MATH 29—OUTLINE FOR EXAM 2

Sections covered: 3.1, 2.1–2.6

Main ideas

A. Inverse functions

B. Polynomial functions

C. Rational functions

D. Polynomial and rational inequalitites

Skills you should have

1. Be able to determine if a function is one-to-one

- Be able to do this both from a table of values and graphically (using the horizontal line test)

2. Be able to find the inverse of a function, if it exists

- Know that a function does not have an inverse if it is not one-to-one
- Be able to find the inverse of a function graphically (by reflecting over the line $y = x$)
- Be able to find the inverse of a function algebraically (by solving for x in terms of y and then swapping the variables)
- Be able to compute values for $f^{-1}(x)$ given a table of values for $f(x)$

3. Be able to work with quadratic functions

- Be able to write a quadratic function in vertex form (by completing the square)
- Be able to graph a quadratic function given a formula for it
- Be able to find a formula for a quadratic function given its graph

4. Be able to work with polynomial functions

- Be able to find the zeros (and multiplicities) of a polynomial function
- Be able to use the Rational Zeros Theorem to help find zeros of a function
- Know that if c is a zero of a polynomial, then $(x - c)$ is a factor and can be factored (divided) out
- Know how to perform polynomial long division
- If you divide $f(x)$ by $d(x)$ and get a quotient $q(x)$ and remainder $r(x)$, know how to write $f(x) = q(x)d(x) + r(x)$
- Be able to determine the end behavior of a polynomial
- Know how to put the above information together to graph a polynomial function (remember how the multiplicity of a zero determines if the graph crosses or only touches at a zero)

5. Be able to work with rational functions

- Be able to find the zeros of a rational function
- Be able to find the vertical asymptotes and identify any holes

- Be able to determine the end behavior of a rational function and any horizontal asymptotes
- Know how to put the above information together to graph a rational function

6. Be able to solve polynomial and rational inequalities

- This may require you to first move everything to one side of the inequality and then factor

How to study

I. Review core topics.

II. Work *lots* of problems all of the way through—focus on ALEKS problems, problems from class, and problems from the book.

- I made homework assignments in ALEKS that are *worth no credit* for you to review. They are titled "Review for Section XXX (no credit)"
- You can also work extra problems from the book. Look at the end of each section we covered and also in the Chapter 2 and 3 reviews.

III. Practice doing several problems in a short amount of time.

IV. Come talk with me if you have any questions!