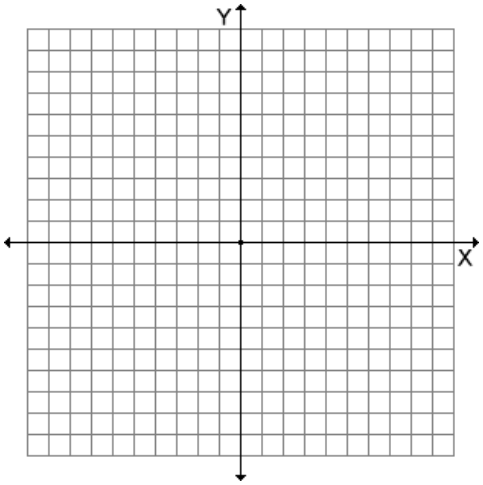
4. Find y as a function of x if $\ln y - \ln x = 3\ln 2 + \ln 4$ (Remember to use your log properties!!).

5. Graph each of the functions below. Label three points and any asymptotes.

a. $f(x) = -3^x + 1$



b. $g(x) = \log_5(x + 1)$



6. Evaluate each expression:

a. $\ln e^5$

b. $\log_9 1$

c. $\log_5 5^{31}$

d. $\log 10{,}000$

e. $8^{\log_8 6}$

f. $\log_{1/3} 27$

7. a. Find the inverse of $f(x) = \frac{x + 2}{2x - 3}$

b. Give the domain and range of f(x) and its inverse.

CALCULATOR ACTIVE.

8. If $3^{(-2x)} = 6$, what is $3^{(-4x)}$?

9. Find $\log_9 21$ to the nearest thousandth.

10. The half-life of Mathonium is 12 days. If 400 grams of Mathonium is present now, how much will be present in 21 days?

12. An object at a temperature of 150˚C was removed from a furnace and placed in a room at 30˚C. If after 60 minutes the temperature of the object is 90˚C, how long will it take for the object to reach 55˚C?

13. Find the balance when $11,000 is invested at an annual rate of 6 percent for 7 years if the interest is compounded

a. quarterly

b. continuously

c. How long will it take to double the investment if it is compounded annually?

14. What is the effective rate of interest for 6% interest compounded monthly?

15. Environmentalists expect the population of a species of eagles in captivity to grow according to the model

$$P(t) = \frac{350}{1 + 60e^{-0.162\,t}}$$

a. How many eagles were there originally?

b. What is the growth rate of the eagle population?

c. What is the carrying capacity of the environment?

d. What is the predicted population of the eagle in 20 years?

e. When will the population be 300?

16. A store manager collected the following data regarding price and quantity demanded of shoes:

Price	Quantity Demanded
79	10
67	20
54	30
46	40
38	50
31	60

a. Find an **exponential** function to model the data. Y = _____.

b. Write the equation in the form $A = A_0e^{kt}$.

c. Predict the quantity demanded if the price is $60.

17. A child's grandparents wish to purchase a bond fund that matures in 18 years to be used for her college education. The bond fund pays 5% compounded monthly. How much should they be willing to purchase **now** so that the bond fund will be worth $60,000 at maturity?

Extra Credit (Non-calculator – Show your work.)

Solve $2^{2x} + 2^{x+2} - 12 = 0$