MATH 117: Exam # 1 Review Outline

Instructor: Joseph McGuire

So first off the exam will be due: **October 16 @ 11:59pm**. I will also be **not accepting late work for this exam**. So get started on this as soon as possible and ask questions when you need to. I expect excellent work from you all, good luck!

So the format of the exam, there will be 10 problems. **CHOOSE ONLY 8**, each worth 12.5 points out a total of 100. If you do more than 8 I will simply choose the first 8 problems to grade.

For reviewing for the exam, I would highly recommend reviewing being familiar with, and being able to apply the following concepts:

- Finding the Zeros of Polynomials:
  - Be able to use the quadratic formula:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$
  - Rational Roots Theorem
  - Finding zeros by dividing $p(x)$ by $x - c$
  - Finding the zeros/roots through a graph
- Polynomial Long Division
  - Be able to divide polynomials $\frac{p(x)}{q(x)}$ and putting this in the form $\frac{p(x)}{q(x)} = a(x) + \frac{r(x)}{q(x)}$
- Finding the Numbers of Different Kinds of Zeros of a Polynomials:
  - Applying Descartes' Rules of Signs
  - The Complete Factorization Theorem
  - The Fundamental Theorem of Algebra
- Rational Functions:
  - Finding the different types of asymptotes of a rational function
  - Using the root finding techniques of polynomials to find vertical asymptotes and zeros of a rational function
  - Finding the end behavior of a rational function

  - How to graph a rational function by interpreting as $\frac{1}{x}$
  - How the degrees of the top and bottom polynomials dictate horizontal asymptotes

- Rational and Polynomials Inequalities:
  - Finding the $x-$values where $p(x) \leq q(x)$ or $p(x) < q(x)$ are true, for $p(x)$ and $q(x)$ being polynomials
  - Relating the roots and asymptotes finding methods to "solve" inequalities like $\frac{p(x)}{q(x)}$

- Complex Numbers and Polynomials:
  - Understand how to multiply, divide, add, and subtract complex numbers
  - Understand how to find complex zeros of a polynomial
  - Be able to understand what a polynomial having a complex zero means