

Name: Key

Date: _____

Use the properties of logarithms to rewrite the expression in terms of log 2 and log 7.

Then use $\log 2 \approx 0.301$ and $\log 7 \approx 0.845$ to approximate the expression.

1. $\log 14$ $\log(2 \cdot 7)$
 $.301 + .845$

1.146

2. $\log(\frac{7}{2})$ $\log 7 - \log 2$
 $.845 - .301$

$.544$

3. $\log 7^{-3}$
 $-3(.845)$

-2.535

Expand the following expressions:

4. $\log_2(3x)$

$\log_2 3 + \log_2 x$

*5. $\log_3(9x)$

$\log_3 9 + \log_3 x$
 $2 + \log_3 x$

6. $\log_2(x^3 \sqrt{x-1})$

$3 \log_2 x + \frac{1}{2} \log_2(x-1)$

*7. $\log_3 3x^{\frac{2}{3}}y^5$

$\log_3 3 + \frac{2}{3} \log_3 x + 5 \log_3 y$
 $1 + \frac{2}{3} \log_3 x + 5 \log_3 y$

*8. $\log_4 2y^2 \sqrt{x}$

$\log_4 2 + 2 \log_4 y + \frac{1}{2} \log_4 x$
 $\frac{1}{2} + 2 \log_4 y + \frac{1}{2} \log_4 x$

9. $\log(\frac{6}{x})$

$\log 6 - \log x$

10. $\log \frac{x^2}{yz^3}$

$2 \log x - \log y - 3 \log z$

11. $\log_2(x^{\frac{1}{4}} \sqrt{x+1})$

$\log_2 x + \frac{1}{4} \log_2(x+1)$

12. $\log_2 \frac{3\sqrt{b}}{a^4 c^2}$

$\log_2 3 + \frac{1}{2} \log_2 b - 4 \log_2 a - 2 \log_2 c$

Condense

13. $\ln 3 + \ln x - \ln y - 2 \ln z$

$\ln \frac{3x}{yz^2}$

14. $2 \log_3 x + \log_3 y$

$\log_3 x^2 y$

15. $\ln 4 + 3 \ln x - 5 \ln y$

$\ln \frac{4x^3}{y^5}$