MDEV 127
Final Exam Review Sheet

Final Exam: 9:00am-11:00am Wednesday, May 11th, MacLean 276

Part 1 Properties of Numbers

• Understand order of operations, set notation and set operations, number systems (Integers, Rational numbers, etc.)
• Understand prime numbers, factoring whole numbers, reducing fractions, multiplying and dividing fractions, adding fractions, least common denominators
• Understand opposites and reciprocals, absolute value, using properties of real numbers (the associative property, the commutative property, the distributive property, etc.)
• Understand adding, subtracting, multiplying and dividing real numbers; dividing fractions, division involving zero, and be able to solve percent problems.

Part 2 Polynomials and Factoring

• The definition of a polynomial as well as the degree and leading term of a polynomial.
• Be able to add, subtract, and multiply, polynomials.
• Know how to divide a polynomial by a monomial by splitting into separate terms and know how to divide polynomials by factoring and deleting common factors. Also be able to do long division of polynomials.
• "Special" multiplication: squaring binomials, multiplying the sum and difference of two terms.
• Factoring methods: greatest common factors, factoring by grouping, factoring trinomials (guess/check and the "ac" - split)
• Special factoring formulas: perfect squares, the difference of squares, sums and differences of cubes
• Know how to multiply expressions involving rational exponents and how to factor expressions involving rational exponents.

Part 3 Exponents

• Know the properties of exponents
• Understand negative exponents and rational exponents
• Be able to simplify expressions involving exponents

Part 4 Rational Expressions

• Be able to simplify rational expressions by factoring and know how to evaluate rational expressions.
• Know the definition of a rational function and be able to find the domain of a rational function in set notation.
• Know how to multiply and divide rational expressions. Also know how to reduce rational expressions by factoring.
• Know how to add and subtract rational expressions by finding the lowest common denominator, combining the numerators, and then simplifying the result.
• Know how to simplify complex fractions by multiplying by the reciprocal.
• Know how to simplify complex fractions by adding and subtracting terms first, and then multiplying by the reciprocal.

Part 5 Radicals

• Know the definition of the nth root of a number, including the fact that the nth root of a negative number is *undefined* when n is even and is *defined* when n is odd.
• Know how to write nth roots as rational exponents and how to write rational exponents using radical notation.
• Memorize the properties of radicals and simplification rules on page 446 of your textbook.
• Be able to apply use the properties of radicals and rationalization techniques to put radical expressions into simplified form.
• Pay attention to whether or not variables in a radical expression are assumed to be positive or are allowed to be negative and understand when to use absolute value signs when simplifying radicals.
• Understand how to add and subtract radical expressions and the fact that the radical portion of each term must be the same in order to combine terms.
• Be able to add and subtract radical expressions involving fractions by finding a common denominator and simplify the result by rationalizing and/or reducing.
• Know how to multiply radical expressions involving either one term or multiple terms.
• Be able to rationalize fractional expressions with two term denominators by multiplying by the conjugate.

Part 6 Lines and Graphing

• Understand the Cartesian plane and graphing ordered pairs.
• Know how to find the x and y-intercepts of a linear equation in two variables and be able to graph lines (including horizontal and vertical lines)
• Memorize the slope formula and be able to find the slope of a line given two points on the line. Also understand the relationship between the slopes of parallel and perpendicular lines.
• Know the three different forms of the equation of a line: standard form, slope/intercept, and point/slope
• Be able to find the slope and intercept of a line and graph it using slope/intercept form.
• Be able to find the equation of a line given a point and the slope and be able to find the equation of a line given two points.

Part 7 Functions

• Know the definition of a function, understand the domain and range of a function, and be able to tell whether a given example is a function or not either from its description, from its graph, or by looking at ordered pairs.
• Be able to sketch a graph of the function by finding values and plotting ordered pairs. Also be able to find the domain and range of a function from its graph.
• Know how to evaluate a function either for a specific value or for an expression.
• Be able to form and evaluate new functions by taking the sum, difference, product, quotient, or composition of two functions.

Part 8 Solving Equations

• Know the properties of equality and the zero-factor property and how they are used to solve equations.
• Know how to solve linear equations in one variable and be able to eliminate fractions and decimals from linear equations using multiplication.
• Be able to recognize equations with no solution and equations that are identities (always true).
• Be able to solve for a single variable in equations of various types.
• Know how to solve absolute value equations by splitting into positive and negative cases.
• Be able to recognize absolute value equations that have no solution and those that are always true.
• Know how to solve rational equations by finding a common denominator and then multiplying to clear the denominator – make sure to check for "false" solutions.
• Know how to solve equations involving one or more radicals by isolating radicals and raising both sides to a power - make sure to check for "false" solutions.
• Be able to solve quadratic equations by factoring, by taking the square root of each side of quadratics in "special form", by completing the square and by using the quadratic formula.
• Be able to solve systems of linear equations using either "elimination" or "substitution". Also know how to recognize when there is one solution, no solution, and infinitely many solutions.

Part 9 Solving Inequalities

• Know the properties of inequalities. Pay special attention to multiplication where you need to reverse the inequality.
• Be able to graph the solution to a linear inequality on a number line and be able to express the solution to a linear inequality in interval notation.
• Understand compound inequalities: both "and" and "or" cases.
• Be able to solve absolute value inequalities by splitting into two cases.
• Know how to write absolute value inequalities as compound inequalities and be able to recognize absolute value inequalities that have no solution and those that are always true.
• Be able to graph the solution of a linear inequality in two variables by graphing the related line and using a test point.
• Be able to solve systems of linear inequalities by graphing the related lines and using a test point.

Part 10 Application Problems

• Know and be able to carry out the blueprint for problem solving: begin each application problem by defining variables and end by stating your conclusion in a sentence.
• Know how to set up and solve application problems involving rational expressions, including rate and work problems.
• Be able to solve application problems involving systems of linear equations and systems of linear inequalities, including mixing problems and rate problems, and economic applications.

Practice Problems: Chapter 1 Cumulative Review p. 172-173 # 11, 14, 15, 18, 23, 26, 30, 35, 37, 41, 43, 47
Practice Problems: Chapter 2 Cumulative Review p. 271-272 # 4, 12, 17, 24, 26, 29, 31, 35, 36, 43, 47, 49
Practice Problems: Chapter 3 Cumulative Review p. 341-342# 6, 7, 9, 12, 17, 20, 22, 26, 38, 42, 43, 49
Practice Problems: Chapter 3 Review p. 339-340# 1, 4, 7, 11, 43, 44, 46, 48, 49
Practice Problems: Chapter 4 Cumulative Review p. 421-422 # 10, 14, 19, 24, 28, 33, 35, 40, 45, 46, 47, 49
Practice Problems: Chapter 5 Cumulative Review p. 490-491 # 5, 6, 7, 14, 16, 17, 19, 21, 23, 26, 32, 34
Practice Problems: Chapter 6 Cumulative Review p. 563-564# 1, 6, 8, 12, 19, 22, 25, 28, 30, 37