

Course Overview- Math 121-D. Benedetto Fall 2021

- **Transcendental and Inverse Functions, and L'Hôpital:**

- Exponentials and Logarithms (Section 6.1-6.4) (Review)
- Inverse Trigonometric Functions (Section 6.6)
- Hyperbolic (and Inverse Hyperbolic Functions) (Section 6.7)
- 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)
- Integral Test and p -Test (Section 11.3)
- Comparison and Limit Comparison Test (Section 11.4)
- Alternating Series (Section 11.5)
- Absolute and Conditional Convergence, Ratio (and Root) Test(s) (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 Integrals, Estimates, Sums, Limits, ~~Higher-Order Derivatives~~

- **Parametric Equations:**

- Parametric Equations (Sketching) (Section 10.1)
- Calculus on Parametric Curves (Section 10.2)
 - * Slopes, Tangent Lines
 - * Arclength
 - * ~~Surface Area (both formulas)~~

- **Polar Coordinates:**

- Introduction to Polar Coordinates (Section 10.3)
- Area with Polar Coordinates (Section 10.4)

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 L'Hôpital's Rule have been (somewhat) unused for months now.

Plan of attack

Sunday December 5th: Chapter 6 (Exponentials/Logs, Inverse Trigonometric Functions, Hyperbolic Functions, L'H Rule)

Monday December 6th: Integration Methods (IBP, Trigonometric Integrals, Trigonometric Substitution) and **Review Exam(s) #1**.

Tuesday December 7th: More Integration Methods (Complete Square, Partial Fractions, Improper Integrals).

Wednesday December 8th: Sequences, Infinite Series, Convergence Tests, **Review Exam(s) #2**.

Thursday December 9th: Power Series, MacLaurin/Taylor Series, and their Applications. Train 6 MacLaurin Series repeatedly. Run **one** Practice Final Exam on Webpage.

Friday December 10th: Parametric Equations and **Review Exam(s) #3**. Office Hour Check-In.

Saturday December 11th: Polar Coordinates, Quiz #12, and Final Review Packet.

Sunday December 12th: Skim other Practice Final Exams on Webpage and Finish Reviewing all materials. Practice studying the presentation of challenging problems.

Monday December 13th: **FINAL EXAM** SCCE E110, 9:00 am -12:00 noon.

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