

# Topics for Exam 3

This exam will be 22 questions. Fifteen of those questions are 4-points and seven of the questions are 6-points. Any topic that is starred (\*) will only be on the test if it is covered by Wednesday in class. I will announce by Wednesday which, if any, of the starred topics will be on the exam.

## **Quadratic Inequalities: 2.4 in Text**

- Be able to solve a quadratic inequality

## **Division of Polynomials: 3.1 and 3.2 in Text**

- Determine if a function is a polynomial
- Find the degree, leading coefficient, and leading term of a polynomial
- Find the multiplicity of a given zero or root
- Use the Rational Roots Theorem to find all possible rational roots of a polynomial
- Be able to divide two polynomials using polynomial long division
- Be able to divide two polynomials using synthetic division
- Be able to factor a polynomial using the Rational Roots Theorem, the Factor Theorem, and the Remainder Theorem
- Be able to determine the remainder of two polynomials divided by each other
- Be able to determine if one polynomial is a factor of another
- Be able to state the Rational Roots, Remainder, and Factor Theorems

## **Complex Numbers: 3.4 in Text**

- Be able to convert from a negative under a square root to a complex number
- Should be able to add, divide, multiply, and subtract two complex numbers
- Should be able to determine the number of real and complex zeros of a quadratic polynomial
- Should be able to find the complex zeros of a quadratic polynomial by using the quadratic formula
- Should be able to state the quadratic formula
- Should be able to determine  $i^n$  for any positive whole number  $n$

- Should be able to find the complex conjugate of any complex number

### **Rational Functions: 4.1 in Text**

- Should be able to find the  $x$ -intercept of a rational function
- Should be able to find the  $y$ -intercept of a rational function
- Should be able to find the domain of a rational function
- Be able to find the horizontal asymptotes of a rational function
- Be able to find the vertical asymptotes of a rational function
- Be able to construct a rational function given asymptotes and intercepts

### **Variation: 4.3 in Text**

- Know what it means if  $x$  is inversely, directly, or jointly (with  $z$ ) proportional to  $y$
- Should be able to write an equation given how variables are related
- Should be able to solve for a numeric answer given some relation between variables.
- Should be able to find the constant if given relation between variables and some extra information

### **Composition of Functions: 5.1 in Text**

- Find the composition of some functions
- Find the composition of some functions evaluated at a number
- Decompose a function into two functions

### **Inverse Functions: 5.2 in Text**

- Find the inverse of a function
- Find the inverse of a function at a particular number
- Determine if a function is one-to-one using the horizontal line test
- Be able to use the Cancellation Test to determine if two functions are inverses to each other

### **\*Intro to Exp/Log Functions: 6.1 in Text**

- Convert from Exponential form to Logarithmic form
- Make a table to determine values of Log and Exp
- Use properties of Log to simplify an expression