Math 127
Exam 3 Review Sheet

## Section 2.9: Inverse Functions

• Know the definition of a one-to-one function and understand and be able to apply the horizontal line test.
• Be able to prove whether or not a given function is one-to-one.
• Know the definition of inverse functions and the Inverse functions composition property.
• Be able to use algebra to find the inverse of a function and be able to verify that two functions are inverses by computing composite functions.
• Understand the relationship between the domain, range, and graph of a function and those if its inverse (symmetry across the line $y = x$).

## Section P.2 and P.6: Exponents and Radicals
• Understand and be able to apply the properties of whole number and negative exponents.
• Be able to simplify expressions involving whole number exponents and negative exponents.
• Understand radical notation, including when a radical is undefined.
• Be able to simplify radical expressions (including rationalizing denominators).
• Be able to add, subtract, multiply, and divide radicals.
• Understand the connection between radical notation and rational exponent notation and be able to translate between these notations.
• Understand and be able to simplify expressions involving rational exponents.
• Be able to evaluate real numbers either in radicals or rational exponent expressions.

## Section 4.1: Exponential Functions

• Know the definition of an exponential function $y = a^x$ including the values that $a$ can have. Also know the basic shape of the graphs of exponential functions and be able to draw the graph of a given exponential function.
• Be able to use two given points to find the formula for an exponential function of the form $f(x) = a^x + b$.
• Memorize the compound interest formula and be able to use it and other exponential functions to solve basic application problems.
• Understand the number $e$ and the fact the the function $P = e^{rt}$ is used to model situations involving "continuous" growth or decay.
• Be able to draw graphs of functions involving $e$ and to draw graphs of exponential functions by applying graph transformations.

## Section 4.2: Logarithmic Functions

• Know the definition of $log_a x$ and understand how to translate between logarithmic and exponential form. Also know the notation for ln and log (log base $e$ and base 10)
• Be able to draw the graph of logarithmic functions and evaluate logarithmic expressions.
• Be able to use shifts of functions to draw graphs related to the graph of a logarithmic function.
• Know how to solve logarithmic equations by translating to exponential form and by using the one-to-one property.
• Be able to use logarithms to solve application problems.

## Section 4.3: Rules of Logarithms

• Memorize the properties of logarithms and be able to apply them both to expand logarithmic expressions and to combine logarithms into a single expression.
• Be able to use the properties of logarithms in order to solve logarithmic equations.
• Be able to use the change of base formula to write a compute approximate values of logarithmic expressions.
• Be able to use logarithms to compute the value of expressions involving very large numbers.

## Section 4.4: Exponential and Logarithmic Equations

• Be able to solve exponential equations by using the one-to-one property of exponential functions.
• Be able to solve logarithmic equations by using the one-to-one property of logarithmic functions. Also understand the importance of checking solutions to logarithmic equations to ensure that the solution values are in the domain of the logarithmic expressions involved.
• Understand how to solve exponential and logarithmic equations of various forms by using the properties of exponents and logarithms.
• Understand how exponential and logarithmic functions can be used to model the change in quantities over time.
• Be able to solve half life, interest and investment, and population growth problems using exponential models and by solving equations using exponential and logarithmic methods.

## Review Problems:

Chapter P pp. 72-73 # 18, 22, 46, 47, 49, 50, 53, 55, 56, 60, 63, 66, 67, 68

Chapter 4 pp. 464-467 # 3, 7, 13, 16, 21, 25, 27, 31, 37, 39, 44, 52, 55, 56, 59, 63, 67, 70, 72, 74, 77, 84, 87, 91, 96, 100