

1. Expand $\log\left(\frac{(x-3)^3(x+4)^5}{(x-9)\sqrt{x+1}}\right)$

2. Expand $\log\left(\frac{(x+4)^2}{(x+9)^7(x+1)^3}\right)$

3. Expand $\log\left(\frac{(x+3)^7(x-4)^6}{(x+19)^5}\right)$

4. Expand $\log\left(\frac{(x-3)^3(x-4)}{(x-9)^{17}}\right)$

5. Write as a single logarithm: $5\ln(x+1) - 2\ln(x-3) + \ln(x+7) - 7\ln(x+9)$

6. Write as a single logarithm: $3\ln(x+1) - 7\ln(x-3) + 5\ln(x+9)$

7. Write as a single logarithm: $-5\ln(x+1) - 2\ln(x-3) - 2\ln(x-9)$

8. Write as a single logarithm: $5\ln(x+1) + 2\ln(x-3) - \ln(x+7) - 7\ln(x+9)$

9. Write as a single logarithm: $3\ln(x+1) - 2\ln(x+3) - \ln(x+1) - \ln(x+9)$

10. Simplify if possible: $10^{\log(5x+1)}$

11. Simplify if possible: $10^{5-\log(x)}$

12. Simplify if possible: $10^{-\log(x+1)}$

13. Simplify if possible: $10^{5+\log(x)}$

14. Simplify if possible: $\log(10^{3x+1})$

15. Simplify if possible: $\log(10^{3x} + 1)$

16. Simplify if possible: $\log(3 \cdot 10^x)$

17. Simplify if possible: $\log(3 \cdot 10^x + 1)$

18. Simplify if possible: $5 + 10^{3 \cdot \log(x)}$

19. Simplify if possible: $5 + \log(3 \cdot 10^x)$

20. Simplify if possible: $10^{3 \cdot \log(x)}$

21. Simplify if possible: $10^{2+\log(x)}$

22. Simplify if possible: $\log(10^{7x-2})$

23. Simplify if possible: $\log(10^x + 13)$

24. Simplify if possible: $\log(7 \cdot 10^x - 1)$

25. Simplify if possible: $5 + 10^{3 \cdot \log(x)}$

26. Simplify: $\log(3 \cdot 10^x)$

Answers:

1. $3\log(x - 3) + 5\log(x + 4) - \log(x - 9) - 0.5\log(x + 1)$

2. $2\log(x + 4) - 7\log(x + 9) - 3\log(x + 1)$

3. $7\log(x + 3) + 6\log(x - 4) - 5\log(x + 19)$

4. $3\log(x - 3) + \log(x - 4) - 17\log(x - 19)$

5. $\ln\left(\frac{(x+1)^5(x+7)}{(x-3)^2(x+9)^7}\right)$

6. $\ln\left(\frac{(x+1)^3(x+9)^5}{(x-3)^7}\right)$

7. $\ln\left(\frac{1}{(x+1)^5(x-3)^2(x-9)^2}\right)$

8. $\ln\left(\frac{(x+1)^5(x-3)^2}{(x+7)(x+9)^7}\right)$

9. $\ln\left(\frac{(x+1)^3}{(x+1)(x+3)^2(x+9)}\right)$

10. $5x + 1$

11. x^5

12. $(x + 1)^{-1}$

13. $x \cdot 10^5$

14. $3x + 1$

15. Does not simplify: $\log(10^{3x} + 1)$

16. $\log(3) + x$

17. Does not simplify: $\log(3 \cdot 10^x + 1)$

18. $5 + x^3$

19. $5 + \log(3) + x$

20. x^3

21. $10^2 \cdot 10^{\log(x)} = 100x$

22. $7x - 2$

23. Does not simplify

24. Does not simplify

25. $5 + x^3$

26. $\log(3) + \log(10^x) = \log(3) + x$