

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 term of a general polynomial function to determine its “basic shape”
- Use the factoring techniques of Chapter 1 to find the x -intercepts of some higher-degree polynomial functions
- Determine behavior of graph of a higher-degree polynomial function between x -intercepts by making a table
- Use this information to sketch the graph of a higher-degree polynomial 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
- 2.3: Analyze linear models by filling out the table of residuals and squared residuals and use it to determine which model is best
- 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