

II. Basic Techniques of Integration

- (i) Completing the Square
- (ii) Polynomial Division
- (iii) Separating Numerators

III. Basic Integration Rules

IV. Integration by Parts

- (i) Choosing u and dv (LIATE)
- (ii) Repeated Iterations
- (iii) Cycling

V. Trig Integrals

- (i) Pythagorean Identities
- (ii) Half Angle and Double Angle Identities
- (iii) Basic Trig Definitions
- (iv) $\sin(u)$ $\cos(u)$ Integral Techniques
- (v) $\sec(u)$ $\tan(u)$ Integral Techniques

I. Limits Review

- (i) L'Hopitals Rule

VI. Trig Substitution

- (i) Standard Substitutions
- (ii) Reference Triangles
- (iii) Converting Answers Back in Terms of x

VII. Partial Fractions

- (i) Simple Roots
- (ii) Repeated Roots
- (iii) Factors without Roots
- (iv) Solving for Unknown Constants (a) Setting Coefficients Equal (b) Plugging in x -Values
- (v) Integration of Partial Fraction Decompositions

VIII. Trapezoidal Rule

- (i) Error Estimate for Trapezoidal Rule

IX. Simpson's Rule

- (i) Error Estimate for Simpson's Rule

X. Improper Integrals

- (i) Infinite Limits of Integration
- (ii) Integrands with Vertical Asymptotes

XIV. Series

- (i) Convergence and Divergence
- (ii) Sequence of Terms $\{a_n\}$
- (iii) Sequence of Partial Sums $\{s_n\}$
- (iv) Harmonic Series
- (v) Re-Indexing a Series
- (vi) Absolute Convergence
- (vii) Conditional Convergence

XV. Convergence Tests for Series

- (i) Partial Sums
- (ii) Nth Term Test/ Divergence Test
- (iii) Geometric Series Test
- (iv) Geometric Series Sum Formula
- (v) P-Series Test
- (vi) Integral Test
- (vii) Remainder Theorem for the Integral Test
- (viii) Direct Comparison Test
- (ix) Limit Comparison Test
- (x) Alternating Series Test
- (xi) Remainder Estimation Theorem for the Alternating Series Test
- (xii) Ratio Test
- (xiii) Root Test

XIII. Sequences

XII. Limit Comparison Test for Integrals

XI. Direct Comparison Test for Integrals

XVI. Power Series

- (i) Interval of Convergence
- (ii) Radius of Convergence
- (iii) Ratio Test and Other Series Tests to Check Endpoints

XVII. Power Series Operations

- (i) Composition of a Power Series with a Continuous Function
- (ii) Term by Term Differentiation
- (iii) Term by Term Integration

XVIII. Taylor and Maclaurin Series

XIX. Taylor Polynomials of Order n

- (i) Approximating Function Values Using Taylor Polynomials
- (ii) Degree vs. Order of a Taylor Polynomial

XX. Taylor's Theorem

XXI. Taylor's Formula

XXII. Remainder of Order n

XXIII. Remainder Estimation Theorem

XXV. Parametric Equations

- (i) Traveling Particle
- (ii) Cartesian Equations vs. Parametric Equations and Converting
- (iii) Domains for the Parameter
- (iv) Parametric Equations for Lines
- (v) Parametric Equations for Circles
- (vi) the Natural Parameterization

XXVI. Arc Length of Curves

XXVII. Polar Coordinates

- (i) Plotting Points in Polar Coordinates
- (ii) Converting Between Rectangular and Polar Coordinates

- (i) Convergence of a Sequence
- (ii) Monotone Sequences
- (iii) Bounded Sequences
- (iv) Monotone Sequence Theorem/ Monotone Convergence Theorem

- (i) Finding an Upper Bound M for the Appropriate Derivative of $f(x)$
- (ii) Finding the Maximum Possible Error of a Taylor Polynomial Approximation
- (iii) Finding the x -Values Where an Approximation will be within a Particular Error Tolerance

XXIV. List of Important Taylor Series to Memorize

- (i) Developing new Taylor Series using substitution
- (ii) Multiplying Taylor Series by constants and powers of x



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