

## 6.5 Properties of Logarithms

Name \_\_\_\_\_

Use the properties of logarithms to rewrite the expressions as logarithms of individual numbers or variables. Simplify where possible.

1.  $\log_b(5x)$

2.  $\log_b(4y)$

3.  $\log_b(x^2)$

4.  $\log_b(w^3)$

5.  $\log_{10}(10w)$

6.  $\log_5(25y)$

7.  $\log_b\left(\frac{1}{2}\right)$

8.  $\log_b\left(\frac{1}{x}\right)$

Answers: 1.  $\log_b 5 + \log_b x$ ; 3.  $2\log_b x$ ; 5.  $1 + \log w$ ; 7.  $-\log_b 2$

Use the properties of logarithms to rewrite the expressions as logarithms of individual numbers or variables. Simplify where possible.

9.  $\log_b \left( \frac{1}{xy} \right)$

10.  $\log_b \left( \frac{1}{3y} \right)$

11.  $\log_b \left( \frac{x^2y}{5} \right)$

12.  $\log_b \left( \frac{4y^3}{x} \right)$

13.  $\log_2 (2\sqrt{5})$

14.  $\log_3 (27\sqrt{2})$

15.  $\log_b \left( \frac{\sqrt{5}}{b} \right)$

16.  $\log_b \left( \frac{w}{b^5} \right)$

Answers: 9.  $-\log_b x - \log_b y$ ; 11.  $2\log_b x + \log_b y - \log_b 5$ ; 13.  $1 + \frac{1}{2} \log_2 5$ ; 15.  $\frac{1}{2} \log_b 5 - 1$

Use the properties of logarithms to rewrite the expressions as single logarithms. Simplify if possible.

17.  $\log_b 8 + \log_b x$

18.  $\log_b v + \log_b w$

19.  $\frac{1}{2} \log_b (9)$

20.  $\frac{1}{5} \log_b (32)$

21.  $2\log_b x + 3\log_b (2y)$

22.  $4\log_b (2v) + \log_b (5w)$

23.  $2\log_b (3xy) - \log_b (x)$

24.  $\log_b (3vw) - 2\log_b (w)$

25.  $\log_b (2x + 3) - \log_b (5x - 1)$

26.  $\log_b (y - 3) - \log_b (5y - 3)$

Answers: 17.  $\log_b (8x)$ ; 19.  $\log_b 3$ ; 21.  $\log_b (8x^2y^3)$ ; 23.  $\log_b (9xy^2)$ ; 25.  $\log_b \left( \frac{2x+3}{5x-1} \right)$