

Unit 9 Review #2 – Exponentials and Logs

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

(Calculator Section)

a. $\left(\frac{50x^4y^{-1}}{2y^{-5}z^2}\right)^{\frac{1}{2}}$

b. $\left(\frac{27x^{-3}y^9}{z^{-6}}\right)^{1/3} \cdot \left(\frac{16x^8}{z^{10}}\right)^{1/2}$

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

$$\frac{49^{6x^2}}{7^x}$$

(Calculator Section)

3. In the year 1990, a painting was purchased at \$126,000. In the year 2005, the painting was worth \$137,000. Write an equation that models the amount the painting was worth after t years.

(Calculator Section)

4. The value of a car, y , in thousands, after t years can be modeled by the equation $y = 28(.88)^t$. It was purchased in the year 2010.

a. What was the initial value of the car?

b. By what percent is the car decreasing by per year?

c. How much of the value remains from one year to the next?

d. What is the value of the car in 2015?

e. When will the car be worth half of its original value?

5. Use $A(t) = 1500e^{0.4t}$ to answer the following questions. The interest rate for this account is 4% (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. Circle one answer: This account was compounded _____.

Yearly

Quarterly

Monthly

Weekly

Daily

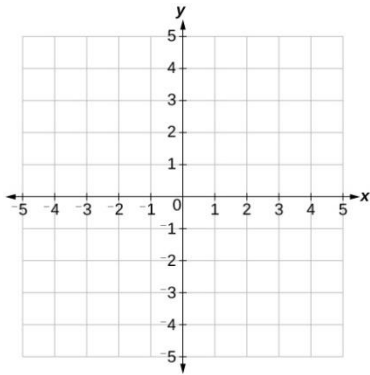
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6. Calculate the initial deposit of an account that is worth \$15,500.75 after earning 7.0% interest compounded semi-annually for 5 years. (Calculator Section)

7. Graph each of the following including one accurately plotted and labeled point.

(Non-Calculator Section)

a. $f(x) = (3)^{x-2} - 1$

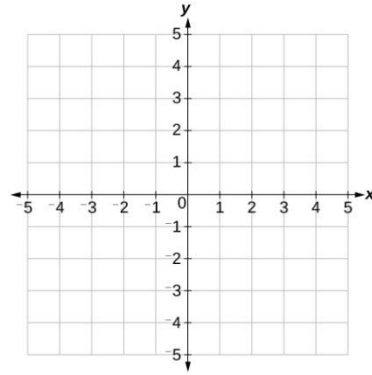


Equation of Asymptote: _____

Domain: _____

Range: _____

b. $g(x) = -\left(\frac{1}{2}\right)^{x-1} + 3$

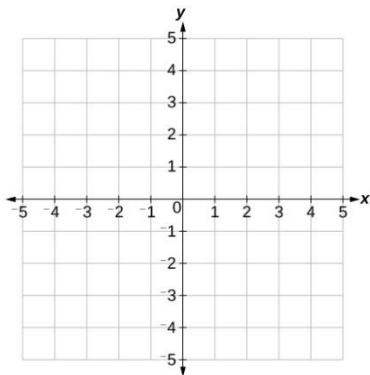


Equation of Asymptote: _____

Domain: _____

Range: _____

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

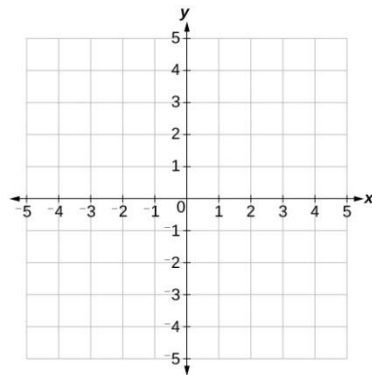


Equation of Asymptote: _____

Domain: _____

Range: _____

d. $f(x) = \log_3(x+3) - 1$



Equation of Asymptote: _____

Domain: _____

Range: _____

8. Evaluate each of the following logarithms.

(Non-Calculator Section)

a. $\log_2\left(\frac{1}{8}\right)$

b. $\log_2 32^2 - \log_3 81$

c. $\ln \sqrt{e}$

d. $\log_4 \left(\frac{1}{64} \right)$

10. Use properties of logarithms to expand the following:

$$\log \left(\frac{4x^5}{y^6} \right)$$

(Non-Calculator Section)

11. Use properties of logarithms to condense the following:

$$\frac{1}{2} \ln x + \frac{1}{2} \ln 16 - \ln 8$$

(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. $\log_4(2x) + \log_4(x-1) = 2$

b. $\ln(x-2) - 10 = 15$

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

d. $16^{2x} = \left(\frac{1}{4}\right)^{-x-2}$

e. $3e^{6x} + 5 = 20$

f. $12^{4x} = 40$