



AP<sup>®</sup>

# AP<sup>®</sup> Precalculus

PREPARING A WIDER RANGE OF  
STUDENTS TO SUCCEED IN MATH THEY'LL  
ENCOUNTER IN COLLEGE

[cb.org/ap-precalculus](https://cb.org/ap-precalculus)



AP<sup>®</sup> Precalculus has a unique mission: make the benefits of AP coursework broadly accessible—particularly for students who’ve never taken an AP course.

## The Problem

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Every year, tens of thousands of American students are derailed by a common obstacle: **inadequate preparation for higher-level math.**



The Mathematical Association of America has described Americans’ struggle with math as “the most significant barrier” to completing college degrees.<sup>1</sup>



A third of college students end up spending time and money on remedial math courses that don’t count toward their degrees because they lack sufficient math skills.<sup>2</sup> Many of these students enter college as STEM majors, but nearly half of these students switch to a non-STEM major or fall short of a degree after failing common gateway courses, particularly calculus.<sup>3</sup>



“The evidence is clear that calculus functions as a critical gatekeeper for U.S. students seeking to enter STEM majors and careers,” according to researchers from Just Equations, a California-based public policy institute. “Calculus’ reputation as a weed-out course is well deserved.”<sup>4</sup>

1. Saxe, Karen, and Linda Braddy, *A Common Vision for Undergraduate Mathematical Sciences Programs in 2025* (The Mathematical Association of America, Inc., 2015), 28. Retrieved from: [maa.org/sites/default/files/pdf/CommonVisionFinal.pdf](http://maa.org/sites/default/files/pdf/CommonVisionFinal.pdf)

2. Chen, X., *Remedial Coursetaking at U.S. Public 2- and 4-Year Institutions: Scope, Experiences, and Outcomes* (National Center for Education Statistics, 2016). Retrieved from: [nces.ed.gov/pubsearch](http://nces.ed.gov/pubsearch)

3. Drew, Christopher, “Why Science Majors Change Their Minds (It’s Just So Darn Hard),” *The New York Times*, November 4, 2011. Retrieved from: [nytimes.com/2011/11/06/education/edlife/why-science-majors-change-their-mind-its-just-so-darn-hard.html](http://nytimes.com/2011/11/06/education/edlife/why-science-majors-change-their-mind-its-just-so-darn-hard.html)

4. Burdman, Pamela, Melodie Baker, and Francesca Henderson, *Charting a New Course: Investigating Barriers on the Calculus Pathway to STEM* (California Education Learning Lab, 2021), 4. Retrieved from: [justequations.org/wp-content/uploads/Learning-Lab-Calculus-Report-Layout-ADA.pdf](http://justequations.org/wp-content/uploads/Learning-Lab-Calculus-Report-Layout-ADA.pdf)

# How Will AP Precalculus Make a Difference?

Precalculus is one of the most powerful high school math courses—it changes students' trajectories. **Students who take precalculus in high school are 155% more likely to complete a bachelor's degree**, a higher boost in degree completion than students taking Algebra 2, Trigonometry, or Calculus.<sup>5</sup> And taking even one AP course changes student outcomes, greatly improving their first-year college GPA and on-time college graduation rates.

AP Precalculus is designed for students who've taken both Geometry and Algebra 2 or for students who've completed Integrated Math 3. Students who've taken these courses at any level have covered all the content necessary for AP Precalculus.

## AP PRECALCULUS:

- Provides students with 140 hours of time with their AP teacher; in comparison, students who take precalculus in college are typically scheduled for 48 class hours. And AP students tend to see their teachers as allies, coaching them to learn what is necessary for college credit.
- Meets students where they are in the familiar environment of a high school classroom — smaller and more personal than a college lecture hall. Students also have access to AP Daily videos that support instruction along with free digital practice that can be tailored to individual student needs.
- Motivates students to take 4 years of math and devote more time and effort because of the opportunity to earn college credit and stand out to colleges.
- Gives teachers access to professional learning and digital resources in AP Classroom, like AP Daily videos, to complement instruction.



