

## Unit 9 Review #1 – Exponentials and Logs

1. Simplify each of the following using properties of exponentials.

(Calculator Section)

a.  $\left(\frac{32x^{-8}y}{2y^{-3}z}\right)^{\frac{1}{4}}$

b.  $\left(\frac{1}{x^2y}\right)^{-1} \cdot -3x^4y^6$

c.  $\left(\frac{8x^3y^{-6}}{z^{-9}}\right)^{\frac{1}{3}} \cdot \left(\frac{4x^6}{y^4}\right)^{\frac{1}{2}}$

d.  $\left(\frac{x^{-1}y^2z^{-3}}{x^{-2}y^0z}\right)^0$

2. Simplify the following with one base and no fraction:

$$\frac{1000^{3x}}{100^x}$$

(Calculator Section)

3. In the year 2000, a car was purchased at \$26,000. In the year 2006, the car was worth \$17,500. Write an equation that models the amount the car was worth after  $t$  years.

(Calculator Section)

4. You take a 300 milligram dosage of ibuprofen. During each subsequent hour, the amount of medication in your bloodstream decreases by 27% each hour. (Calculator Section)

a. Write an exponential model giving the amount  $y$  (in milligrams) of ibuprofen in your bloodstream  $t$  hours after the initial dose.

b. How long will it take for you to have 100 milligrams of ibuprofen in your bloodstream.

5. The number  $y$  of duckweed fronds in a pond after  $t$  days is  $y = a(1230.25)^{t/16}$ , where  $a$  is the initial number of fronds. By what percent does the duckweed increase each day? (Calculator Section)

6. Use  $A(t) = 11,000\left(1 + \frac{0.03}{52}\right)^{52t}$  to answer the following questions. (Calculator Section)

a. What is the value of the account?

b. What is the initial deposit?

c. How many years has the account been accumulating interest?

d. What is the interest rate on the account?

e. Circle one answer: This account was compounded \_\_\_\_\_.

Yearly

Quarterly

Monthly

Weekly

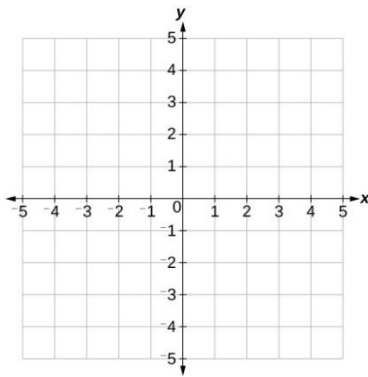
Daily

Continuously

7. Calculate the initial deposit of an account that is worth \$15,500.75 after earning 7.0% interest compounded continuously for 5 years.  
(Calculator Section)

8. Graph each of the following including one accurately plotted and labeled point. (Non-Calculator Section)

a.  $f(x) = \left(\frac{1}{2}\right)^{x+3} - 4$

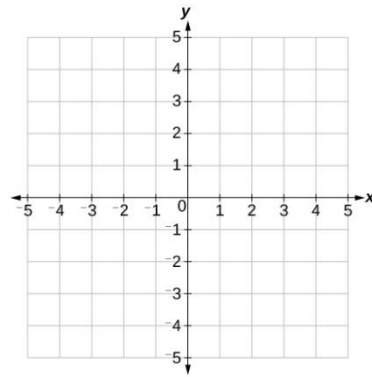


Equation of Asymptote: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

b.  $g(x) = -2^{x+1} + 4$

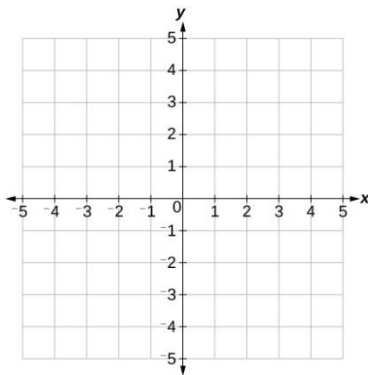


Equation of Asymptote: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

c.  $h(x) = \ln(x+1) - 2$

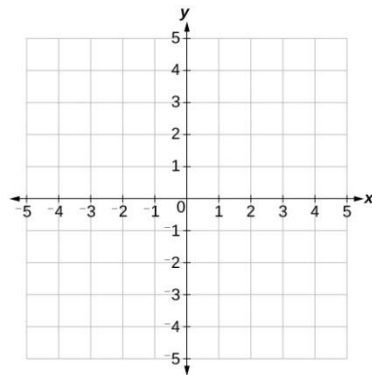


Equation of Asymptote: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

d.  $f(x) = \log_2(-x-2) + 3$



Equation of Asymptote: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

9. Evaluate each of the following logarithms.

(Non-Calculator Section)

a.  $\log_4 2$

b.  $\log_2 16^2 + \log_3 27$

c.  $\ln e$

d.  $\log_5 \left( \frac{1}{125} \right)$

10. Use properties of logarithms to expand the following:

$$\ln \left( \sqrt[3]{\frac{xy^6}{z^3}} \right)$$

(Non-Calculator Section)

11. Use properties of logarithms to condense the following:

$$\frac{1}{2} \log 25 + 3 \log x - \log 10 \quad (\text{Non-Calculator Section})$$

12. Solve each of the following equations.

(Non-Calculator Section)

You may leave logarithms in your answer since you will not have a calculator. Be sure to check your answers for extraneous solutions.

a.  $\log_6(3x) + \log_6(x-1) = 3$

b.  $6\ln(x+1) - 10 = 26$

c.  $\ln(2x+5) = \ln(x-1)$

d.  $36^{2x} = \left(\frac{1}{6}\right)^{-x-2}$

e.  $2e^{4x} + 5 = 13$

f.  $11^{6x} = 38$