

WORKSHEET 12

Warm-up Problems

- Convert each of the following exponential expressions into an equivalent expression involving a logarithm.
 - $5^2 = z$
 - $a^5 = m$
- Convert each logarithmic expression into an equivalent expression involving an exponent.
 - $\log_5 u = 13$
 - $\log_a 4 = 3$

Real Problems

- Find the exact value of each expression without using a calculator. (You will have to use some of the properties on some of these problems).
 - $\log_2\left(\frac{1}{8}\right)$
 - $\ln \sqrt{e}$
 - $\log_3 3^{71}$
 - $2^{\log_2 7}$
 - $\log_6 18 - \log_6 3$
 - $5^{\log_5 6 + \log_5 7}$
 - $\log_{e^2} e$
- Find the domain of the following functions.
 - $f(x) = \ln\left(\frac{1}{x+1}\right)$
 - $g(x) = \sqrt{\ln x}$
- Use transformations to graph $f(x) = 3 + \log(x+2)$. Determine the domain, range and vertical asymptote of f .

Challenge Problems

- Find the value of $\log_2 3 \cdot \log_3 4 \cdot \log_4 5 \cdot \log_5 6 \cdot \log_6 7 \cdot \log_7 8$. (*Hint:* Use the Change-of-Base formula).
- Find the value of $\log_2 3 \cdot \log_3 4 \cdots \log_n(n+1) \cdot \log_{n+1} 2$. (*Hint:* Use part (a)).