

Calculus A/B Syllabus



Course Summary

This course is meant for students ages 15 to 18 who have completed, at a minimum, the Common Core (or equivalent) curriculum for Algebra 2, Geometry and PreCalculus. Students will be exposed to the Focus Areas section listed below with a focus on **Introductory Calculus and Calculus AB** testing, and we expect students to master the skills listed in the Expected Outcomes section listed below.

Important Note: We recommend that this course is **done the year before your student plans to take their AB test (or in parallel with their school's Calculus curriculum)**, since testing is done before the end of this class calendar.

Focus Areas at this Level

Concepts, skills, and learning tools students see in this course include, but are not limited to:

- Functions, Continuity and Limits
- Derivatives
- Integrals

Expected Outcomes

Students will be **expected to adequately perform in or explain** the following areas after course completion:

- Set notation, set theory as it pertains to functions
- Functions, their properties, continuity and limits
- Understanding and calculating derivatives of common functions
- Applying derivatives to real life situations
- Understanding and performing integrations of common functions including
 - Antiderivatives, Chain Rule
 - Integration by parts, Substitution methods, Partial fractions
- Applying integrals to real life situations
 - Areas and Volumes of planar and 3D figures
 - Length of a curve, Average value of a function
- Limits involving infinity
 - Rational and exponential indeterminate forms, L'Hopital's Rule, improper integrals
- Defining and understanding differential equations including second-order linear d.e.

Pre Requisites

Students registering for this course should be **comfortable with the following Math**:

- Introductory Geometry for
 - trigonometric functions and identities
- Algebra 2 and Precalculus concepts for
 - graphing, solving equations, and systems of equations with 3 unknowns
 - logarithms and exponential functions
 - polynomials (factoring, finding roots, behavior of graphs)
 - sequences and series

- radians, polar coordinates and complex numbers

Students should also be **willing and able to**:

- Communicate in English at a beginner's level
- Be respectful of other students in their classes
- Practice writing things down on paper
- Share their thoughts with the instructors to help them discover solutions to their problems
- Take constructive criticism when it comes to their learning habits

Course Materials (Required)

- All classes will be taught online, via [Zoom](#). Your student will need a device with a microphone and camera.
- Homework will be assigned via the textbook:
 - Art of Problem Solving's [Calculus](#) by David Patrick (2nd Edition)
 - Purchasable here: <https://artofproblemsolving.com/store> ; **Mandatory purchase** required
 - Physical or eBook contain the same problems
- Parents are expected to have read and understood EMC's policies
 - Parents should review the expectations in class with their student(s)
 - Parents of this age group may need to help their students learn the technology used on the student's end

Students should also have access to:

- **Graphing** Calculator
 - [AP Exams Calculator Policy – AP Students | College Board](#)
- Paper, Pencils, Ruler and Erasers
- Colored pencils or markers
- Reliable internet connection and digital device

Homework Expectations

Homework at EMC is set up to be flexible for the needs of your student. Usually we feel students fall into three general categories:

- EMC is **replacing public school or** accelerating my student for **testing out of Math** in the future
 - All Homework is **mandatory**
- EMC is helping **improve my grades or skills**
 - Homework is **highly recommended**, we recommend concentrating on school homework first
- EMC is for **interest's sake** and/or for **exposure** to problem solving **before seeing it in school**
 - Homework is **recommended, yet optional**

Homework Delivery

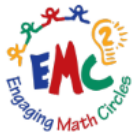
Homework is delivered in a two main ways:

- **Practice Homework**
 - Assigned through the Art of Problem Solving (AoPS) Textbook
 - PDFs of our lesson slides are posted weekly and include extra questions not assigned
 - AoPS has challenging questions and an alternate learning style compared to EMC, outlined below:

- Problem Section
 - Questions designed to teach, read all these solutions if you're self-paced learning outside of the class times
- Exercises
 - Questions to demonstrate understanding of the content ; we recommend not reading these solutions until after you have your first answer or get completely stuck
- **Assessment Homework** (aka Quizzes, Tests)
 - Canvas, set of questions to show instructors a student's understanding of the content
 - Auto-graded upon submission
 - Instructors adjust grades after seeing results to give partial marks where appropriate, and plan to cover certain problem areas in the Homework Check portion of next class

Course Calendar

On yellow dates on the calendar below, no classes are held. Some days of the week (Sat, Sun, Mon) have less classes per year. These courses will have slightly condensed in-class schedules, and your instructor will let you know which homework assignments to do each week.



