Evaluating Logarithmic Expressions

1) $\log_2 112 - \log_2 7 = 4$

$\log_2 \frac{112}{7}$

$\log_2 16$

4

2) $\log \sqrt{0.1}$

$\log .1^{\frac{1}{2}}$

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

$\frac{1}{2} \log_{10} \frac{1}{10}$

$\frac{1}{2} (-1)$

$-\frac{1}{2}$

3) $\log_{12} 9 + \log_{12} 16$

$\log_{12} 144$

2

4) $e^{3 \ln 5} = x$

$\ln x = 3 \ln 5$

$\ln x = \ln 5^3$

$\ln x = \ln 125$

$x = 125$

Solving using Change of Base

1) $\log_2 112$

$\frac{\log 112}{\log 2}$

6.81

Change of Base Formula

$$\log_b a = \frac{\log a}{\log b} = \frac{\ln a}{\ln b}$$

2) $3^{-x} = .7$

$\log_3 .7 = -x$

$\frac{\log .7}{\log 3} = -x$

$-.325 = -x$

$.325 = x$

3) $(1.1)^x = 2$

$\log_{1.1} 2 = x$

$\frac{\log 2}{\log 1.1} = x$

$x = 7.272$

4) $x = \log_7 2$

$x = \frac{\log 2}{\log 7}$

$x = .356$