MA 15800 Topics

3.4 Definition of Functions
- Inputs and outputs
- Domain and range
- Intervals of increasing/decreasing/constant
- Determining the difference quotient

3.5 Graphs of Functions
- Odd/Even functions
- Translation of Graphs
    - Horizontal/Vertical shifts
    - Horizontal/Vertical stretches/compressions
    - Axes reflections
- Piece-wise defined functions and graphs

3.6 Quadratic Functions
- Graphs of quadratic functions
- Standard equation of a parabola
- Finding vertex of a parabola/min-max

3.7 Operations on Functions
- Finding sum/difference/product/quotient of 2 functions
- Finding a composite function
- Determining the domain/range of a composite function

4.1 Polynomial Functions of Degree Greater Than 2
- Sketching Graphs
- Writing equations given zeros and function values
- Writing equations given the graph

4.2 Properties of Division
- Dividing 2 polynomials
- Finding quotients and remainders

4.3 Zeros of Polynomials
- Factoring
- Quadratic formula

4.5 Rational Functions
- Graphs of rational functions
    - Vertical asymptotes
    - Horizontal asymptote
    - Holes
    - x-intercepts and y-intercept
    - domain and range
    - positive/negative intervals
    - increasing/decreasing
- Writing equations of rational functions given asymptotes, zeros, holes, and a point

5.1 Inverse functions
- Finding inverse functions
- Graphing inverse functions
- Domain and range of inverse functions

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5.2 Exponential Functions

- Graphs of exponential functions
  - Domain and range
  - Translations
- Solving exponential equations
- Word problems
  - Compound interest (formulas on cover sheet)
  - General growth and decay

5.3 The Natural Exponential Function

- The natural number
- Finding zeros of functions with exponentials
- Graphs of natural exponentials
- Solving equations
- Word Problems
  - Compound interest (formula on cover sheet)
  - Growth and Decay

5.4 Logarithmic Functions

- Converting between logarithms and exponentials
- Solving equations by changing between exponential and logarithmic forms
- Graphs of logarithms
  - Asymptotes, intercepts, positive/negative, increasing/decreasing. translations
- Word problems

5.5 Properties of Logarithms

- Know the 5 properties I gave in class
- Combining multiple logarithms into a single logarithm
- Separating a single logarithm into multiple logarithms

5.6 Logarithmic Equations

- Change of base formula
- Solving logarithmic/exponential equations for
  - The exact answer
  - Answer using calculator and change of base formula

6.1 Angles

- Converting between degrees and radians
- Converting degrees between decimals and minutes/seconds
- Finding the quadrant of an angle
- Linear and angular speeds

6.2 Trigonometric Functions

- Six trig functions relating an angle to the sides of a right triangle
- Trig identities
- Values of trig functions at special angles
- Trig functions as coordinates on the *xy*-plane
- Signs of the trig functions in each quadrant

6.3 Trigonometric Functions of Real Numbers

- Trig functions in terms of the unit circle
- Basic graphs of sin*x*, cos*x*, and tan*x*

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6.4 Values of Trig Functions
- Finding the reference angle
- Using calculators to find approximate values of trig functions or angles

7.2 Trigonometric Equations
- Evaluating inverse trig functions over a given interval

6.5 Trigonometric Graph
- Graphs of sine and cosine functions, including
    - Amplitude
    - Period
    - Phase shift
    - Vertical shift
    - Zeros
    - *y*-intercepts
    - Increasing/Decreasing
    - Positive/Negative
- Writing equations of trig functions given the graph

6.7 Applied Problems
- Word problems involving trigonometric functions
- Angles of elevation and angles of depression

7.4 Multiple-Angle formulas
- Half-angle identities
- Double-angle identities

8.2 Law of Cosines
- Using law of cosines to find missing angles and sides in a non-right triangle
- Word problems using law of cosines

9.1 Systems of Equations
- Solving systems of equations using substitution

9.2 Systems of Linear Equations in Two Variables
- Finding the intersection of two lines
- Application problems

9.5 Systems of Linear Equations in More Than Two Variables
- Solving systems of equations with three unknowns

11.5 Polar Coordinates
- Converting between polar and rectangular coordinates
- Converting between polar equations and rectangular equations
- Sketching graphs of polar equations
- Cardioids and Limiçons
    - Sketching the graphs
    - Finding poles