5. Trusty, Jerry, and Spencer G. Niles, "High-School Math Courses and Completion of the Bachelor's Degree," *Professional School Counseling* vol. 7, no. 2 (December 2003), 99–107.

**“AP Precalculus is a well-balanced and meaningful course that will be beneficial for every student regardless of their intended future plans. The content captures the modeling of our dynamic, changing world, which can ignite a passion and appreciation for the pursuit of many areas related to mathematics.”**

JULIE HARRISON, SPELMAN  
COLLEGE, DEVELOPMENT  
COMMITTEE MEMBER

**“AP Precalculus will open the door for many students to advanced course studies in mathematics and will bring a college-level course to students who may not have access to other AP math classes. It will level the playing field for underrepresented students, and all students who have completed an Algebra 2 course (or equivalent class) will be able to succeed in this course.”**

BRENDAN MURPHY, JOHN BAPST  
MEMORIAL HIGH SCHOOL,  
DEVELOPMENT COMMITTEE  
MEMBER

## Every Precalculus Student Can Be an AP Precalculus Student

Every student who's completed both Geometry and Algebra 2 or Integrated Math 3 is ready for AP Precalculus.



**AP Precalculus will prepare students who start Algebra 1 in ninth grade for a successful transition to a STEM major in college.**

Half of American students begin Algebra 1 in ninth grade. Most of these students interested in STEM majors and careers will first encounter calculus in college.

These students deserve solid preparation for the advanced math they'll need in STEM majors and careers. Providing them with an AP credit opportunity for precalculus will motivate many students to persist in four years of high school math and will significantly boost student readiness for the math classes they will need to major in STEM. In fact, students who take math all four years of high school are 140% more likely to be considered “college ready” and “calculus ready.”



**AP Precalculus will help students who take Algebra 1 before ninth grade better prepare for AP Calculus AB or AP Calculus BC, and for any subsequent math they may need in college.**

Half of American students take Algebra 1 prior to ninth grade. While many of these students aspire to study calculus in high school, a significant number are not ready. The most frequent AP Calculus AB Exam scores are 1s and 2s, highlighting the need to better prepare students.



**AP Precalculus can help students fulfill their college math requirement when their majors and careers do not require calculus.**

Students interested in non-STEM majors can use a qualifying AP Precalculus Exam score to fulfill a college math requirement. These students can then focus their time and budget on the courses most central to their majors and careers.

Expanding access to AP Precalculus in high school will afford a wide range of high school students a new and valuable way to improve math readiness and on-time college graduation.

# Mathematics Pathways

This table shows math pathways available to students starting with the year they take Algebra 1 or Integrated Math 1. AP Precalculus is designed for students who've taken both Geometry and Algebra 2 or Integrated Math 3.

Year 1	Year 2	Year 3	Year 4	Year 5+
Algebra 1	Geometry OR Algebra 2	Algebra 2 OR Geometry	<b>AP Precalculus*</b>	AP Calculus AB* AP Calculus BC* AP Statistics*
			AP Statistics	AP Calculus AB AP Calculus BC <b>AP Precalculus</b>
			AP Calculus AB	AP Calculus BC AP Statistics
	Geometry and Algebra 2	<b>AP Precalculus*</b> AP Statistics AP Calculus AB	AP Calculus AB* AP Calculus BC* AP Statistics	AP Calculus AB AP Calculus BC AP Statistics*
Integrated Math 1	Integrated Math 2	Integrated Math 3	<b>AP Precalculus*</b>	AP Calculus AB* AP Calculus BC* AP Statistics*
			AP Statistics	AP Calculus AB AP Calculus BC <b>AP Precalculus</b>
			AP Calculus AB	AP Calculus BC AP Statistics

\* Represents an anticipated sequence for most students on this pathway.

The Pre-AP course sequence is Pre-AP Algebra 1, Pre-AP Geometry with Statistics, Pre-AP Algebra 2.

