

## 1 Preliminaries

1. The limit of a function
  - (a) Basic limits
  - (b) Elaborations: left- and right-hand limits, limits at infinity
2. Continuous Functions
  - (a) Definition of continuity
  - (b) Properties: maxima and minima, intermediate values

## 2 The “Big Three” Ideas of Calculus I

1. The derivative of a function
  - (a) As the slope of the tangent line to the graph of a function
  - (b) As an instantaneous rate of change (velocity)
2. The Integral of a Function
  - (a) As the area under a curve
  - (b) As a net change (distance travelled)
3. The Fundamental Theorem of Calculus

## 3 Computational Skills

1. Computing limits using the limit laws
2. Computing derivatives with:
  - (a) Formulas for differentiating specific functions (constant, polynomial, trig, exponential)
  - (b) Rules for derivatives: derivative of sums and products, chain rule, implicit differentiation
3. Computing antiderivatives with:
  - (a) Rules for antiderivatives of specific functions
  - (b) Rules for antiderivatives: linearity, substitution rule

## 4 Problem-Solving Skills

1. Simple mechanics problems in one dimension
2. Understanding behavior of functions (graphing, asymptotics)
3. Elementary optimization problems
4. Related rates problems