

College Algebra Review for Test 4

1. Find the domain and range of $f(x) = \left(\frac{1}{2}\right)^x - 3$.
2. A certain population increases according to the model $P(t) = 40e^{.025t}$. Use the model to determine the population when $t = 50$. Round your answer to the nearest integer.
3. Find the domain and range of $f(x) = 3 + \log(x - 1)$.

Write the following in exponential form.

4. $\log 10 = 1$
5. $\ln x = y$

Write in logarithmic form.

6. $e^2 = x$
7. $10^2 = 100$

Find the value of the following using your calculator. Round your answers to 4 decimal places.

8. $\log_{\frac{1}{3}} 7$
9. $\log_2 9$

Simplify the following completely without the use of a calculator.

10. $\ln \frac{1}{e}$
11. $3\log_a a$
12. $\ln \sqrt[5]{e^3 x}$

Write the following as a sum, difference, or multiple of logarithms.

13. $\log \left(\frac{x^2 y^3}{z} \right)^4$
14. $\ln \frac{5x}{\sqrt[3]{x^2 + 1}}$

Write the following as the logarithm of a single quantity.

$$15. \frac{1}{3} [2 \log(x^2 + 1) - 3 \log(x - 3) - \log 4]$$

$$16. 3 \ln x^{\frac{1}{4}} + 2 \ln y^4 - 3 \ln z$$

Solve the following for x . Round answers to four decimal places where needed.

$$17. 2 = 5^{3x-1}$$

$$18. \log(7-x) - \log(3x+2) = 1$$

$$19. \log(7-x) + \log(3x+5) = \ln(24x)$$

20. Find the constant k such that the exponential function $y = 2e^{kx}$ passes through the points $(0, 2)$ and $(2, 5)$. Find the value exactly, no decimals.

21. The number N of bacteria in a culture is given by $N = 200e^{kt}$. If $N=300$ when $t = 4$, find k to the nearest tenth and then determine approximately (to the nearest hour) how long it will take for the number of bacteria to triple in size.

22. TRUE or FALSE:

$$\begin{aligned} \log_2(8+16) &= \log_2 8 + \log_2 16 \\ &= 3 + 4 \\ &= 7 \end{aligned}$$

Explain your answer.