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Math 108
Quiz 1

1.a

$$\log_6\left(\frac{1}{1296}\right) = x$$

$$6^x = \frac{1}{1296}$$

1.b

$$\log_6\left(\frac{1}{1296}\right) = x$$

$$\boxed{6^x} = \frac{1}{1296} = \frac{1}{6^4} = \boxed{6^{-4}}$$

$$x = -4$$

$$\log_a n = \frac{\log_b n}{\log_b a}$$

2. $\log_3 36 = \frac{\ln(36)}{\ln(3)} = \underline{3.26}$

$b = e$
$n = 36$
$a = 3$

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

3. Expand $\log\left(\frac{x^3 y}{\sqrt{10z}}\right)$

$$\log(x^3 y) - \log\sqrt{10z}$$

$$\log x^3 + \log(y) - \log\sqrt{10z}$$

$$\log x^3 + \log(y) - \log(10z)^{1/2}$$

$$3\log x + \log(y) - \frac{1}{2}\log 10z$$

4.

$$(1/3)\log_4(x) - \log_4(y) - 2\log_4(z)$$

$$\log_4(x)^{1/3} - \log_4(y) - \log_4(z)^2$$

$$\log_4\left(\frac{x^{1/3}}{y}\right) - \log_4(z)^2$$

$$\log_4\left(\frac{x}{y}\right)^{1/3} - \log_4(z)^2$$

$$\log_4\sqrt[3]{\frac{x}{y}} - \log_4(z)^2$$

$$\log_4\left(\frac{\sqrt[3]{\frac{x}{y}}}{z^2}\right)$$

5. $25^x = \frac{1}{125}$

↓

$25^x = 5^{-3}$

↓

$\ln 25^x = \ln 5^{-3}$

↓

$x \frac{\ln(25)}{\ln(25)} = -\frac{3\ln(5)}{\ln(25)}$

↓

$x = -1.5$