Midterm 2 Topics List

Midterm 2 will cover material from Homework Assignments 4,5,6 and from chapters 11 to 20 (Graph Transformations up to Graphing Polynomials).

NOTE: Any and all homework questions are fair game to show up on the midterm, you should understand not just how to solve them, but also the techniques you used so that you could solve a similar problem (like a homework problem with different numbers).

Chapter Breakdowns:

Graph Transformations: "Before"=horizontal and "after"=vertical transformations. Know how to draw the graph of a linear polynomial (like p(x)=3x-4) as a sequence of graph transformations.

Inverse Functions: Know that one-to-one means passes the horizontal line test, and that onto means that the functions has the same range and target. Understand that a function being one-to-one and onto means that a function is invertible (has and inverse). Understand the idea of reversal of assignment. i.e that if $f(3) = 6$, then $f^{-1}(6)=3$. If you are given the graph of a function know how to graph the inverse by flipping the original graph over the line $y = x$. Know about the domain and range of an inverse function. Finally know how to find an inverse if you are given the original function.

N-th Roots: Know how to find the implied domain of a n-th root function. Know how to solve inequality and equality equations that have n-th roots in them for x. (i.e solve $\sqrt[4]{2x+7}=4$ for x). Know how to simplify numbers in a n-th root with prime factorization.

Basics of Polynomials: Know what the coefficients, degree, and leading term of a polynomial are. Know how to add, subtract and multiply polynomials together. Know that the leading term of the product is the product of the leading terms for polynomials.

(Polynomial) Division: Know how to do long division of polynomials and how to properly express the answer if there is a remainder left over. You do NOT need to know how to do synthetic division.

Roots and Factors: Know the definition of a root of a polynomial, and that the root of a polynomial is the same as an x-intercept of the polynomial. Understand that if, a, is a root of the polynomial, then (x-a) is a factor of the polynomial, and that (x-a) will divide the polynomial cleanly. Understand that the degree of a product of polynomials is the sum of the degrees of the factors, and that the degree of the polynomial is a limit on the number of roots it has. An n-th degree polynomial has at most n roots.

Constant and Linear Polynomials: Know what constant and linear polynomials are, and how many roots they can have. Know how to find the root of a linear polynomial. Know what slope is and how to graph linear polynomials by using the x and y-intercepts.

Quadratic Polynomials: Know what a quadratic polynomial is, how to use the completing the square formula to rewrite the polynomial. What the discriminant is and how to use it to find how many roots the polynomial has. What the quadratic formula is and how to use it to find the roots. How to graph a quadratic polynomial by using the completed square form.

Factoring Polynomials: Know what completely factored means and what monic means. Know how to factor a quadratic polynomial based off of how many roots it has (and what the roots are). Know how to factor higher order polynomials by guessing roots and using long division to factor (x-a) out of the original polynomial.

Graphing Polynomials: Know how to graph (roughly) polynomials to the far right and far left. For the interior if the roots are known, know how to find the shape of the polynomial for the whole domain.