Exponential Rules

$a^m \cdot a^n = a^{m+n}$
$\dfrac{a^m}{a^n} = a^{m-n}$
$(a^m)^n = a^{mn}$
$a^0 = 1 \ (a \neq 0)$
$a^{-n} = \dfrac{1}{a^n}$
$a^{1/n} = \sqrt[n]{a}$

Logarithmic Rules

$\log_b(xy) = \log_b x + \log_b y$
$\log_b\left(\dfrac{x}{y}\right) = \log_b x - \log_b y$
$\log_b(x^r) = r \log_b x$
$\log_b b = 1$
$\log_b 1 = 0$
$\log_b x = \dfrac{\log_k x}{\log_k b}$
$b^{\log_b x} = x$
$\log_b(b^x) = x$

Practice Problems

1. Simplify: $\log_2(8)$
2. Simplify: $\log_5(25) + \log_5(4)$
3. Simplify: $\log_{10}(1000) - \log_{10}(10)$
4. Simplify: $\log_3(\dfrac{81}{3})$
5. Simplify: $2\log_2(5) - \log_2(\sqrt{25})$
6. Solve: $2^x = 16$
7. Solve: $3^{2x+1} = 81$
8. Solve: $5^x = 1/25$
9. Solve: $e^{2x} = 7$
10. Solve: $10^x = 3$
11. Solve: $\log_3(x) = 4$
12. Solve: $\log(x+2) = 1$
13. Solve: $\log_2(2x-1) = 3$
14. Solve: $\log_5(x) + \log_5(x-4) = 1$
15. Solve: $2\log_3(x) = \log_3(9)$
16. Solve for x: $\log_2(3x) = \log_2(12)$
17. Solve for x: $\log(x^2) = 2\log(x) - \log(5)$
18. Expand: $\log(10x^2/\sqrt{y})$

19. Condense: $\log(x) + 2\log(y) - \log(z)$
20. Solve for x: $\ln(x^2) = \ln(5x)$
21. Simplify: $\log_4(64)$
22. Simplify: $\log_6(36) - \log_6(6)$
23. Simplify: $\log_{10}(10000)$
24. Simplify: $\log_9(81)$
25. Simplify: $3\log_3(2) + \log_3(9)$
26. Solve: $4^x = 1/16$
27. Solve: $10^{2x-1} = 100$
28. Solve: $7^x = 49$
29. Solve: $e^x = 20$
30. Solve: $2^x = 10$
31. Solve: $\log_4(x) = 2$
32. Solve: $\log(x - 3) = 2$
33. Solve: $\log_2(x + 4) = 5$
34. Solve: $\log_3(x) - \log_3(x - 1) = 1$
35. Solve: $\log_6(x^2 - 9) = 2$
36. Solve for x: $\log_5(4x) = \log_5(20)$
37. Solve for x: $\log(x^3) = 3\log(x)$
38. Expand: $\log(\frac{x^3y}{z^2})$
39. Condense: $2\log(a) - \frac{1}{2}\log(b) + \log(c)$
40. Solve for x: $\ln(x^3) = \ln(27)$