

## Logarithm Homework

Evaluate the following. Show all necessary work.

1.  $\log_4 64$

2.  $e^{\ln 40}$

3.  $\ln \frac{1}{e^9}$

4.  $\log 10,000$

5.  $\log_7 \frac{1}{\sqrt{7}}$

6.  $\log_2 32$

7.  $\log_5 \frac{1}{5}$

8.  $12^{\log_2 15}$

9.  $\ln \sqrt[5]{e}$

10.  $\log_4 \frac{1}{16}$

11.  $10^{\log \sqrt[3]{x}}$

12.  $\log_3 \frac{1}{81}$

Condense the following logarithms. Show ALL steps.

13.  $\frac{1}{3}(\log_4 x - \log_4 y)$

14.  $7 \ln x - \frac{1}{3} \ln y$

$$15. 5\log_3 2 + \frac{1}{5}\log_3(x-2) - \frac{1}{2}\log_3 x$$

$$16. \frac{1}{2}(\log_5 x + \log_5 y) - 2\log_5(x+1)$$

Expand the following logarithms. Show ALL steps.

$$17. \log_4 \left( \frac{\sqrt[3]{p}\sqrt[5]{q}}{t^2} \right)$$

$$18. \log_3(27xy^4)$$

$$19. \ln \left[ \frac{x^3\sqrt{x+2}}{(x-1)^2} \right]$$

$$20. \log_5 \sqrt[3]{\frac{x^2y}{25}}$$

1. 3
2. 40
3. -9
4. 4
5.  $-\frac{1}{2}$
6. 5
7. -1
8. 15
9.  $\frac{1}{5}$
10. -2
11.  $\sqrt[3]{x}$
12. -4
13.  $\log_4 \sqrt[3]{\frac{x}{y}}$
14.  $\ln \frac{x^7}{\sqrt[3]{y}}$
15.  $\log_3 \frac{32\sqrt[5]{x-2}}{\sqrt{x}}$
16.  $\log_5 \frac{\sqrt{xy}}{(x+1)^2}$
17.  $\frac{1}{7}\log_4 p + \frac{1}{5}\log_4 q - 2\log_4 t$
18.  $3 + \log_3 x + 4\log_3 y$
19.  $3\ln x + \frac{1}{5}\ln(x+2) + 2\ln(x-1)$
20.  $\frac{1}{3}(2\log_5 x + \log_5 y - 2)$