

Integrated Math 2
Review 13.1-13.2

Name: _____
Date: _____ Period: _____

Convert each exponential equation into a logarithmic equation.

1. $3^x = 729$

2. $\frac{1}{2}^{16} = x$

1. $\log_3 729 = x$

2. $\log_{\frac{1}{2}} x = 16$

Convert each logarithmic equation into an exponential equation.

3. $\log_2 x = 32$

4. $\log_3 6561 = x$

3. $2^{32} = x$

4. $3^x = 6561$

Solve the following exponential or logarithmic equation.

5. $\log_4 x = 5$

$4^5 = x$

$1024 = x$

6. $\log_3 243 = x$

$3^x = 243$

$3^x = 3^5$

$x = 5$

5. 1024

6. 5

7. $\log_x 343 = 3$

$x^3 = 343$

8. $\log x = -2$

$10^{-2} = x$

$\frac{1}{100} = x$

7. 7

8. $\frac{1}{100}$ or 0.01

9. $2^x = 64$

$2^x = 2^6$

$x = 6$

10. $\left(\frac{1}{3}\right)^x = 27$

$(3^{-1})^x = 3^3$

$-x = 3$

$x = -3$

9. 6

10. -3

Use the properties of logarithms to rewrite each logarithmic expression in expanded form.

11. $\log_4(4x^3)$

$$\log_4 4 + 3\log_4 x$$

$$1 + 3\log_4 x$$

12. $\log_7\left(\frac{5y^4}{8}\right)$

$$\log_7 5 + 4\log_7 y - \log_7 8$$

$$\log_4 4 + 3\log_4 x$$

$$11 = 1 + 3\log_4 x$$

12. $\log_7 5 + 4\log_7 y - \log_7 8$

13. $\ln(2xy^2)$

$$\ln 2 + \ln x + 2\ln y$$

14. $\log\left(\frac{x^5}{2y}\right)$

$$5\log x - \log 2 - \log y$$

$$5\log x - (\log 2 + \log y)$$

13. $\ln 2 + \ln x + 2\ln y$

14. $5\log x - \log 2 - \log y$

OR

$$5\log x - (\log 2 + \log y)$$

Use the properties of logarithms to rewrite each logarithmic expression as a single logarithm.

15. $\log_2 8 + 4\log_2 x$

16. $2\log(10) - 4\log(3)$

$$\log \frac{10^2}{3^4}$$

15. $\frac{\log 8x^4}{2}$

16. $\log \frac{100}{81}$

17. $2(\ln 3 - \ln x) + \ln 5$

$$2\ln 3 - 2\ln x + \ln 5$$

$$\ln \frac{9 \cdot 5}{x^2} = \ln \frac{45}{x^2}$$

18. $\log_4 x - 6\log_4 y$

$$\log_4 \frac{x}{y^6}$$

17. $\ln \frac{45}{x^2}$

18. $\log_4 \frac{x}{y^6}$

Challenge Question: Condense as a single logarithm.

$$2(\log_3 3x - \log_3 y) - (\log_3 4 + 4\log_3 7)$$

$$\log_3 \left(\frac{3x}{y}\right)^2$$

$$\log_3 \frac{9x^2}{y^2} - \log_3 4(7)^4$$

$$\log_3 \frac{9x^2}{9 \cdot 16 \cdot 49^2}$$

Answer: $\log_3 \frac{9x^2}{9 \cdot 16 \cdot 49^2}$