

[logarithmic functions]

1. The inverse of an exponential function is a _____.
2. Sketch the graphs of $y = 2^x$ and $y = 3^{-x}$
3. Solve the following equations for x . Give exact solutions, not decimal approximations.
Use the rules of logarithms where appropriate.

a. $\log_4 x = 3$

b. $\log_3 3^3 = x$

c. $\log_{\frac{1}{3}} 25 = x$

d. $\log_x 27 = \frac{3}{2}$

e. $8^3 = 5$

f. $\log_{10} \frac{1}{10} = x$

g. $\log_{10}(x + 2) + \log_{10}(x - 1) = 1$

h. $\log_2 x = \log_2 9 + \log_2 5$

4. Express $\frac{1}{3} [\log_5 3 + 2 \log_5 x^2 - \log_5 2]$ as a single logarithm.

5. Solve the following equation for x . Give your answer to 4 decimal places.

$$3^{\frac{x}{2}-4} = 7$$

6. An isotope of sodium Na^{24} , has a half-life of 15 hours. Find the amount remaining from a 6 g sample after 8 hours. (Give the answer to the nearest tenth of a gram.)
7. Mitch wants to invest \$2400 in bonds which bears an interest rate of 8.75% compounded semi-annually. How long will it take for Mitch to have at least \$3000.
8. A bacteria culture starts at a count of 4000 and 7.5 hours later there are 25 000. Calculate doubling period of this type of bacteria.