

## Applying Rules of Logarithms

In problems 1-4, write each expression in terms of a single logarithm with a coefficient of 1.

Example:  $\log_b u^2 - \log_b v = \log_b \left( \frac{u^2}{v} \right)$

1.  $\log_b m - \frac{1}{2} \log_b n$

$$\log_b \frac{m}{\sqrt{n}}$$

2.  $\log_b w + \log_b x - \log_b y$

$$\log_b \frac{wx}{y}$$

3.  $3 \log_b x + 2 \log_b y - \frac{1}{4} \log_b z$

$$\log_b \frac{x^3 y^2}{\sqrt[4]{z}}$$

4.  $\frac{1}{3} \log_b w - \log_b x - 5 \log_b y$

$$\log_b \frac{w^{\frac{1}{3}}}{x^3 y^5}$$

In problems 5-8, write each expression in terms of logarithms of first-degree polynomials.

Example:  $\log_b \frac{(2x+1)^3}{(3x-5)^4} = 3 \log_b (2x+1) - 4 \log_b (3x-5)$

5.  $\log_b ((5x-4)^3 (3x-5)^4)$

$$3 \log_b (5x-4) + 4 \log_b (3x-5)$$

6.  $\log_b \frac{(x-3)^5}{(5+x)^3}$

$$5 \log_b (x-3) - 3 \log_b (5+x)$$

7.  $\log_b \frac{x^2}{\sqrt{x+1}}$

$$2 \log_b x - \frac{1}{2} \log_b (x+1)$$

8.  $\log_b (x^4 + x^3 - 20x)$

$$\log_b (x(x^3 + x^2 - 20))$$

$$\log_b x + \log_b (x^3 + x^2 - 20)$$