Math 21C-2
Review Sheet

• Sequences
  Definition
  Convergence, Limits, Divergence to Infinity
  1 Definition of Convergence
  Calculation of Limits
  Nondecreasing Sequence Theorem

• Series
  Definition of $n$th Term, Partial Sum, Convergence
  Geometric Series
  Techniques for Checking Convergence
  $n$th Term Test for Divergence
  Integral Test
  Comparison, Limit Comparison Tests
  Ratio and Root Tests
  Alternating Series
  Definitions of Absolute/Conditional Convergence
  Power Series
  Definition, Radius of Convergence, Interval of Convergence
  Term-by-term Differentiation/Integration
  Taylor and Maclaurin Series
  Definition
  Calculation of Taylor series
  Taylor Polynomials
  1 Remainder Estimation Theorem
• Vectors
  Rectangular coordinates
  Distance formula
  Component form for vectors
  Magnitude
    Unit Vectors
  Vector Addition, Subtraction, Scalar Multiplication
  Standard Unit Vectors \( \mathbf{i}, \mathbf{j}, \mathbf{k} \)
  Dot Product
    Calculation
    Angle Formula
    Orthogonality
    Projection
  Cross Product
    Definition
    Calculation
    Geometric Interpretation
  Equations of Lines in Space
  Equations of Planes in Space
  \(^1\) Distances from Points to Lines/Planes

• Vector-Valued Functions
  Geometric Interpretation
  Limits and Continuity of vector-valued functions
  Derivatives and Integrals of vector-valued functions
    Position, velocity, acceleration
  \(^1\) Ideal Projectile Motion Equation
  \(^1\) Arc Length
  \(^1\) Unit Tangent Vector
  \(^1\) Curvature, Principal Unit Normal Vector
• Partial Derivatives
  Functions of several variables
    Domain, range
  Interior Points, Boundary Points, Open, Closed
  Bounded, Unbounded
  Level Curves, Level Surfaces
  Graph
  Limits of Functions of Several Variables
    1 Definition
    Calculation of Limits
    Continuous Functions of Several Variables
  Definition of Partial Derivatives
  Calculation of Partial Derivatives
    Chain Rule
    Mixed Partial Derivatives
  Directional Derivatives
    Definition
    Calculations
  Gradient
    Calculation
    Geometric and Functional Interpretation
  1 Tangent Planes
  1 Differentials and Linearizations
  Extreme Values and Saddle Points
    Definitions
    First Derivative Test
    Second Derivative Test
    Calculation of Local and Absolute Extrema
Method of Lagrange Multipliers

Calculations with One Constraint

Calculations with Two Constraints

\[^{1}\text{These topics will not be expressly covered on the Final Exam. Though, knowing them may be helpful.}\]