

# Final Topics

Calculus II - MAT 132

August 9, 2007

## 1. Integration

- (a) Definitions and properties
- (b) Fundamental Theorem of Calculus
- (c)  $u$ -Substitution
- (d) Integration by parts
- (e) Trigonometric Substitutions
  - i. Definitions of trigonometric functions
  - ii. Trigonometric identities
- (f) Partial Fractions
- (g) Improper Integrals

## 2. Applications of Integration

- (a) Area between curves
- (b) Volumes
  - i. Disc method
  - ii. Washer method
  - iii. Cylindrical shells method
- (c) Average value of a function
- (d) Computing work in physics

## 3. Differential Equations

- (a) Definitions and properties
- (b) Separable differential equations
- (c) Second order, homogeneous differential equations (from the extra packet)
- (d) Applications
  - i. Population growth (including bacteria)
  - ii. Continuously compounded interest

## 4. Infinite Sequences and Series

- (a) Sequences

- i. Finding the  $n$ th term of a sequence by seeing the pattern
- ii. Computing limits
- iii. L'Hôpital's rule
- (b) Series
  - i. Geometric series
  - ii.  $p$ -series
  - iii. Divergent sequence theorem
  - iv. Integral test
  - v. Comparison test
  - vi. Limit comparison test
  - vii. Alternating series test
  - viii. Absolute convergence test
  - ix. Ratio test
- (c) Power series
- (d) Representation of functions as power series
- (e) Taylor series