AP® Precalculus: Who Participated and What We Learned in Launch Year

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Introduction

Multiple indicators suggest that many students are underprepared for college-level mathematics. According to the College Board (2024), only 41% of students in the high school graduating class of 2024 who took the SAT had at least a 75% chance of earning a C or better in first-semester, credit-bearing college math courses such as algebra, statistics, precalculus, or calculus. As a result, many students are placed into remedial math courses in college (U.S. Department of Education, 2023). These courses cost time and money but do not count toward degree requirements. Research shows that placement into these lower-level courses can discourage students from pursuing STEM fields (Park & Ngo, 2021). Even though precalculus is not considered remedial, needing to take it in college is associated with a higher likelihood of leaving STEM and a lower likelihood of progressing to calculus. Hsu and Bressoud (2015) found that even among college students who were successful in college precalculus, a significant proportion—over one-third—did not go on to enroll in calculus.

To address these challenges and expand access to rigorous math pathways, the College Board launched AP® Precalculus in the 2023–24 academic year. This course is designed for all students taking precalculus, whether they are on a path to calculus in high school or reaching precalculus as their most advanced high school math course. Expanding AP math offerings can have a powerful impact on educational equity. Research shows that a one percentage point increase in the share of Black 11th and 12th graders enrolled in AP math increases the likelihood that an academically eligible Black student will take an advanced math course by 22 percentage points in racially diverse schools and by 11 percentage points in predominantly Black schools (Francis & Darity, 2021).

This research brief is designed to provide educators, policymakers, and researchers insights into the rollout and reach of AP Precalculus in the 2023-24 academic year including where it was offered, who took the course, and what students did after AP Precalculus. The research highlights early outcomes and lays the groundwork for future studies on longer-term effects on student trajectories.

Data and Methodology

Our analysis draws on both administrative and survey data. The primary source is a College Board database of de-identified administrative records, which includes AP participation and performance data, PSAT™ 10 scores, and student demographic characteristics (i.e., gender, race/ethnicity, and parental education recoded as first-generation if neither parent earned a bachelor's degree). We also include school-level information from the National Center for Education Statistics (NCES), including school size and urbanicity, as well as a measure of high school challenge developed by the College Board.[1] High school challenge is a composite index based on six indicators of educational opportunity at the census tract level: college attendance, household structure, median family income, housing stability, education level, and crime rates. Schools in the highest challenge quintile are more disadvantaged than 80% of U.S. high schools, and their students typically face more limited educational opportunities

Our second data source is a survey of AP Precalculus teachers conducted at the end of the first year of AP Precalculus implementation. Approximately 1,400 AP Precalculus teachers responded to at least part of the survey.

Results

School and Student Representation in AP Precalculus

AP Precalculus was first offered in the 2023-24 school year and had the largest course launch in the history of the AP Program with over 184,000 exam takers worldwide, 76% of whom achieved a credit-granting score of 3 or higher. Nearly 5,000 high schools offered courses taught by slightly more than 5,600 teachers.

[1]For more information, see: https://securemedia.collegeboard.org/landscape/comprehensive-data-methodology-overview.pdf

Table 1 shows the attributes of high schools offering AP Precalculus in the 2023-2024 school year. AP Precalculus was offered at similar rates in city and suburban high schools, 34% and 37% respectively, while 20% of participating schools were in rural areas and 8% in towns. Additionally, schools with larger student enrollments were more likely to offer AP Precalculus than schools with smaller student enrollments. The distribution of AP Precalculus offerings was relatively consistent across high school challenge levels meaning AP Precalculus was a course option regardless of broader educational disadvantage at the high school.

Table 1. Attributes of High Schools Offering AP Precalculus in 2023-24

Category	Subcategory	Percentage
Urbanicity	City	34%
	Rural	20%
	Suburban	37%
	Town	8%
School Size	Smallest (< 176)	6%
	Middle (176 to 559)	24%
	Largest (560 +)	68%
High School Challenge	Lowest	25%
	Second	21%
	Third	19%
	Fourth	17%
	Highest	17%

Table 2 shows the characteristics of students who took the AP Precalculus Exam in 2024 by grade level, gender, race/ethnicity, first-generation status, prior achievement, and other AP experiences including taking AP at the same time as or prior to AP Precalculus.

Table 2. Attributes of AP Precalculus Exam Takers in 2023-24

		Total (n=185,521)	Grade 10 (n=47,660)	Grade 11 (n=101,902)	Grade 12 (n=31,026)
Gender	Female	49.6	47.1	50.4	50.8
	Male	50.4	52.9	49.6	49.2
Race/Ethnicity	American Indian	0.4	0.2	0.5	0.6
	Asian	16.2	24.0	13.4	9.0
	Black	8.4	5.6	8.0	14.9
	Hispanic	23.1	15.2	23.7	35.3
	Native Hawaiian/Pacific Islander	0.1	0.1	0.2	0.2
	White	42.7	40.6	47.2	33.9
	Two or More	4.7	4.9	4.9	4.1
	No Response	4.3	9.5	2.3	2.0
First Generation	Yes	30.4	20.5	30.3	49.4
	No	69.6	79.5	69.7	50.6
PSAT 10 Math	Average Score	523	589	521	462
	% PSAT 10 takers	67.1	73.1	70.2	58.1
No Prior or Concurrent AP	No AP Exams	16.8	18.3	13.0	22.3
	No AP STEM Exams	53.3	61.6	47.4	56.5

