

# 2-5 Natural Logarithms

The function  $y = e^x$  has an inverse, the **natural logarithmic function**,  
 $y = \log_e x$ , or  $y = \ln x$ .

**Essential Understanding** The functions  $y = e^x$  and  $y = \ln x$  are inverse functions. Just as before, this means that if  $a = e^b$ , then  $b = \ln a$ , and vice versa.

What is  $2 \ln 15 - \ln 75$  written as a single natural logarithm?

$$\ln 15^2 - \ln 75$$

$$\ln \frac{15^2}{75}$$

Quotient  
power

$$\ln 7 + 2\ln 5$$

$$\ln 7 + \ln 5^2$$

$$\ln 7 + \ln 25$$

$$\ln(7 \cdot 25)$$

$$\ln 175$$

$$3 \ln x - 2 \ln 2x$$

$$\ln x^3 - \ln (2x)^2$$

$$\ln x^3 - \ln 4x^2$$

$$\ln \frac{x^3}{4x^2}$$

$$\ln \frac{x}{4}$$