

AP Calculus BC Part 2

(Calculus 2, after AP Calculus AB)

NOTE: The content of calculus proceeds in the sequence **Calculus 1, 2 & 3**.

- **AP Calculus AB** is equivalent to Calculus 1.
- **AP Calculus BC** is equivalent to Calculus 1 and 2.
- **Multivariable Calculus** is equivalent to Calculus 3.

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TO REGISTER: <https://xumath.org>

WHEN AND WHERE?

Term: Aug 26, 2025 – Jan 13, 2026

Live Zoom Lectures by Prof Xu: Tue. 7:00pm-9:00pm (CT)

Homework Solving Videos: Available on Canvas on Mon

Format:

- 20 2-hour live zoom lectures + 20 1-hour homework solving videos
- 20 homework assignments (to be graded) + 2 exams (to be graded)
- A student can request the video of a live class if the student has to miss the class.

Tuition: \$690 (before July 13, 2025), \$720 (after July 13, 2025)

WHO TEACHES?

Dr. Sheng Xu: Associate professor of math at Southern Methodist University

- Ph.D. from Cornell and post-doc at Princeton and Cornell
- 19 years and 16 math courses teaching experience
- Betty McKnight Speairs Endowed Teaching Excellence Award in Math
- Recommendation by K12 students and parents in anonymous testimonials on <https://xumath.org>
- Author of an undergraduate textbook: *Introduction To Scientific Computing*, Taylor Francis

COURSE INFO

Syllabus, Sample Notes and Videos: <https://xumath.org>

Required Textbook:

- [1] Customized notes by Prof. Xu (available before each class)
- [2] Calculus Volume 2 within the OpenStax project (free online or order print copies)
<https://openstax.org/details/books/calculus-volume-2>

References:

- [3] R. Larson & B. Edwards, *Calculus Early Transcendental Functions*, Edition 6e, ISBN 1-285-77977-9
- [4] J. Stewart, *Essential Calculus Early Transcendentals*, 2nd Edition, ISBN 1-133-11228-5

TOPICS

Unit 1: Techniques of Integration

1. Integration by parts
2. Trigonometric integrals and substitutions
3. Partial fractions
4. Other integration techniques
5. Improper integrals

Unit 2: Sequences and Series

1. Sequences and series
2. Integral and comparison tests
3. Other convergence tests

Unit 3: Power Series

1. Power series
2. Representing functions as power series
3. Taylor and Maclaurin series
4. Applications of Taylor's theorem

Unit 4: Parametric Equations and Polar Coordinates

1. Parametric equations
2. Calculus of parametric curves
3. Polar coordinates
4. Areas and lengths in polar coordinates

Unit 5: Differential Equations

1. Direction fields and numerical methods
2. Separable equations
3. The logistic equation