Math 127
Final Exam Review Sheet

Final Exam: Tuesday, July 1st 9:30-11:45am, Bridges Room 264

Part 1: Chapter 1 - Sections 1.1, 1.2, 1.3, and 1.4

Key Topics:
• Number systems (Integers, Rational, Irrational, Real, Complex), properties of real numbers
• Properties of exponents, simplifying expressions involving exponents, negative and rational exponents
• Radical notation, simplifying radicals, rationalizing denominators
• Polynomials, operations on polynomials, factoring polynomials (greatest common factor, trinomials, grouping, difference of squares, perfect squares)
• Rational expressions, simplifying rational expressions (sums, differences, products, and quotients)

Not Tested: scientific notation, cubic factoring formulas

Review Problems: Chapter 1 # 3, 6, 15, 22, 35, 38, 39, 45, 49, 50, 57, 60, 61, 64, 79, 81

Part 2: Chapter 2 - Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7

Key Topics:
• Solving linear equations and equations that are linear in form
• Application problems (mixing problems, rate problems ($d = rt$), and other applications)
• Quadratic equations (solving by factoring, completing the square, the quadratic formula, and the discriminant)
• Complex Numbers (definition of i, addition/subtraction, multiplication, division of complex numbers, powers of i), quadratics with complex solutions
• Other equations (factoring by grouping, rational exponents, radical equations, quadratic substitution, absolute value equations)
• Inequalities (interval notation, graphing inequalities, factor analysis, continued inequalities, factor analysis, rational inequalities, absolute value inequalities)

Review Problems: Chapter 2 # 4, 9, 10, 11, 12, 13, 20, 23, 26, 29, 33, 37, 41, 47, 52, 55, 61, 63, 69

Part 3: Chapter 3 - Sections 3.1, 3.2, 3.3, 3.4, 3.7

Key Topics:
• Cartesian coordinates, plotting points, distance, midpoints, the Pythagorean Theorem
• Graphing equations, x and y- intercepts, symmetry, circles (equations and graphs)
• lines, slope, point-slope, slope-intercept, general form, parallel and perpendicular lines, graphing lines, vertical/horizontal lines, perpendicular bisectors
• functions (definition, vertical line test, increasing/decreasing/constant), domain and range of a function (finding algebraically and graphically), evaluating functions, difference quotients, graphing functions
• The Algebra of functions (sums, differences, products, quotients, and composition), evaluating combinations of functions, composing and decomposing functions, finding the domain of a combinations of two functions, evaluating using tables

Not Tested: semicircles

Review Problems: Chapter 3 # 3, 4, 9, 11, 15, 17, 22, 23, 33, 36, 39, 51, 55, 56, 67, 70, 71, 73

Part 4: Chapter 5 - Sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6

Key Topics:
• One-to-one functions, showing a function is or is not one-to-one, the horizontal line test.
• Inverse functions, finding the inverse of a function, domain, range, composition and the inverse function theorem, graphs of inverses
• Exponential Functions (definition, properties of exponents, graphs of exponentials), compound interest, applications, the number e, continuous interest
• Logarithmic Functions (definition, graphs of logarithms, ln and log), changing between exponential and logarithmic form, evaluating logarithms
• properties of logarithms, simplifying logarithmic expressions, solving exponential and logarithmic equations

Not Tested: pH, change of base formula, logarithmic applications

Review Problems: Chapter 5 # 3, 5, 10, 17, 21, 24, 25, 27, 30, 35, 43, 45, 46, 53, 56, 59

Part 5: Chapter 9 - Sections 9.1, 9.2, 9.5, 9.6, 9.7

Key Topics:
• Systems of equations, substitution, elimination, representing a linear system as a matrix
• Matrix row operations, solving systems using matrices
• Unique solutions versus infinitely many solutions and no solutions
• Operations on Matrices: equality, addition/subtraction, scalar multiplication, multiplying matrices
• Additive and Multiplicative identities, inverses of matrices, solving systems of equations using inverse matrices.

Review Problems: Chapter 9 # 1, 4, 9, 11, 21, 24, 25, 26, 29, 30, 31, 33, 35