Unit 2 Test Prep

1. Use the exponential function to answer the following questions.

$$f(x) = 12(0.96)^x$$

a) Find f(6) and round to 2 decimal places

$$12(0.96)^6 = 9.39$$
itial value

b) What is the initial value

12

c) What is the base value

d) Is the exponential function growing or decaying

2. Axel invested \$480 into a bank account at an interest rate of 8% compounded quarterly. How much money does she have after 7 years?

$$A = P(1 + \frac{1}{n})^{n+1}$$

① \$835.69
$$A = 480 \left(\frac{4}{4} + \frac{0.08}{4} \right)^{4(7)}$$

$$7 = +$$

$$87 = r = 0.08$$

F12 = 517

3. The population P(t) of bacteria in a petry dish is modeled by the following equation where t measures in hours since the population study began.

$$P(t) = \frac{1200}{1 + 11 \times 1.7^{-t}}$$

a. What is the carrying capacity?

b. What is the initial population of bacteria?

$$P(0) = \frac{1200}{1 + 11 \times 1.70} = 100$$

c. What is the population of bacteria after 4 years?

$$\frac{1200}{1 + 11 \times 1.7^{-4}} = 517$$

4. Change the equation to logarithmic form

to logarithmic form
$$6^{3x} = 36$$

$$\log_6(36) = 3\times$$

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5. Change the equation to exponential form

$$\log(x-3) = 2$$

t pol - pol + 6. Solve the equation algebraically. Round the answer to 4 decimal places

$$43^{x}) + 10 = 90$$

$$-10 - 10$$

$$4(3^{x}) = 80$$

7. Solve the following algebraically. Round to 2 decimal places

$$2\log_{e}(x) + 5 = 19$$

$$-5 - 5$$

$$2\log_{e}(x) = 14$$

$$2$$

$$\log_{e}(x) = 7$$

$$\ln(x) = 7$$

Solution: 1096.63

Solve the following algebraically. Round to 4 decimal places

$$5\log_{2}(3x) - 7 = 15$$

$$+ 7 + 7$$

$$5\log_{2}(3x) = \frac{22}{5}$$

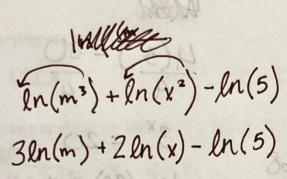
$$\log_{2}(3x) = \frac{22}{5} = 4.4$$

$$\log_{2}(3x) = \frac{22}{5} = 4.4$$

Solution: 7.0374
$$\frac{2^{4.4}}{3} = \frac{3}{3}$$

9. Expand the expression. If possible, write the answer without exponents

$$\ln \frac{m^3 x^2}{5}$$



Combine the expression. If possible, write the answer without 10. exponents

$$\log(x^2) + \log(5x) - \log(6)$$

$$\log\left(\frac{x^2 \cdot 5x}{6}\right)$$

Solve the equation using log properties. 11.

$$\log_3(x+8) = 2 - \log_3 x + \log_3 x$$

$$+ \log_3 (x) + \log_3 (x+8) = 2$$

$$\log_3 (x^2 + 8x) = 2$$

Solve the equation using log properties.

$$3^{2} = \chi^{2} + 8\chi \quad \Rightarrow 9 = \chi^{2} + 8\chi = 0 = \chi^{2} + 8\chi - 9$$

$$2\log A = \log(7a + 18)$$

$$\log(a^{2}) = \log(7a + 18)$$

$$\alpha = 2$$

$$\alpha = 3^{2} = 2$$

12.

$$2\log a = \log(7a + 18)$$

$$\log(a^{2}) = \log(7a + 18)$$

$$a^{2} = 7a + 18$$

$$-7a = 18$$

$$-7a = 18$$

$$a^2 - 7a - 18 = 0$$

- 13. The formula $C(x) = 280 \ln(x + 1) + 1925$ models the number of calories consumed by a person owning x acres of land.
 - a. How many calories daily would a person consume if they owned 1.5 acres of land?

b. Estimate the number of acres owned for which the average intake is 2300 calories per day.

$$2300 = 280ln(x+1) + 1925$$

$$-1925$$

$$\frac{375}{280} = \frac{280 \ln(x+1)}{280}$$

$$1.339 = ln(x+1)$$

$$e^{1.339} = X + 1$$

$$3.814 = y + 1$$