

Write the expression as a single logarithm, and simplify if possible.

1. $\log_b 9x + 3(\log_b x - \log_b y)$

[A] $\log_b \frac{12x^2}{y}$

[B] $\log_b \frac{9x^4}{y^3}$

[C] $\log_b \frac{27x^2}{y}$

[D] $\log_b \frac{12x}{3y}$

2. $\log_a 8x + 5(\log_a x - \log_a y)$

[A] $\log_a \frac{13x}{5y}$

[B] $\log_a \frac{40x^2}{y}$

[C] $\log_a \frac{13x^2}{y}$

[D] $\log_a \frac{8x^6}{y^5}$

3. $\log_c 7x + 4(\log_c x - \log_c y)$

[A] $\log_c \frac{11x^2}{y}$

[B] $\log_c \frac{7x^5}{y^4}$

[C] $\log_c \frac{11x}{4y}$

[D] $\log_c \frac{28x^2}{y}$

4. $\log_b 6x + 6(\log_b x - \log_b y)$

[A] $\log_b \frac{12x^2}{y}$

[B] $\log_b \frac{6x^7}{y^6}$

[C] $\log_b \frac{36x^2}{y}$

[D] $\log_b \frac{12x}{6y}$

5. $\log_a 5x + 4(\log_a x - \log_a y)$

[A] $\log_a \frac{9x}{4y}$

[B] $\log_a \frac{5x^5}{y^4}$

[C] $\log_a \frac{20x^2}{y}$

[D] $\log_a \frac{9x^2}{y}$

6. $\log_c 3x + 5(\log_c x - \log_c y)$

[A] $\log_c \frac{8x}{5y}$

[B] $\log_c \frac{15x^2}{y}$

[C] $\log_c \frac{8x^2}{y}$

[D] $\log_c \frac{3x^6}{y^5}$

7. $\log_b 4x + 6(\log_b x - \log_b y)$

[A] $\log_b \frac{4x^7}{y^6}$

[B] $\log_b \frac{24x^2}{y}$

[C] $\log_b \frac{10x}{6y}$

[D] $\log_b \frac{10x^2}{y}$

Write the expression as a single logarithm, and simplify if possible.

8. $\log_a 2x + 3(\log_a x - \log_a y)$

[A] $\log_a \frac{6x^2}{y}$

[B] $\log_a \frac{2x^4}{y^3}$

[C] $\log_a \frac{5x}{3y}$

[D] $\log_a \frac{5x^2}{y}$

9. $\log_c 9x + 6(\log_c x - \log_c y)$

[A] $\log_c \frac{15x}{6y}$

[B] $\log_c \frac{54x^2}{y}$

[C] $\log_c \frac{15x^2}{y}$

[D] $\log_c \frac{9x^7}{y^6}$

10. $\log_b 8x + 4(\log_b x - \log_b y)$

[A] $\log_b \frac{12x}{4y}$

[B] $\log_b \frac{32x^2}{y}$

[C] $\log_b \frac{8x^5}{y^4}$

[D] $\log_b \frac{12x^2}{y}$

11. $\log_6 36 + \log_6 30 - \log_6 5$

12. $\log_5 5 + \log_5 125 - \log_5 625$

13. $\log_7 7 + \log_7 28 - \log_7 4$

14. $\log_9 81 + \log_9 729 - \log_9 6561$

15. $\log_8 64 + \log_8 192 - \log_8 3$

16. $\log_3 3 + \log_3 27 - \log_3 81$

17. $\log_4 4 + \log_4 64 - \log_4 256$

18. $\log_2 4 + \log_2 32 - \log_2 4$

19. Solve $\log_9 3 - \log_9 (x+5) = \log_9 7$, for x .

[A] $\frac{38}{7}$ [B] $-\frac{32}{7}$ [C] $-\frac{2}{7}$ [D] $\frac{8}{7}$

20. Solve $\log_6 8 + 7 \log_6 x = \log_6 6$, for x .

[A] $\left(\frac{4}{3}\right)^{\frac{1}{7}}$ [B] $\left(\frac{3}{4}\right)^{-7}$ [C] 1 [D] $\left(\frac{3}{4}\right)^{\frac{1}{7}}$

21. Solve $\log_7 5 - \log_7 (x+3) = \log_7 5$, for x .

[A] $\frac{8}{5}$ [B] 4 [C] $\frac{2}{5}$ [D] -2

22. Solve $\log_3 4 + 9 \log_3 x = \log_3 4$, for x .

[A] $\left(\frac{4}{9}\right)^{\frac{1}{4}}$ [B] $\left(\frac{9}{4}\right)^{-4}$ [C] $\left(\frac{9}{4}\right)^{\frac{1}{4}}$ [D] 1

23. Solve $\log_5 7 - \log_5 (x+2) = \log_5 2$, for x .

[A] $\frac{5}{2}$ [B] $\frac{11}{2}$ [C] $\frac{3}{2}$ [D] $\frac{9}{2}$

24. Solve $\log_8 (x+2) - \log_8 (x-1) = \log_8 4$ for x .

[A] 2 [B] -3 [C] $\frac{2}{3}$ [D] 1

25. Solve $\log_2 (x+3) - \log_2 (x-3) = \log_2 4$ for x .

[A] 1 [B] -5 [C] 2 [D] 5

26. Solve $\log_4 (x+3) - \log_4 (x-1) = \log_4 5$ for x .

[A] -4 [B] 2 [C] $\frac{3}{4}$ [D] 1

27. Solve $\log_7 (x+1) - \log_7 (x-4) = \log_7 6$ for x .

[A] 1 [B] -2 [C] $\frac{1}{5}$ [D] 5

28. Solve $\log_9 (x+2) - \log_9 (x-2) = \log_9 5$ for x .

[A] 3 [B] $\frac{1}{2}$ [C] 1 [D] -3

29. Solve $\log_2 6 + 8 \log_2 x = \log_2 3$, for x .

30. Solve $\log_5 4 - \log_5 (x+2) = \log_5 7$, for x .

31. Solve $\log_8 5 + 4 \log_8 x = \log_8 7$, for x .
32. Solve $\log_7 7 - \log_7 (x - 4) = \log_7 6$, for x .
33. Solve $\log_3 5 + 7 \log_3 x = \log_3 6$, for x .
34. Solve $\log_6 (x + 4) - \log_6 (x - 1) = \log_6 6$ for x .
35. Solve $\log_7 (x + 3) - \log_7 (x + 1) = \log_7 3$ for x .
36. Solve $\log_5 (x + 1) - \log_5 (x - 3) = \log_5 3$ for x .
37. Solve $\log_2 (x + 3) - \log_2 (x - 3) = \log_2 4$ for x .
38. Solve $\log_3 (x + 4) - \log_3 (x + 2) = \log_3 3$ for x .