

Math 127
Final Exam Review Sheet

Final Exam: 11:30-1:30pm - Tuesday, May 12th. in Bridges Hall Room 268

Part 1: Prerequisites: Fundamental Concepts of Algebra

Key Topics:

- 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), complex fractions

Not Tested: cubic factoring formulas

Review Problems: pp. 72-73 # 17, 23, 30, 37, 44, 49, 54, 55, 56, 63, 66, 67, 68, 70, 74, 77, 82, 83, 88, 90, 93, 96, 103, 106, 109, 110, 114, 116, 121, 127, 128

Part 2: Equations and Inequalities

Key Topics:

- Cartesian coordinates, plotting points, graphing equations, x and y intercepts of graphs
- Solving linear equations, equations that are linear in form, and rational equations
- Solving application problems
- 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)
- Linear, Quadratic, and Rational Inequalities (interval notation, graphing solutions to inequalities, sign charts)

Review Problems: pp. 151-152 # 4, 7, 12, 20, 22, 25, 30, 33, 42, 44, 48, 52, 56, 58, 60, 65, 66, 75, 78, 82, 85, 87, 91, 95, 97, 116, 118, 124, 127

Part 3: Functions and Graphs

Key Topics:

- functions (definition, vertical line test, increasing/decreasing/constant), domain and range of a function (finding algebraically and graphically), evaluating functions, difference quotients, function notation
- Increasing and decreasing functions, maximum and minimum values. Even and odd functions (symmetry with respect to the y -axis and with respect to the origin), piecewise defined functions
- lines, slope, point-slope, slope-intercept, general form, parallel and perpendicular lines, graphing lines, vertical/horizontal lines, graphing piecewise defined functions, the average rate of change of a function on an interval
- Transformations of functions, graphing functions using one or more of the 6 basic transformations.
- Combinations 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 functions and combinations of functions using tables of values
- One-to-one functions, showing a function is or is not one-to-one, the horizontal line test.
- Inverse functions, finding a formula for the inverse of a function, domain, range, composition and the inverse function theorem, graphs of inverses
- distance, midpoints, the Pythagorean Theorem, and circles (finding and interpreting equations, graphing)
- be able to solve basic application problems

Review Problems: pp. 285-287 # 1, 8, 10, 13, 17, 20, 21, 26, 29, 35, 36, 40, 42, 43, 45, 46, 47, 54, 59, 61, 63, 65, 69, 71, 75, 79, 81, 84, 85, 93, 98, 102, 105, 107, 109

Part 4: Exponential and Logarithmic Functions

Key Topics:

- Exponential Functions (definition, properties of exponents, graphs of exponentials), compound interest, applications, the number e ,
- Exponential growth and decay, population modeling and half-life applications
- Logarithmic Functions (definition, graphs of logarithms, \ln and \log), changing between exponential and logarithmic form, evaluating logarithms, the change of base formula
- properties of logarithms, simplifying and expanding logarithmic expressions
- Solving exponential and logarithmic equations of various forms

Review Problems: 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

Part 5: Polynomial Functions

Key Topics:

- Quadratic Functions, finding the vertex and axis of symmetry, finding intercepts, graphing, applications
- Graphing polynomial functions, end behavior and the leading term test, finding intercepts, zeros and multiplicity, the Intermediate Value Theorem, turning points
- Long division of polynomials, synthetic division, finding zeros using division, evaluating polynomials using synthetic division, the factor theorem
- The rational zero theorem, factoring polynomials by finding rational zeros, solving equations by finding rational zeros

Review Problems: pp. 385-387 # 2, 5, 8, 12, 13, 16, 21, 22, 24, 27, 28, 30, 31, 34, 35, 37, 38, 41, 42, 45, 49, 52, 53, 54, 56, 60, 61, 86, 91