

How do I convert between exponentials and Logarithms

The inverse of an exponential function is a Logarithmic function.

$$y = b^x$$

Exponential function



$$\log_b y = x$$

- allows us to solve for x in exponential equations

$$16 = 2^4$$

$$\log_2 16 = 4$$

Exponential to Log

$$3^x = 81$$

$$x = \log_3 81$$

$$3^x = 27$$

$$x = \log_3 27$$

$$18 = 4^x$$

$$4^x = 18$$

$$x = \log_4 18$$

INVERSES with COMPOSITION
each other by using composition

$$2) f(x) = \frac{2}{3}x + 10$$
$$g(x) = \frac{3}{2}(x - 10)$$

$$f^{-1}(x) = \frac{3}{2}(x - 10)$$
$$g^{-1}(x) = \frac{2}{3}(x + 10)$$

Log to Exponential

$$\log_3 81 = x$$
$$81 = 3^x$$

$$\log_5 25 = x$$
$$25 = 5^x$$

Calculator can evaluate logs in base 10

$$\log_{10} 8 = \log 8 = .903$$

$$\log_{36} 36 = \frac{\log 36}{\log 36} = 2$$

$$\log_{11} 134 = \frac{\log 134}{\log 11} = 2.04$$