

9. Solve for x , $3^{2x+1} = 5$, approximated to four decimal places

- a) .7325 b) .3333 c) .2325 d) 1

Also solve the following equations for x

i. $5^{2x-3} = 7^{x+1}$

ii. $5^{2x+10} = 5^{x^2-5}$

iii. $3 \cdot 5^{2x-3} = 14$

10. $\log_2 15 \approx$

- a) 1.1761 b) 3.9069 c) .8751 d) .5880

11. Solve for x , $\log(7x-12) - 2\log x = 0$

- a) 4, 3 b) $\frac{7}{3}$ c) $\frac{12}{5}$ d) 1, -2

12. Find the pH of a solution with a hydrogen ion concentration of 5.3×10^{-4} gram-ions per liter.

- a) .00053 b) 3.28 c) -4 d) Undefined

13. Determine which of the following is true:

- a) $\log_b xy = (\log_b x)(\log_b y)$ b) $\log_b 0 = 1$ c) $\log_b ab = \log_b a + 1$ d) $\frac{\log_b A}{\log_b B} = \log_b A - \log_b B$

14. Solve the equation: $\log_2 x + \log_2(x+2) = 3$

15. Solve the equation: $3^{x-1} = 100^x$

16. In 1997 the population of the United States of America was 268 million people and the annual growth rate was 0.89%. Assuming this growth rate remains constant, determine the year when the population of the United States of America is 300 million?

17. An account with an initial investment of \$5000 grows to \$7000 in 5 years. Assuming continuous compounding, what interest rate is being paid?

18. Determine the age of a bone (to the nearest 10 years) if it now contains 60% of its original amount of carbon-14. Use 5730 years as the half-life of carbon-14.

19. Simplify $3^{\log_3 x}$

20. Solve for x $1 - \log(x+2) = \log x$

21. Suppose that \$5000 is invested at 9% compounded continuously. Estimate the time required for the \$5000 to double

22. An initial deposit of \$4000 is made in a savings account for which the interest is compounded continuously. The balance will triple in 20 years. What is the annual rate of interest of this account?
23. An Ark was found in the hills near Mount Sinai. It is claimed to be Noah's Ark. The amount of Carbon 14 found in the Ark is 80% of that found in living wood and that the half life of Carbon 14 is 5730 years. How old is the Ark? Could it have been Noah's? (Hint: use $Q(t) = Q_0 e^{kt}$)
24. Suppose that $\log_x x = 5$, $\log_x y = 3$, and $\log_x z = 2$. Use the properties of logarithm to compute $\log_x \frac{xy^2}{z^3}$
25. An initial deposit of \$4000 is made in a savings account for which the interest is compounded continuously. The balance will triple in 20 years. What is the annual rate of interest of this account?
26. How long will it take for \$1500 to double if it is invested in an account that pays interest at an annual rate of 8% and the interest is **compounded continuously**?