

Test 4 Review
Fall 2006
MATH 111 Section 04

1. Change the following from logarithm notation to exponential notation:

- (a) $\log_2 16 = 4$
- (b) $\log_3 81 = y$
- (c) $\log_e x = 3$
- (d) $\log_{10} 10^x = x$

2. Change the following from exponential notation to logarithm notation

- (a) $2^3 = 8$
- (b) $e^{\ln e^x} = x$
- (c) $e^9 = x$
- (d) $10^y = x$

3. Find the number, if possible

- (a) $\log_2 512$
- (b) $\log_3 -3$
- (c) $\log_{10} 0.000001$
- (d) $\log_2 0.125$
- (e) $\log_1 2$

4. Solve the equation if possible

- (a) $\ln x^2 = -2$
- (b) $\log_2 \left[(x + 1)^{\frac{1}{\log_2 3}} \right] = \log_3 2$
- (c) $\log(57x) = 2 + \log(x - 2)$
- (d) $\log x - \log(x + 1) = 3 \log 4$

5. Sketch the graphs of the following functions

- (a) $y = \log x$
- (b) $y = \log(x + 1)$
- (c) $y = \log(x) + 1$
- (d) $y = 2 \log(x + 1) - 3$

6. If the pollution of Lake Erie were stopped suddenly, it has been estimated that the level P of pollutants would decrease according to the formula

$$P = P_0 e^{-0.3821t},$$

where t is the time in years and P_0 is the pollutant level at which further pollution ceased. How many years would it take to clear 50% of the pollutants?

7. Verify the identity by transforming the left-hand side to the right-hand side.

(a) $\cos^2(\alpha) - \sin^2(\alpha) = 2\cos^2(\alpha) - 1$

(b) $(1 + \sin(\theta))(1 - \sin(\theta)) = \sec^{-2}(\theta)$

(c) $\sec(\theta) - \cos(\theta) = \tan(\theta)\sin(\theta)$

(d) $\log \tan(\theta) = \log \sin(\theta) - \log \cos(\theta)$

8. Find the exact value of the following

(a) $\sin(132\pi/3)$

(b) $\tan(3082\pi)$

(c) $\cot(3081\pi)$

(d) $\cos(264\pi/6)$