

## Course Overview- Math 121-D. Benedetto Fall 2023

- **Transcendental and Inverse Functions, and L'Hôpital:**
  - Exponentials and Logarithms (Section 6.1-6.4) (Review)
  - Inverse Trigonometric Functions (Section 6.6)
  - L'Hôpital's Rule and Indeterminate Forms (Section 6.8)
- **Integration Methods:**
  - Integration by Parts (Section 7.1)
  - Trigonometric Integrals (Section 7.2)
  - Trigonometric Substitution, Completing the Square (Section 7.3)
  - Partial Fractions (Section 7.4)
  - Integration Strategies (Section 7.5)
  - Improper Integrals (Section 7.8)
- **Sequences and Series:**
  - Sequences (Section 11.1) and Introduction to Series (Section 11.2)
  - Geometric Series Test and  $n^{\text{th}}$  Term Divergence Test (Section 11.3)
  - Integral Test and  $p$ -Series Test (Section 11.3)
  - Comparison and Limit Comparison Test (Section 11.4)
  - Alternating Series (Section 11.5)
  - Absolute and Conditional Convergence, Ratio Test (Section 11.6)
  - Series Testing Strategy (Section 11.7)
  - Introduction to Power Series, Interval/Radius of Convergence (Section 11.8)
  - Representing Functions as Power Series (Section 11.9)
  - Taylor and MacLaurin Series (Section 11.10)
    - \* Applications: New Derivatives, Integrals, Estimates, Sums, Limits
- **Parametric Equations:** NOT on Final this semester
- **Polar Coordinates:**
  - Introduction to Polar Coordinates (Section 10.3)
  - Using Cartesian Plots to Sketch Polar curves.
  - Sketching Circles and Cardioids
  - Area with Polar Coordinates (Section 10.4)

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The best recommendation is to study one of these sections above **each** day for about a week. Make a plan and you will not be overwhelmed. Allow extra time for the following two concerns: the newest material is fresh in your mind, *but* you have not been tested on it. Allow time to solidify the fine details and to practice the last review packet (since the last exam 3). Secondly, allow time to review each technique of integration carefully. Some recent topics naturally included integration review. For polar curve area computation, we layered on top of trig. integrals. However, topics like trig sub, partial fractions, some improper integrals or certain types of L'Hôpital's Rule have been (somewhat) unused for months now.

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### Plan of attack

Tuesday December 12th: Chapter 6 (Exponentials/Logs, Inverse Trigonometric Functions, L'H Rule)

Wednesday December 13th: Integration Methods (IBP, Trigonometric Integrals, Trigonometric Substitution) and **Review Exam(s) #1**.

Thursday December 14th: More Integration Methods (Complete Square, Partial Fractions, Improper Integrals). CAKE PARTY!! Powerhouse 3:30 pm

Friday December 15th: Sequences, Infinite Series, Convergence Tests, **Review Exam(s) #2**.

Saturday December 16th: Power Series, MacLaurin/Taylor Series, and their Applications. Train 6 MacLaurin Series repeatedly. Run **one** Practice Final Exam on Webpage.

Sunday December 17th: **Review Exam(s) #3**.

Monday December 18th: Polar Coordinates, Practice Worksheets #12 and 13, and Final Review Packet. Office Hour Check-In.

Tuesday December 19th: Skim other Practice Final Exams on Webpage and Finish Reviewing all materials. Practice studying the presentation of challenging problems.

WEDNESDAY December 20th: **FINAL EXAM** SCCE ??, 9:00 am -12:00 noon.

Webpage: <https://dbenedetto.people.amherst.edu/math121/>