

Chapter 5 Review (5-1 to 5-5)

I. Evaluate without a calculator.

(a) $\log_2 \frac{1}{64}$

(b) $\log_3 81$

(c) $\ln e^{-x^2}$

II. (a) Prove $\log_a (MN) = \log_a M + \log_a N$ Hint: Let $A = \log_a M$ and let $B = \log_a N$

(b) Prove $\log_a M^r = r \log_a M$

Hint: Let $A = \log_a M$

III. Rewrite as a single logarithm.

(a) $-2 \log_3 \left(\frac{1}{x} \right) + \frac{1}{3} \log_3 \sqrt{x}$

(b) $\log (x^2 - 9) - \log (x^2 + 7x + 12)$

IV. Find the inverse of $f(x) = 2^{x+3}$. Graph $f(x)$ and $f^{-1}(x)$. Find the domain, range and asymptotes of each.

V. Graph.

(a) $f(x) = 1 - e^x$

(b) $f(x) = \frac{1}{2} \ln x$

(c) $f(x) = 4 - \log_2 (-x)$

(d) $f(x) = -2^{3x-1}$ (bonus)

VI. Solve.

(a) $8^{6+3x} = 4$

(b) $4^{x-x^2} = \frac{1}{2}$

(c) $\log_{\sqrt{2}} x = -6$

(d) $25^{2x} = 5^{x^2-12}$

(e) $\log_3 \sqrt{x-2} = 2$

(f) $\log_{10}(7x-12) = 2 \log_{10} x$

(g) $\log_x 125 = 3$

(h) $\log_2 x + \log_2(x+6) = 4$

(i) $3^{2x} + 3^{x+1} - 4 = 0$

(j) $2 \log_3(x+4) - \log_3 9 = 2$

(k) $\log_{25} x + \log_5 x = 9$

(l) If $2^x = 7$, find 2^{2x-3}