Name : _____ Score : _____

Teacher : _____ Date : _____

Properties of Logarithms

Expand each logarithm.

1) $\log_8 (x \cdot r)^2$

2) $\log_5 \left(\frac{9^6}{4^3}\right)$

3) $\ln \left(k^2 \cdot b^4 \cdot n\right)$

4) $\log \left(x \cdot m^2 \cdot p^6\right)$

5) $\log_4 \left(5^6 \cdot 3 \cdot 8\right)$

6) $\log_2 (z^3 \cdot d)$

Condense each expression to one logarithm.

7) $4\log_6 d + 3\log_6 p$

8) $\log k + \log y + \log s$

9) $5\log_2 8 - \log_2 6$

10) $\log_{11} 9 - 4\log_{11} 7$

11) $\log_5 9 + \log_5 8$

12) $\frac{\log_8 8}{2} + \frac{\log_8 2}{2} + \frac{\log_8 7}{2}$

Name : _____ Score : _____

Teacher : _____ Date : _____

Properties of Logarithms

Expand each logarithm.

1) $\log_8 (x \cdot r)^2$

$2\log_8 x + 2\log_8 r$

2) $\log_5 \left(\frac{9^6}{4^3}\right)$

$6\log_5 9 - 3\log_5 4$

3) $\ln \left(k^2 \cdot b^4 \cdot n\right)$

$2\ln k + 4\ln b + \ln n$

4) $\log \left(x \cdot m^2 \cdot p^6\right)$

$\log x + 2\log m + 6\log p$

5) $\log_4 \left(5^6 \cdot 3 \cdot 8\right)$

$6\log_4 5 + \log_4 3 + \log_4 8$

6) $\log_2 (z^3 \cdot d)$

$3\log_2 z + \log_2 d$

Condense each expression to one logarithm.

7) $4\log_6 d + 3\log_6 p$

$\log_6 (d^4 \cdot p^3)$

8) $\log k + \log y + \log s$

$\log \left(k \cdot y \cdot s\right)$

9) $5\log_2 8 - \log_2 6$

$\log_2 \left(\frac{8^5}{6}\right)$

10) $\log_{11} 9 - 4\log_{11} 7$

$\log_{11} \left(\frac{9}{7^4}\right)$

11) $\log_5 9 + \log_5 8$

$\log_5 (9 \cdot 8)$

12) $\frac{\log_8 8}{2} + \frac{\log_8 2}{2} + \frac{\log_8 7}{2}$

$\log_8 (8 \cdot 2 \cdot 7)^{\frac{1}{2}}$