ALGEBRA FOR CALCULUS Topics List for Chapters 3 and 4 Exam

Section 3.1 and 3.2 Complex Numbers and Quadratic Functions

- All calculations with complex numbers, like the homework on pp.239-240. Be sure to review powers of i like #79 – 88 on p. 240.
- Be able to use complex numbers while solving a quadratic equation or finding zeros of quadratic functions (# 43, 44, 47, 71, 72 on p. 254)
- Be able to solve a quadratic equation by completing the square (like #29 – 36 on p. 254)
- Be able to solve a quadratic equation by using the quadratic formula (like #37 – 56. You will definitely be given one in which you need to simplify the radical – like #45. All answers must be given in exact form – no decimal approximations!)
- Be able to solve quadratic type equations, like #79 – 94 on pp. 254-255

Section 3.3 Graphs of Quadratic Functions

- Be able to complete the square on a quadratic function and put it in vertex form (#11 – 16 on p. 266)
- Use the shortcut formula for finding the vertex of a given quadratic function (#31 – 40 on p. 268). Also identify domain, range, whether it has a max or min, and the intervals over which function is increasing or decreasing
- Find max or min value in a real world scenario, given the quadratic function (#41 – 44, 49, 51)
- Be able to write a quadratic function, given a real world scenario. You definitely will have one of these, most likely an area problem (like # 46, 53 on pp. 268-69 and also those on the worksheet) or a profit function (like #50 – 52).

Section 4.1

- Be able to classify the types of polynomial functions (#1 – 10 on p. 306)
- Be able to determine end behavior of the graph of a polynomial function, given its function rule (like #11 – 18 on p. 306)
- Be able to determine whether or not a given function is a polynomial and why/why not.
- Given a polynomial function, give its zeros and the multiplicities of those zeros (#27 – 42 on p. 306).

Section 4.2

- Given a polynomial function, be able to indicate its end behavior, zeros and their multiplicities, construct a sign chart, and a rough sketch WITHOUT the use of your calculator. (Like the quiz. Good problems to look at are # 13 – 36 on pp. 318-19)
- Given the graph of a polynomial function, be able to determine whether its degree is even or odd and if its leading coefficient is positive or negative.
- Given the graph of a polynomial function, be able to write a possible function rule for the function.

Section 4.3

- Use long division to divide two polynomials.
- Use synthetic division to divide two polynomials.

- Use synthetic division to find function values and be able to explain why this works. (#23 – 30 on p. 326).
- Use synthetic division to determine whether or not a number is a zero of a polynomial. (# 31 – 38 on p. 327).

Section 4.4

- List all the possible rational zeros of a polynomial. (#49 – 54 on p. 338)
- Find all the zeros of a polynomial, including imaginaries (# 55 – 70 on p. 338). You need to show all these steps in order to obtain full credit. This problem will be worth approximately 15 points:
  1. Use the Rational Zero Test to list all the possible rational zeros.
  2. Use your graphing calculator to narrow your choices.
  3. Use synthetic division to test your choices.
  4. List the factored form EACH TIME YOU FIND A ZERO.
  5. List all linear factors and all zeros.

- write a polynomial given its zeros (#1 – 16 on pp. 337-338).

MyLabsPlus has a set of practice HW problems (under the "homework" tab) and a practice exam (under the "Test and Quizzes" tab). The more problems you do, the better prepared you will be! Also, working through the MLP practice exam will simulate the time pressure of the real thing. Study hard!

THE FOLLOWING SECTIONS WILL BE INCLUDED ON A SEPARATE IN-CLASS 25 POINT QUIZ. NO GRAPHING CALCULATORS WILL BE PERMITTED ON THE QUIZ.

Section 4.5 Rational Functions

- Be able to identify the vertical and horizontal asymptotes of a rational function (#1-20 on p. 357)
- Be able to sketch by hand a rational function (#33 – 51; 55, 57, 61, 65, 67 on p. 358), showing all steps (*x*- and *y*- intercepts, vertical and horizontal asymptotes, domain, sign chart). No graphing calculators will be permitted on this quiz.

Section 4.6 Polynomial and Rational Inequalities

- Be able to solve a polynomial or rational inequality using a sign chart. You need to show your sign chart to receive points for the problem. (# 29 - 46 and 53 – 71 on p. 369-70)