**“The AP Precalculus course content leverages research on learning calculus that calls for precalculus to include a focus on students conceptualizing quantities’ values and considering how they are related and vary together. Including a focus on exploring how quantities change together allows students to understand and define growth patterns described in applied problems using function formulas and graphs.”**

MARILYN CARLSON, ARIZONA  
STATE UNIVERSITY, DEVELOPMENT  
COMMITTEE MEMBER

## The Course

The Advanced Placement® Program convened college faculty to build a precalculus course that invites a diverse group of students into AP. AP Precalculus contains similar content to existing high school precalculus courses—which are, by their design, already advanced.

In AP Precalculus, students explore everyday situations using mathematical tools and lenses. Through regular practice, students build deep mastery of modeling and functions, and they examine scenarios through multiple representations. They will learn how to observe, explore, and build mathematical meaning from dynamic systems, an important practice for thriving in an ever-changing world.

**AP Precalculus prepares students for higher-level mathematics and science courses.** The framework delineates content and skills common to college precalculus courses that are foundational for careers in mathematics, physics, biology, health science, social science, and data science.

## What Will Students Experience in AP Precalculus?



### MODELING REAL-WORLD DATA

Students will apply the mathematical tools they acquire in real-world modeling situations. By examining scenarios, conditions, and data sets and determining and validating an appropriate function model, they gain a deeper understanding of the nature and behavior of each function type.



### EXPLORING MULTIPLE REPRESENTATIONS

Students will examine functions through multiple representations. They will gain a deeper understanding of functions by examining them graphically, numerically, verbally, and analytically.



### MASTERING SYMBOLIC MANIPULATION

Students will develop rigorous symbolic manipulation skills needed for future mathematics courses. They learn that a single mathematical object can have different analytical representations depending on the function type or coordinate system, and that the different analytical representations reveal different attributes of the mathematical object.



### HARNESSING A DYNAMIC WORLD

Students will engage in function building that reflects the dynamic, shifting reality of how things change. Every function representation characterizes the way in which values of one variable simultaneously change as the values in another variable change. This understanding of functions and their graphs as embodying dynamic covariation of quantities prepares students to better understand an ever-changing world.





## Credit and Placement

AP Precalculus can fulfill a math requirement at a diverse range of colleges and universities, including the majority of public institutions. The course also offers a valuable tool for guiding math and science placement for newly enrolling students. College Board is working with colleges and universities to expand credit policies and ensure that AP Precalculus sets a strong foundation for college success.

## Supporting Teachers

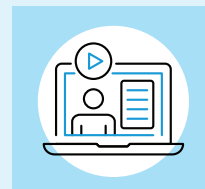
Teachers can continue to use their existing precalculus textbooks and follow along with the course and exam description. They can also enroll in an AP Summer Institute (APSI) for Precalculus, a four-day professional learning experience that equips teachers with a deep understanding of the course framework, exam, and instructional supports. Additional one-day professional learning workshops will also be available. APSI scholarships are available to teachers who qualify.

## Recruiting Students

AP Precalculus is designed for students who've taken both Geometry and Algebra 2 or Integrated Math 3. Students who've taken these courses at any level have covered all the content necessary for AP Precalculus. This course prepares more students for success in most majors and careers.

- AP Precalculus helps students interested in STEM majors develop an exceptionally strong foundation for calculus, the launchpad for most STEM majors. For female students, taking 1 year of high school precalculus resulted in a 48% increase in the odds of choosing a science or math major.
- Students interested in non-STEM majors may be motivated to take a fourth year of math with the opportunity to earn college credit or placement that allows them to focus on college courses most relevant to their major and career.

AP Precalculus offers a unique opportunity to welcome far more students into advanced coursework, creating more equitable representation in AP classes. We encourage schools to consider enrolling every precalculus student in AP Precalculus.



### AP CLASSROOM

AP students and teachers receive access to **AP Classroom**, a free digital instructional resource with through-course supports that include instructional videos, formative assessments, and personalized feedback reports.



To learn more visit:  
**[cb.org/ap-precalculus](https://cb.org/ap-precalculus)**