

Expand and Condense Logs

Name: _____

1) What are all the possible values of x in the expression: $\log_{15}(2x + 8)$?

2) What are all the possible values of x in the expression: $\log_4(10 - x)$?

Expand the following expressions.

3) $\log(xy^3)$

4) $\log \frac{xy}{10}$

5) $\log_2 \left(\frac{4}{3x^2} \right)$

6) $\ln(x \cdot \sqrt[3]{e})$

7) $\ln \sqrt{x^4 y}$

8) $\log_4 \left(\frac{(2x)^4}{y} \right)$

9) $\log \frac{100}{\sqrt{x} \cdot y^4}$

10) $\log_3 \left(\frac{x-1}{x+1} \right)^2$

11) $\log_3 \left(\frac{1}{xy^3} \right)$

Condense the following expressions.

12) $\log 4 + 3\log x - \log y$

13) $3\log x + \log 2 - \log y - \log 4$

14) $\log_2 9 - \log_2 y + \frac{1}{2}\log_2 x - \log_2 3$

15) $2(\ln x + \ln 3) - 3\ln y$

16) $\frac{1}{2}(\ln 8x^2 - \ln 4 - 3\ln x - \ln y)$

17) $2\log_3(x + 3) + \log_5 x - \log_5 y + 4\log_3 y$

Condense the following logarithmic equation and then convert to an exponential equation.

18) $2\ln(x) - \ln(4) = 9$

19) $3\log_{12}(x) + \log_{12}(9) = \frac{1}{5}$