

## Properties of Logs

(09 br)

Write each equation in exponential form.

1.  $\log_2 64 = 6$

2.  $\log_4 \frac{1}{64} = -3$

3.  $\log_{10} (0.01) = -2$

Write each equation in logarithmic form.

4.  $2^5 = 32$

5.  $5^{-1/2} = \frac{\sqrt{5}}{5}$

6.  $10^{-1} = 0.1$

Evaluate the expression. Hint—set = x and solve for x.

7.  $\log_2 8$

8.  $\log_8 64$

9.  $\log_6 216$

10.  $\log_7 7$

11.  $\log_5 1$

12.  $\log_8 \frac{1}{8}$

13.  $\log_7 \frac{1}{49}$

14.  $\log_9 \frac{1}{27}$

15.  $\log_5 \sqrt{5}$

16.  $\log_9 3$

17.  $\log_2 16$

18.  $\log_{1/2} 16$

Solve for x.

19.  $\log_5 x = 2$

20.  $\log_5 x = 3$

21.  $\log_{16} x = -1$

22.  $\log_9 x = 2$

23.  $\log_{1/4} x = -2$

24.  $\log_x 64 = 3$

25.  $\log_x 8 = -1$

Expand each logarithm.

1)  $\log(6 \cdot 11)$

2)  $\log(5 \cdot 3)$

3)  $\log\left(\frac{6}{11}\right)^5$

4)  $\log(3 \cdot 2^3)$

5)  $\log\frac{2^4}{5}$

6)  $\log\left(\frac{6}{5}\right)^6$

7)  $\log\frac{x}{y^6}$

8)  $\log(a \cdot b)^2$

9)  $\log\frac{u^4}{v}$

10)  $\log\frac{x}{y^5}$

11)  $\log\sqrt[3]{x \cdot y \cdot z}$

12)  $\log(x \cdot y \cdot z^2)$

**Condense each expression to a single logarithm.**

13)  $\log 3 - \log 8$

14)  $\frac{\log 6}{3}$

15)  $4\log 3 - 4\log 8$

16)  $\log 2 + \log 11 + \log 7$

17)  $\log 7 - 2\log 12$

18)  $\frac{2\log 7}{3}$

19)  $6\log_3 u + 6\log_3 v$

20)  $\ln x - 4\ln y$

21)  $\log_4 u - 6\log_4 v$

22)  $\log_3 u - 5\log_3 v$

23)  $20\log_6 u + 5\log_6 v$

24)  $4\log_3 u - 20\log_3 v$

**Critical thinking questions:**

25)  $2(\log 2x - \log y) - (\log 3 + 2\log 5)$

26)  $\log x \cdot \log 2$