

Natural Logs (ln) have a base of _____.

$$\ln_e x =$$

Evaluate:

1. $\ln e^7$

2. $\ln \sqrt{e}$

3. $\ln \frac{1}{e^8}$

Change to an exponent:

$$\ln 2 = x$$

Change to a natural log:

$$e^x = y$$

Properties of Logarithms and Natural Logs

- Product Property: $\log_b mn =$

- Quotient Property: $\log_b \frac{m}{n} =$

- Power Property: $\log_b m^x =$

Example 1: Write as a single logarithm. State the property used.

a. $\log_2 8 - \log_2 4$

b. $\ln 2 + \ln 3$

c. $5 \log_4 x - \log_4 y$

d. $5 \log_7 2 + 3 \log_7 x$

e. $\frac{1}{2} \log x$

Example 2: Expand each logarithm.

a. $\log_6 \frac{x}{y}$

b. $\log_3 7\sqrt{x}$

c. $\ln \frac{x^2}{5}$

d. $\log \left(\frac{3}{y} \right)^2$

e. $\log_8 x^5 y^4$

f. $\ln \frac{2x^2 y}{3k^3}$

Solve.

d. $\log_3 3 + \log_3 1 =$

e. $\log_2 16 + \log_2 2 + \log_2 1 + 3 \log_2 2 =$