EMC SCHOOL

2026-2027 School Calendar

August 2026						
M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2026						
M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2026						
M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2026						
M	Tu	W	Th	F	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2026						
M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2027						
M	Tu	W	Th	F	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2027						
M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2027						
M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2027						
M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2027						
M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June 2027						
M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

First and Last Day of School
 School Holidays & Vacations

Aug 17 First Day of Classes
 Sep 5 - 7 Labor Day Weekend - No Classes
 Nov 23 - 29 Thanksgiving Week - No Classes
 Dec 21 - Jan 3 Winter Break - No Classes

Apr 12 - 18 Spring Break - No Classes
 May 29 - 31 Memorial Day - No Classes
 Jun 13 Last Day of School

Course Itinerary

Chapter	Lesson	Class Dates	Homework Assigned
Chapter 1: Functions	1) Set and Interval Notation	Aug 17- Aug 23	1.1 Sets Exercises 1.1.1 and 1.1.2 1.2 Numbers and intervals Exercise 1.2.3
	2) Functions	Aug 24 - Aug 30	1.3 Functions Exercises 1.3.1, 1.3.2, 1.3.3 1.5 Trigonometric Functions Exercises 1.5.1, 1.5.2, 1.5.5, 1.5.7, and 1.5.8 1.7 Exponentials and logarithms Exercises 1.7.1 and 1.7.3
	3) Graphing Functions	Aug 31 - Sept 6 OFF Sat Sept 5, Sun Sept 6 Labor Day	1.4 Graphs of functions: Exercises 1.4.1 and 1.4.2
	4) Trigonometric Identities	Sept 7 - Sept 13 OFF Mon Sept 7 Labor Day	1.6 Basic trigonometric identities Exercises 1.6.1, 1.6.2, and 1.6.3 Ch1 Review: Review Problems 1.34, 1.36, 1.40, and 1.42
Chapter 2: Limits	5) What's the Limit?	Sept 14 - Sept 20	2.1 Limits: Exercises 2.1.1, 2.1.3, and 2.1.4
	6) Continuity	Sept 21 - Sept 27	2.2 Continuity: Exercises 2.2.1, 2.2.2, and 2.2.3 Ch2 Review: Problems 2.16, 2.17, 2.18
Chapter 3: Derivatives	7) What's the Derivative?	Sept 28 - Oct 4	3.1 Intuitive introduction Read 3.2 Definition of the derivative Exercises 3.2.1, 3.2.2, and 3.2.4
	8) Common Derivatives	Oct 5 - Oct 11	3.3 Basic derivative computations Exercises 3.3.1, 3.3.2a, b, and 3.3.4
	9) Product and Quotient Rules	Oct 12 - Oct 18	3.3 Basic derivative computations Exercises 3.3.2 c), f), h), and 3.3.5 (use 3.3.3 for definition of Quotient Rule)
	10) Chain Rule	Oct 19 - Oct 25	3.4 The Chain Rule for derivatives Exercises 3.4.1 and 3.4.2 3.5 Rolle's Theorem and the Mean Value Theorem Exercises 3.5.1 and 3.5.4
	11) Chapter Review	Oct 26 - Nov 1	3.6 Implicit differentiation Exercises 3.6.1, 3.6.2, and 3.6.3 3.7 Summary of derivative computation Read Ch3 Review Review Problems 3.36a) c) e) f), 3.27, and 3.28

