Test #1 Review Sheet

Test Coverage: Sections 2.7, 4.1 – 4.5

How to Prepare for the Test:
1) Make a study guide of all important definitions, theorems and examples. Use your notes and the book for this.
2) Do review problems on p. 128 – 129 (27, 31, 37, 39, 41, 43) and p. 315 – 316 (1 – 35 odd)
3) Find a study group and go over any remaining questions.
4) Redo homework problems that gave you trouble.
5) Do the practice tests for each section on the book’s website (see Test Reviews on course website for the link).
6) Review Quest #1 solutions (see course website).

Major Topics to Know:

Section 2.7:
1) Know what a polynomial inequality is and how to solve it with a sign chart. Know how to write your answer in interval notation.
2) Know what a rational inequality is and how to solve it with a sign chart. Know how to write your answer in interval notation. Know how to test for where the cut points are and where there may be solutions that are not cut points.

Section 4.1:
1) Know what a polynomial function is and how to sketch them when the degree is odd and when it is even.
2) Know how to find the maximum number of turning points by looking at the degree of the polynomial function.
3) Know the Intermediate Value Theorem and how to use it to tell if a polynomial has a zero between two values.
4) Know how to sketch a polynomial function and find all intervals where the function $f(x) > 0$ and $f(x) < 0$.
5) Know how to look at a sign chart and make a rough sketch of a function.

Section 4.2:
1) Know how to do polynomial long division and how to write your answer according to the Division Algorithm. Also, know what the Division Algorithm states.
2) Know the Remainder Theorem and how to use it to find the value of something like $f(4)$ using polynomial long division.
3) Know the Factor Theorem and how to use it to show that $x – c$ is a factor of some polynomial.
4) Know how to use the Factor theorem to find a polynomial of a certain degree given its zeros.
5) Know how to use Synthetic Division to find something like $f(3)$ given a polynomial $f(x)$ and how to use it to show a number is a zero of a polynomial $f(x)$.

Section 4.3:
1) Know what the zeros / roots of a polynomial are and how to find them.
2) Know what a complex number is.
3) Know the Fundamental Theorem of Algebra and the Complex Factorization Theorem for Polynomials.
4) Know the Maximum Number of Zeros Theorem and how to use it to find the maximum number of zeros in a polynomial.
5) Know how to find a factored form of a polynomial with a particular degree given something like $f(-4) = 5$. This is the one where you have to solve for “$a$”.
6) Know how to find multiplicity of zeros and how to tell if given a zero of a particular multiplicity, whether the graph will cross or turn at a zero on the graph.
7) Know how to express a polynomial as a product of linear factors and how to find all its zeros.
8) Know Descartes’ Rule of Signs and how to tell how many positive real zeros, negative real zeros and imaginary zeros are possible.
Section 4.4:
1) Know the Conjugate Pairs Theorem and how to use it to find a polynomial of a certain degree given one or more zeros that are imaginary.
2) Know how to express a polynomial expression as a product of linear and/or quadratic polynomials with real coefficients irreducible over the real number system OR how to express the polynomial expression just as a product of linear factors.
3) Know the Rational Root / Zero Theorem and how to find all possible rational roots.
4) Know how to show a polynomial has no rational roots.
5) Know how to use the Rational Root Theorem to find all rational zeros of a polynomial equation in standard form.

Section 4.5:
1) Know what a rational function is and be able to express its domain in interval notation.
2) Know how to find any vertical asymptotes and holes of a rational function.
3) Know how to find horizontal asymptotes, if there are any, and know if there is a slant/oblique asymptote, when that would occur, and how to use polynomial long division to find it.
4) Know how to sketch a rational function by finding all intercepts, asymptotes, holes, and whether or not the graph crosses any horizontal asymptote.
5) Know how to find a rational function given information about it, such as asymptotes, intercepts and holes.