Logarithm & Exponent Bingo

1. What is the value of $\log_{10}100^3$ (6)
2. For what value of A is $\log_5 A = 1$ $5^1 = A$ [5]
3. For what exact value of B is $\ln B = 1$ e
4. If $C = 2\ln e^4$, then C is what value? $2 \cdot 4 =$ [8]
5. True or [False]: the function $f(x) = \ln(x-4)$ has a y-intercept that is a negative number. $\ln(0-4) = 1.38$
6. Solve for x: $\log_4(5x-6) = 3$ $4^3 = 5x-6$ [$x = 14$]
7. If $\log_4 a = 2$, then what is the value of $\sqrt{a}$? $a = 4^2 = 16$ $\sqrt{16} =$ [4]
8. Solve for x: $\log_5(7x-3) = \log_5(4x+9)$ $7x-3 = 4x+9$ $3x = 12$ [$x = 4$]
9. Solve for x: $\ln 4x = 2$? $4x = e^2$ [$x = 1.85$]
10. Solve for x: $\log_3 4(x+1) = \log_3(7x-5)$ $4x+4 = 7x-5$ $9 = 3x$ [$x = 3$]
11. What is the domain of $y = \log_2(5-x)$? can't be neg. $5-x > 0$ $-x > -5$ [$x > 5$]
12. Covert to logarithmic form: $7^m = 30$ [$\log_7 30 = m$]
13. Solve for x: $2 + 3\log_3 4x = 8$ [9/4]
14. What is the value of $\log_8 27$ [1.58]
15. Solve for x: $\ln x - \ln 2 = 1$ $\ln x/2 = 1$ $x/2 = e^1$ [5.44]
16. Solve for a: $\log(a-2) = 2$ $a-2 = 100$ [102]
17. Find the solution(s) for this equation: $\ln(x-5) = \ln(2x+11) - \ln(x+1)$ [$x = 8$]
18. Solve for x: $\log_4(x-3) + \log_4(x-6) = \log_4(x) + \log_4(x-7)$ $x^2 - 9x + 18 = x^2 - 7x$ $+9x$ $+9x$ $2x = 18$ [$x = 9$]
19. What is the largest integer that is less than $\log 85$? (1)
20. Fill in the blank with >, < or =: $\log_{10}10{,}000$ [>] $\ln e^3$
21. What is the value of $\log_2(1/32)$ [-5]
22. If $\log K = 2.5186$, what is the value of K to the nearest integer? 330
23. Evaluate $\log_4(1/16)$. [-2]
24. You bought an iPad for \$499, which depreciates at a rate of 7% per year. Write an exponential model showing this and find when the value will be about \$300? $300 = 499(.93)^t$ $.93^t = 300/499 = .6012$ 7

value

Review Problems

Answers

1. Write the formula for half-life: $y = a\left(\frac{1}{2}\right)^{t/HL}$
   a. The isotope Hg-197 is used in kidney scans. It has a half-life of 64.128 h. After that time, half the isotope will have decayed. Write the exponential decay function for a 12-mg sample. Find the amount remaining after 72 h. $y = 12\left(\frac{1}{2}\right)^{72/64.128} = 5.5$ mg
   b. The isotope Sr-85 is used in bone scans. It has a half-life of 64.9 days. Write the exponential decay function for an 8-mg sample. Find the amount remaining after 100 days. $y = 8\left(\frac{1}{2}\right)^{100/64.9} = 2.7$ mg
2. Your parents give you $10,000. You place it in an account that pays 6.1% annual interest **compounded continuously**. How much will you have in 20 years? Round the answer to the nearest dollar. $A = (10,000)e^{(.061)(20)} = \$33,872$
3. Bram invested $10,000 in an account that earns **simple 5% interest annually**.
   a. How much interest does the account earn in the first 10 years? Round to the nearest dollar. ~~$y = 10,000(1.05)^{10} = 16,289$~~ omit
   b. How much more would the account earn in interest in the first 10 years if the interest **compounded continuously**? Round to the nearest dollar.

$A = 10,000\,e^{(.05)(10)} = 16,487$ 198

Write each expression as a single logarithm.

4. $\log 8 + \log 3$ $\log 24$
5. $4(\log_2 x + \log_2 3)$ $\log_2 (3x)^4$
6. $3\log x + 4\log 4$ $\log 4x^3$
7. $\log 4 + \log 2 - \log 5$ $\log \frac{8}{5}$

Expand each logarithm.

8. $\log_b 2x^2y^3$ $\log_b 2 + 2\log_b x + 3\log_b y$
9. $\log_b 3m^3p^2$ $\log_b 3 + 3\log m + 2\log p$
10. $\log_b (4mn)^5$ $5\log 4 + 5\log m + 5\log n$
11. $\log_b \frac{x^2}{2y}$ $2\log x - \log 2 - \log y$
12. $\log_b \frac{(xy)^4}{2}$ $4\log x + 4\log y - \log 2$
13. $\log_b \sqrt[5]{x^3}$ $\log x^{3/5}$ $3/5 \log x$

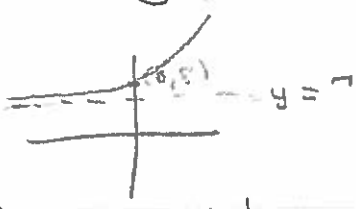
14. Use the properties of logarithms to evaluate $\log_8 6 - \log_8 15 + \log_8 20$. $\log_8 \left(\frac{2}{5}\right) \cdot 20$ $\log_8 8$ 1

15. Solve: $e^{2x}e^x = 7$ $\ln e^{3x} = \ln 7$ $3x = \ln 7$ $x = .65$

16. Determine whether the following functions represent exponential growth or decay.
   a. $y = 0.99\left(\frac{1}{3}\right)^x$ less than 1 D
   b. $y = 20(1.75)^x$ more than 1 G
   c. $y = 185\left(\frac{5}{4}\right)^x$ more G
   d. $f(x) = \frac{2}{3}\left(\frac{1}{2}\right)^x$ less than one D

17. Identify the decay factor: $y = 1.85(.75)^x$ 25% 1 − .25

18. What is the range of the graph $y = 2^x + 7$ up 7 $y > 7$ $(7, \infty)$



20. Identify the vertical asymptote of $y = \log(x + 6) - 2$ $x = -6$ KEY (1,0) → (−5, −2) pt.