

Math 127: Review for Test 4 Bring your calculator!

Review Problems:

Chapter 8 Review, page 600: 21 – 41 odd, 45; page 602: 11 – 19 ALL; page 581: 49, 51, 57, 59;
page 594: 41, 43, 45, 47, 51, 53

Chapter 12 Review, page 889: 2 – 14 ALL; 16 – 28 ALL

I. The Algebra of Functions

- Be able to add, subtract, multiply or divide functions, when the functions are represented by (a) an equation, (b) a graph, or (c) a table of data.
- Be able to find the composition of two functions

II. Inverse Functions

- Understand the nature of inverse functions (they UNDO each other)
- Be able to check that two functions are inverses by composition
- Find the inverse of a function from (a) a table of data, (b) a graph, or (c) from an equation
- Determine whether a given function is one-to-one and know how this relates to finding the inverse of a function.

III. Exponential Functions

- Graph an exponential function $y = a^x$, and clearly show the 3 characteristics of an exponential graph (horizontal asymptote, point (0,1), rapid growth)
- Recognize exponential growth and exponential decay (a) from an equation, or (b) from a graph:
- Know the domain and range of an exponential function
- Know that the common base “e” is approximately 2.718.
- Applications: Know the Compound Interest formulas, population growth formula and radioactive decay formula and be able to use them to solve problems.
- Be able to use your calculator

IV. Logarithmic Functions

- Graph a log function $y = \log_a x$ and clearly show the 3 characteristics of a log graph (vertical asymptote, point (1,0), slow growth)
- Know the domain and range of a log function
- Know the inverse relationship between exponential functions and log functions, i.e. that $y = \log_a x$ and $y = a^x$ are inverses of each other.

V. Logarithms

- Know the definition of logarithm (the two related equations: log form and exponential form)
log form: $P = \log_a x$ means $y = a^P$ (exponential form)
- Know the question that a log is asking: $\log_3(81) = ?$ is asking “what power on 3 gives you 81?”
- Know that common log is base 10: i.e., $\log(x)$ means $\log_{10}(x)$
- Know that natural log is base “e”: i.e., $\ln(x)$ means $\log_e(x)$
- Know basic log facts: (a) $\log_a(1) = 0$ so $\log(1) = 0$ and $\ln(1) = 0$
(b) $\log_a(a) = 1$ so $\log(10) = 1$, $\ln(e) = 1$
(c) $\log_a(0)$ is **UNDEFINED** $\log_a(\text{negative})$ is **UNDEFINED**
- Expand or contract log expressions using the properties of logs.
- Evaluate logs using a calculator

VI. Solving Equations

- Solve log equations: Consolidate logs into single log then rewrite in exponential form and solve.
- Know to check log equations for extraneous solutions!
- Solve exponential equations: Isolate the exponential portion, then take log or LN of both sides of equation in order to bring down the exponent.