

(1-4) Match the expression with the logarithm that has the same value

1. $\ln 6 - \ln 2$

2. $2\ln 6$

3. $6\ln 2$

4. $\ln 6 + \ln 2$

A) $\ln 64$

B) $\ln 3$

C) $\ln 12$

D) $\ln 36$

(5-8) Use $\log 4 \approx 0.602$ and $\log 12 \approx 1.079$ to evaluate the logarithm.

5. $\log 48$

6. $\log 64$

7. $\log \frac{1}{3}$

8. $\log \frac{1}{12}$

(9-16) Expand the expression.

9. $\ln 5x$

10. $\log_5 x^5$

11. $\ln \frac{12}{5}$

12. $\ln 4x^2y$

13. $\log_6 36x^2$

14. $\log 10x^3$

15. $\ln \frac{6x^2}{y^4}$

16. $\log_3 \sqrt{9x}$

17. Describe and correct the error in expanding the logarithmic expression:

$$\ln 8x^3 = 3\ln 8 + \ln x$$

(18-22) Condense the expression

18. $\ln 12 - \ln 4$

19. $6 \ln x + 4 \ln y$

20. $5 \log_4 2 + 7 \log_4 x + 4 \log_4 y$

21. $\log_5 4 + \frac{1}{3} \log_5 x$

22. $2(\log_3 20 - \log_3 4) + 0.5 \log_3 4$

(23-25) Use the change-of-base formula to evaluate the logarithm

23. $\log_5 13$

24. $\log_8 22$

25. $\log_2 \frac{15}{7}$

26. The intensity of the sound TV ads make is ten times as great as the intensity for an average TV show. How many decibels louder is the TV ad? Justify your answer using the properties of logarithms.