

## FINAL EXAM MATERIAL AND EXPECTATIONS

For the final exam, you should be able to do the following things:

### Chapter 1.

- Know basics of arithmetic, including order of operations, evaluating absolute value, and using the symbols  $<$ ,  $>$ , and  $=$
- Add and subtract polynomials by combining like terms
- Multiply polynomials using repeated use of the distributive property (such as FOIL)
- Factor a polynomial by pulling out a common factor from all terms
- Factor a three-term polynomial of the form  $ax^2 + bx + c$  using trial and error or the methods introduced in class
- Write a rational expression in lowest terms by factoring the numerator and denominator and canceling common factors
- Multiply rational expressions by multiplying the numerators and multiplying the denominators
- Divide rational expressions by multiplying the first by the reciprocal of the second
- Rewrite a rational expression with a new denominator
- Add and subtract polynomials by finding a common denominator and rewriting the expressions with that denominator, then adding the new numerators
- Use the rules of exponents to manipulate and simplify expressions with exponents, including negative exponents or rational exponents
- Translate between expressions with rational exponents and radical expressions, and use this to manipulate and simplify expressions with radicals
- Solve linear equations by isolating the variable
- Solve first-degree rational equations by multiplying both sides by a common denominator and solving the resulting linear equation
- Solve equations with absolute value by remembering how to set up the solution method
- Solve quadratic equations by factoring and by using the quadratic formula

### Chapter 2.

- Plot points in the  $xy$ -plane
- Find the  $x$ -intercepts and  $y$ -intercepts of the graph of an equation
- Compute the slope of a line given two points on the line
- Find the slope of a line given its equation
- Find the slope of a line parallel or perpendicular to a given line
- Write equations of lines that meet certain criteria
- Solve linear inequalities by isolating the variables, remembering that multiplying or dividing an inequality by a negative number requires you to flip the sign
- Solve three-part inequalities
- Solve absolute value inequalities by remembering how to set up the solution method
- Solve quadratic inequalities by remembering the solution method (factor, find  $x$ -intercepts, and make table that checks test values between  $x$ -intercepts)

**Chapter 3.**

- Given a function, determine its domain
- Given a function, evaluate it at given values
- Sketch the graph of a function by plotting points, including piecewise-defined functions
- Find the vertex of a quadratic function
- Given the vertex of a quadratic function and another point on the graph, write the formula for the function
- Find all  $x$ -intercepts and  $y$ -intercepts of the graph of a quadratic function
- Use the leading coefficient of a quadratic function and its vertex to determine the maximum or minimum value of the the function

**Chapter 4.**

- Know shape of a graph of an exponential function, including domain and range
- Evaluate exponential functions at different values
- Be familiar with the number  $e$
- Know how to translate between a logarithmic statement and an exponential statement:  $\log_a(x) = y \leftrightarrow a^y = x$
- Know shape of a graph of a logarithmic function, including domain and range
- Know the log laws and other important properties of logarithms
- Know the change of base formula
- Solve exponential and logarithmic equations using the methods covered in class

**Chapter 6.**

- Solve two-variable systems of linear equations using either substitution or elimination
- Solve three-variable systems of linear equations using elimination, and either the back-substitution method or the Gauss-Jordan method.

**Possible Word Problem Material.**

- 1.2: Cost, revenue, and profit
- 1.6: Word problems with first-degree equations
- 3.3: Problems on cost, revenue, and profit with marginal cost/revenue and break-even analysis, as well as problems on supply and demand curves
- 4.2: Compound interest, and other problems involving exponential functions