

# Properties of Logarithms

Name \_\_\_\_\_

**Use a calculator to approximate each to the nearest thousandth.**

1)  $\log_5 38$

2)  $\log_6 49$

3)  $\log_5 -16$

4)  $\log_4 35$

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

5)  $2\log_2 z + 2\log_2 x + 12\log_2 y$

6)  $\log_4 5 + \frac{\log_4 3}{2} + \frac{\log_4 7}{2} + \frac{\log_4 2}{2}$

7)  $20\log_5 11 + 20\log_5 10 - 4\log_5 3$

8)  $4\log_9 z + 12\log_9 x + 4\log_9 y$

9)  $3\log_8 a + 9\log_8 b + 3\log_8 c$

**Identify the domain and range of each.**

10)  $y = \log_6 (2x + 4) + 2$

11)  $y = \log_4 (2x + 12) + 5$

12)  $y = \log_2 (4x + 4) + 3$

13)  $y = \log_3 (2x - 4)$

**Expand each logarithm.**

14)  $\log_3 (x \cdot y \cdot z^5)$

15)  $\log (c^5 \sqrt{a})$

16)  $\log_9 \frac{11^3}{5^5}$

17)  $\log_2 (ab^5)^4$

18)  $\log (x^2 \cdot y)^2$