Chapter 4: Derivatives in Real Life	12) Graphs and Derivatives	Nov 2 - Nov 8	4.1 Graphical interpretation of the derivative Exercises 4.1.1, and 4.1.2
	13) Max / Min Optimization	Nov 9 - Nov 15	4.2 Extrema and optimization Exercises 4.2.1, 4.2.2, 4.2.3, and 4.2.6
	14) Newton's Laws	Nov 16 - Nov 22	4.3 Velocity Exercises 4.3.1 and 4.3.2
Holiday	Thanksgiving	OFF Nov 23 - Nov 29	Have a great week!
Chapter 4: Derivatives in Real Life	15) Approximations	Nov 30 - Dec 6	4.4 Tangent line approximation Exercises 4.4.1 and 4.4.2 4.5 Newton's Method Exercise 4.5.1
	16) Rates of Change	Dec 7 - Dec 13	4.6 Related rates Exercises 4.6.1, 4.6.3, and 4.6.5 Ch4 Review Review Problems
17) Winter Review		Dec 14 - Dec 20	• Review of Chapters 1 through 4
Holiday	Winter Break	OFF 2 WEEKS Dec 21 - Jan 3	Have a great break!
Chapter 5: Integration	18) Int-ro-gration	Jan 4 - Jan 10	5.1 Area under a curve Exercises 5.1.1 and 5.1.2 5.2 The Fundamental Theorem of Calculus Exercises 5.2.1 and 5.2.2
	19) Next Level Integration	Jan 11 - Jan 17	5.3 Integration 5.3.1 Definition and basic examples Review Exercise 5.3.1 a), b) 5.3.2 Antiderivatives of common functions Review Exercise 5.3.1 c) 5.3.3 The Chain Rule Review Exercises 5.3.1 e), f), g)
	20) Integrating by Parts	Jan 18 - Jan 24	5.3.4 Integration by parts: Review Exercises 5.3.1 j), k)
	21) Integrate by Substitution	Jan 25 - Jan 31	5.3.5 Substitution methods: Review Exercises 5.3.1 m) s), u)
	22) Partial Fractions	Feb 1 - Feb 7	5.3.6 Partial fractions: Review Exercises 5.3.1 o), p), and q)
	23) Chapter	Feb 8 - Feb 14	5.3.7 A monster example Read 5.3.8 Review Exercises: Exercises 5.3.1 d), h),

	Review		i), l), and t) Exercise 5.3.4
Chapter 6: Applications of Integrals	24) Geometry	Feb 15 - Feb 21	5.4.1 Areas of regions in the plane Exercises 5.4.1 a) and b) 5.4.2 Volumes Exercise 5.4.2 a), b), and c) 5.4.3 Length of a curve Exercise 5.4.3 a)
	25) Newton's Laws II	Feb 22 - Feb 28	EMC assigned homework
	26) Economics	Mar 1 - Mar 7	EMC assigned homework 5.4.4 Average value of a function
27) Spring Review		Mar 8 - Mar 14	<ul style="list-style-type: none"> Review of Chapters 5 through 6 Math Map Where does this go?
Chapter 7: To Infinity...	28) ... But Not Beyond	Mar 15 - Mar 21	6.1 Limits towards infinity Exercise 6.1.1 6.2 Limits of infinity Exercise 6.2.2
	29) Indeterminate Forms	Mar 22 - Mar 28	6.3 Rational indeterminate forms and l'Hopital's Rule Exercise 6.3.1 6.4 Exponential indeterminate Forms Exercise 6.4.1
	30) Improper Integrals	Mar 29 - Apr 4	6.5 Improper integrals Exercises 6.5.1, 6.5.2, and 6.5.3
	31) Infinite Series	Apr 5 - Apr 11	7.1 Infinite sequences 7.2 Infinite series 7.3 Series convergence tests 7.4 Alternating series
Holiday	Spring Break	OFF Apr 12 - Apr 18	Have a great week!
Chapter 7: To Infinity...	32) Taylor Series	Apr 19 - Apr 25	7.5 Taylor polynomials 7.6 Taylor series
Chapter 8: Differential Equations	33) Solving for C in a D.E.	Apr 26 - May 2	9.1 Definitions and basic examples Exercise 9.1.1
	34) Slope Fields	May 3 - May 9	9.1 Definitions and basic examples Exercise 9.1.2
	35) Second Order D.E.	May 10 - May 16	9.2 Second-order linear differential equations Exercise 9.2.1 Ch9 Review Problems Exercises 9.19, 9.20, 9.23, and 9.24
Chapter 9: AB Prep	36) Functions and Derivatives Review	May 17 - May 23	Ch 1, 2, 3, 4 Review Problems 1.37, 1.38, 3.26 b), d), e), h), 4.34, 4.39

	37) Integrals and D.E. Review	May 24 - May 30 OFF Sat Sun May 29 and 30 Memorial Day	Ch 5, 6, 9 Review Problems 5.54, 5.59, 6.23, 6.25, 9.21, 9.22
	38) Combined Review	May 31 - June 6 OFF Mon May 31 Memorial Day	EMC provided AP Calculus AB test
39) Mock AP Calc AB Final		June 7 - June 13	In-class live AP Calculus AB test Solo, quiet, proctored by the instructor.