

Math 124, 4.3 Logarithmic Functions

Evaluate each expression without a calculator! $y = \log_a(x) \implies a^y = x$

1.) $\log(1000)$

4.) $\log(\sqrt{10})$

2.) $\ln\left(\frac{1}{e}\right)$

5.) $\log_5(25)$

3.) $\log_2(8)$

6.) $\log_3(81)$

Use a calculator to evaluate each expression. $\log_a(x) = \frac{\log(x)}{\log(a)} = \frac{\ln(x)}{\ln(a)}$

7.) $\log(453)$

9.) $\log_3(750)$

8.) $\ln(381)$

10.) $\log_{12}(31589)$

Use properties of logarithms to combine each expression into a single logarithm.

$$\boxed{\log_a(x) + \log_a(y) = \log_a(x \cdot y)}$$

$$\boxed{\log_a(x) - \log_a(y) = \log_a\left(\frac{x}{y}\right)}$$

$$\boxed{r \cdot \log_a(x) = \log_a(x^r)}$$

11.) $3 \ln(x) + 5 \ln(y) + 4 \ln(z)$

12.) $\log(x + 1) + \log(x - 1)$

13.) $\log_2(x + 2) + \log_2(x - 3) - \log_2(x)$

14.) $2 \log(x + 3) + \log(x - 4)$