

E is none of these

1. Find the real value of x that satisfies $\log_2 x + \log_4 x + \log_{16} x = 7$

- a) 2 b) 4 c) 8 d) 16

2. $\log_b 3 = 1.5$, $\log_b 5 = 2.2$. Evaluate: $\log\left(\frac{27}{25}\right)$.

- a) 0 b) 0.2 c) 3.7 d) 8.9

3. If $128^{(x-1)}$ divided by $4^{(2x+3)}$ equals 32^x , find the value of $\frac{x}{2}$.

- a) $\frac{17}{2}$ b) $\frac{17}{6}$ c) $-\frac{13}{4}$ d) $-\frac{13}{2}$

4. Simplify: $\frac{2^{2^3}}{2^{2^2}} + \frac{3^{3^3}}{3^{3^2}}$:

- a) 31 b) 13 c) 3.5 d) 3

5. Solve for x : $2\log_{12} x = \frac{1}{2}\log_{12} 9 + 3\log_{12} 3$.

- a) 3 b) 9 c) 18 d) 27

6. If $\log 2\sqrt{x} - \log \frac{3}{2x} + \frac{1}{2} \log x^2 = a \log x + \log b$, find $a + b$.

- a) 3 b) $\frac{23}{6}$ c) $\frac{19}{6}$ d) $\frac{25}{6}$

7. Solve: $\log(x + 4) - \log(2x - 3) = \log 2$.

- a) -1 b) 5 c) $\frac{10}{3}$ d) 2

8. Simplify: $(6^2 - 10^2)^{-\frac{1}{2}}$.

- a) $\frac{4}{15}$ b) $\frac{1}{8}$ c) $\frac{15}{2}$ d) $\frac{1}{2}$

9. Find the inverse of $f(x) = 3 \cdot 2^{(x+1)}$.

- a) $f^{-1} = \log_2 \frac{x}{3} - 1$ b) $f^{-1} = \frac{\log_2 x - \log_2 3}{\log_2 x}$

2009 Logs and Exponents Topic Test (Theta)

c) $f^{-1} = \frac{\log_2 x - \log_2 3}{\log_2 3}$

d) $f^{-1} = 3\log_2 x - 1$

10. If $\log_4(\log_8(64)) = \log_5 x$.

a) $\sqrt{5}$

b) 5

c) 25

d) $\frac{1}{5}$

11. Given: $2^{3x+1} \cdot 3^{5y+7} = \frac{16}{27}$, find $2x - 3y$.

a) -4

b) 6

c) 8

d) 10

12. Simplify: $\frac{1}{2}\ln 9 + \ln 12 - 2\ln 3$

a) 4

b) $\ln 4$

c) $\ln 6$

d) $\ln 9$

13. Find the sum of the digits in base ten of $(10^{4n^2+8} + 1)^2$.

a) $4n^2$

b) $4n$

c) $2 + 2n$

d) 4

14. Find the value of $\log_2 .25 + \log_{.5} 32 - \log_{\sqrt{2}} 4$.

a) -3

b) -11

c) 0

d) 2

15. If $\log 80 = a$ and $\log 45 = b$, find $\log 36$ in terms of a and b .

a) $a + 2b$

b) $a + b + 2$

c) $a + b - \frac{1}{2}$

d) $a + b - 2$

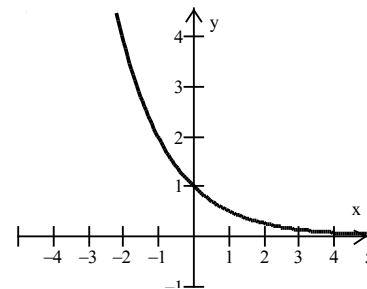
16. Which of the following is the graphed function:

a) $y = 2^x$

b) $y = -\log_2 x$

c) $y = 2^{-x}$

d) $y = \log_2 x$



17. Find the average of $\log_2 64 + \log_8 128 + \log_3 9 + \log_{1/3} 3$.

a) $\frac{55}{3}$

b) $\frac{31}{3}$

c) $\frac{14}{3}$

d) $\frac{11}{3}$

18. Which of the following is not in the solution set of: $-2 < \log_2 x < 16$.

2009 Logs and Exponents Topic Test (Theta)

- a) $5/4$ b) 2 c) $11/4$ d) $17/4$

19. If the point of intersection of $y = \log_3(3x + 4)$ and $y = \log_3(x - 2) + 2$, find (x, y) .

- a) $(11/3, \log_3 15)$ b) $(25/6, \log_3 10)$ c) $(11/6, \log_3 5)$ d) $(11/2, \log_3 5)$

20. Solve: $\ln \sqrt{x^2 - 1} - \ln \sqrt{x + 1} = 2$

- a) $e^4 - 1$ b) $e^2 + 2$ c) $e^4 + 1$ d) $e + 1$

21. Which of the following statements are true?

- | | | |
|--|------------|-----------|
| I. $\log_5 x + \log_8 x = \log_{13} x$ | a) I only | b) I, II |
| II. $\log_5 x^2 + \log_5 2x = 2 \log_5 x^3$ | c) II, III | d) I, III |
| III. $\log_5 x + \log_7 x = \frac{\log x (\log 7 + \log 5)}{(\log 7)(\log 5)}$ | | |

22. Evaluate: $\log \frac{1}{2} + \log \frac{2}{3} + \log \frac{3}{4} + \dots + \log \frac{998}{999} + \log \frac{999}{1000}$.

- a) $3 - \log 999$ b) $2 + \log 999$ c) -3 d) $-3 - \log 999$

23. Simplify: $(\log 4)^3 + 3(\log 4)^2(\log 25) + 3(\log 4)(\log 25)^2 + (\log 25)^3$

- a) 8 b) 6 c) $4 + (\log 4)^3$ d) $8 + 4 \log 2$

24. The solution to $\log(\log x) = 3$ has how many digits?

- a) 101 b) 1000 c) 1001 d) 10000

25. Solve: $x = \log_4 9 \cdot \log_9 12 \cdot \log_{12} 32$,

- a) 1.5 b) 2 c) 2.5 d) 3

26. Solve: $5^{x^2} \cdot 5^{-9x} = 5^{-18}$.

- a) 3, 5 b) 2, 4 c) 6 d) 3, 6

27. The solutions to $(\log_4 x)^2 + \log_4 x = 6$ are $x_1 < x_2$. Find x_2 .

- a) 4 b) 16 c) 32 d) 64

28. If $4^{3m-1} = 1 + 8^{2(k+3)}$, find m^k .

2009 Logs and Exponents Topic Test (Theta)

a) 27

b) 21

c) 9

d) 3

29. The number of students infected with the flu at the local high school is modeled by:

$$P(t) = \frac{800}{1+49e^{-0.2t}}. \text{ Solve for } t.$$

a) $t = 50 \ln\left(\frac{800+P(t)}{49}\right)$

b) $t = -50 \ln\left(\frac{800-P(t)}{49}\right)$

c) $t = 49 \ln\left(\frac{800-P(t)}{50}\right)$

d) $t = -49 \ln\left(\frac{800+P(t)}{50}\right)$

30. Solve for x : $\log_7(x^3 + 27) - \log_7(x + 3) = 2$

a) 0

b) 4

c) 6

d) 8

Tie-Breakers:

1. Find $f(3)$ if $f(x) = \log_2(x^2) - \log_2(3x) - 5$.

2. If $\log_a x + \log_{a^2} x + \log_{a^4} x = c$ find x in terms of c .

3. Find the solution to $2^{3x+1} = 16^{2x-1}$ and $3^{2y-1} = 27^{4y+3}$.