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Chapter 9 Test Review

Round all answers to the nearest thousandth.

1. Bob buys a used car in 2014. At that time, Bob's car was valued as $12,500. Since then bobs car has depreciated at a rate of 6% every year.

   a. Write an equation that models the value of the car after x years.

   100% - 6% = 94%

   a. $y = 12,500(.94)^x$

   b. What is the value of the car after 7 years?

   $12,500(.94)^7$

   b. $8,105.97

   c. After how many years will the car be worth only $5,000?

   $5000 = 12,500(.94)^x \leftarrow 15$

   c. ≈ 15 yrs. later

2. In 1900, the population of London England was 6,000,000. The city experienced a growth of about 9% every 6 years.

   a. Write an equation that models the population after x years.

   100% + 9% = 109% = 1.09

   a. $y = 6,000,000(1.09)^{x/6}$

   b. Suppose the rate continues, what would the population be in 1940?

   $y = 6,000,000(1.09)^{40/6}$

   b. 10,657,645

   c. What was the population in 1880? 20 yrs ago

   $y = 6,000,000(1.09)^{-20/6}$

   c. 4,501,904

3. Sulfur-35 has a half-life of about 87 days. A lab began a study with a sample of 25g of Sulfur-35.

   a. Write an equation that models that amount of Sulfur-35 remaining after x days.

   $y = 25(0.5)^{x/87}$

   a. $y = 25(0.5)^{x/87}$

   b. After 300 days, how much Sulfur-35 will remain?

   $y = 25(0.5)^{300/87}$

   b. 2.29 g

   c. After how many days will 17g of the Sulfur-35 remain?

   $17 = 25(0.5)^{x/87}$ ≈ 48

   c. ≈ 48 days

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4. Write the equation in exponential form: $\log_5 8 = x$

4. $5^x = 8$

5. Write the equation in exponential form: $\log_{31} 6 = x$

5. $31^x = 6$

6. Write the equation in logarithmic form: $3^y = 156$

6. $\log_3 156 = y$

7. Write the equation in logarithmic form: $4^t = 453$

7. $\log_4 453 = t$

8. Simplify: $7\log_5 y + \frac{\log_5 x}{3}$

$\log_5 y^7 + \log_5 x^{1/3}$

8. $\log_5 (y^7 \cdot \sqrt[3]{x})$

9. Simplify: $\log_3 u - 12\log_3 v$

$\log_3 \left(\frac{u}{v^{12}}\right)$

9. $\log_3 \left(\frac{u}{v^{12}}\right)$

10. Simplify: $3\log_2 x + 2\log_2 y - 5\log_2 z$

$\log_2 (x^3 \cdot y^2) - \log_2 z^5$

10. $\log_2 \left(\frac{x^3 y^2}{z^5}\right)$

11. Expand: $\log_5 (y \cdot z)^{1/4}$

$\log_5 y^{1/4} + \log_5 z^{1/4}$

11. $\log_5 \sqrt[4]{y} + \log_5 \sqrt[4]{z}$

12. Expand: $\log_8 \frac{x}{y^9}$

12. $\log_8 x - 9\log_8 y$

13. Expand: $\log \frac{4x}{y}$

13. $\log 4x - \log y$

14. Evaluate: $\log_2 678$ $\frac{\log 678}{\log 2}$

14. 9.41

15. Evaluate: $\log_4 68$ $\frac{\log 68}{\log 4}$

15. 3.04

16. Evaluate: $\log_5 324$ $\frac{\log 324}{\log 5}$

16. 3.59

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17. Solve the equation for y: $\frac{7 \cdot 3^y}{7} = \frac{567}{7}$

$y \cdot \log 3 = \log 81$

17. $y = 4$

18. Solve the equation for x: $4^x = 4096$

$\log 4^x = \log 4096$

18. $x = 6$

19. Solve the equation for m: $73^m - 6 = 5233$

$+6 \quad +6$

$m \cdot \log 73 = \log 5239$

19. $m = 1.996$

20. Solve the equation for x: $2^{5x-20} + 45 = 77$

$-45 \quad -45$

20. $x = 5$

$(5x-20) \cdot \frac{\log 2}{\log 2} = \frac{\log 32}{\log 2}$

$5x - 20 = 5$

$+20 \quad +20$

$\frac{5x}{5} = \frac{25}{5}$

$x = 5$