

Lesson 113 = Logarithms and Antilogarithms

"The log is the exponent"

Base 10 = log

$$\log_{10} X = y$$

base \rightarrow 10 $\xleftarrow{\log} y = X \xleftarrow{\text{antilog}}$

$$\log_{10} 10^x = x = 10^{\log x} = X$$

Base e = ln

$$\ln_e X = y$$

$$e^y = X$$

$$e^{\ln x} = x = \ln e^x = x$$

Ex. a.) $X = \ln 0.0076$

$X = -4.88$

b.) $34 = 10^{x+3}$

$\log 34 = \log 10^{x+3}$
 $\log 34 = x + 3$
 $1.53 = x + 3$

$x = -1.47$

c.) $e^x = 92.6$

$\ln e^x = \ln 92.6$

$x = 4.53$

d.) $\log x = 3.412$

$\log x = 3.412$
 $10 = 10^{3.412}$

$x = 10^{3.412}$

$x = 2,582.26$

e.) $\ln x = 5163$

$\ln x = 5163$
 $e = e^{5163}$

$x = e^{5163}$

Ex. f) Use ln to express each number as a power. Then solve.

$\frac{(0.000374)(48.5)}{0.0618 \times 10^{-16}} = \frac{(e^{-7.89})(e^{3.88})}{e^{-39.63}}$

$2.95 \times 10^{15} = e^{-7.89 + 3.88 + 39.63} = e^{35.62}$