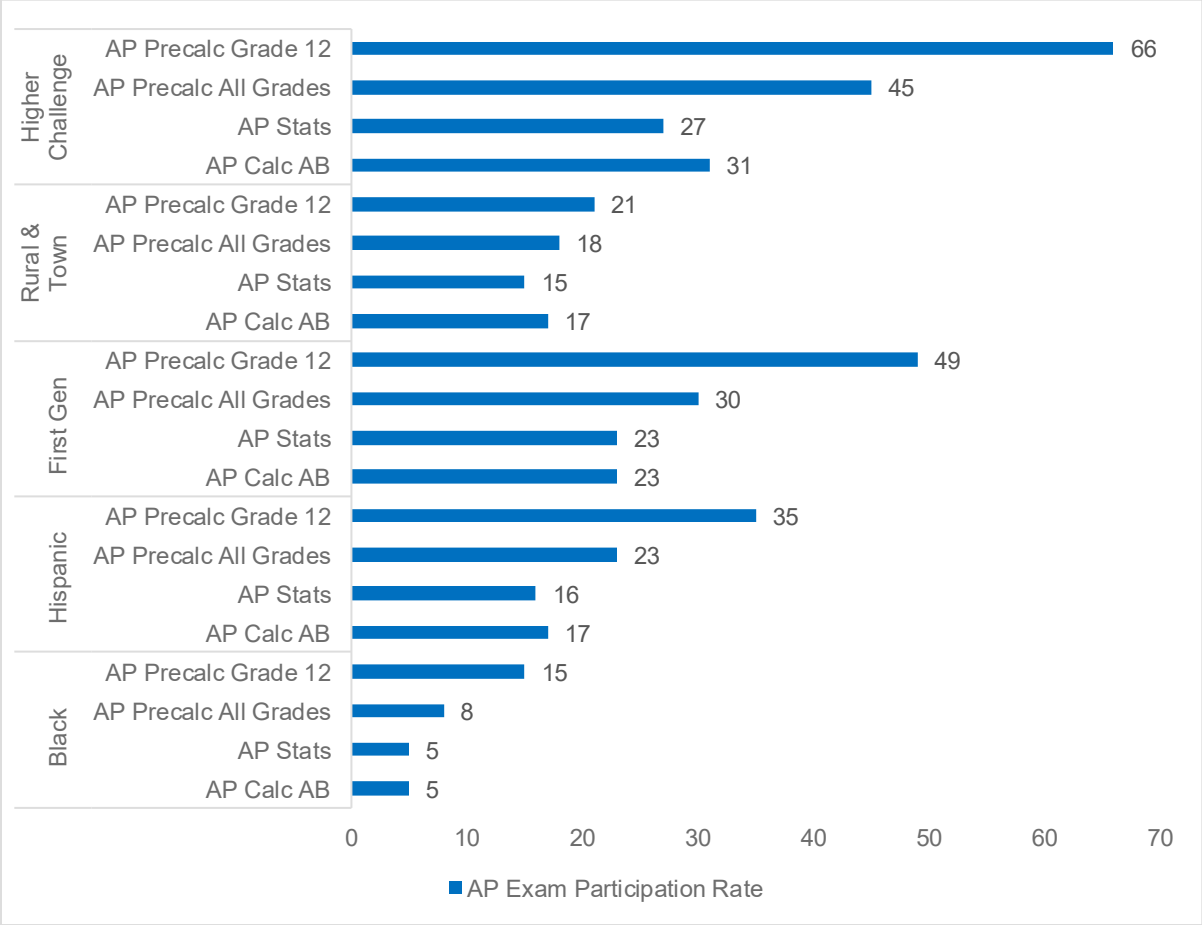
Note: A student is characterized as first generation if neither parent obtained a baccalaureate degree.

As Table 2 shows, while most AP Precalculus Exam takers were in 11th grade (55%), a quarter of students took the exam in 10th grade and 17% of students took the exam during their last year of high school. Table 2 further reveals that gender representation is nearly balanced across all grades, while other student characteristics are not. AP Precalculus is reaching a higher share of Black and Hispanic students in later grades, particularly in 12th grade, where Black (14.9%) and Hispanic (35.3%) representation are highest. First-generation students were also most concentrated in 12th grade (43.4%). In terms of academic readiness, we see that average PSAT Math scores from 10th grade decline with grade level from an average of 589 among students who took the Precalculus exam in 10th grade, to 521 in 11th grade, and 462 in 12th grade. While this suggests that earlier test-takers are more academically prepared, as you would expect, it also suggests that AP Precalculus is reaching a broader range of students in later years. Finally, Table 2 also shows that a significant portion of 12th graders (56.5%) had no prior AP STEM experience, reinforcing the course's role in broadening participation in advanced coursework, especially AP STEM.

AP Precalculus Participation Compared to Participation in Other AP Math Subject Areas

To better understand how AP Precalculus is broadening access, we compare the demographics of students taking the AP Precalculus Exam, both overall and for 12th grade students, with those taking other AP Math Exams. Figure 1 highlights participation rates among students who attend higher challenge schools, students who attend schools in rural and town areas, and among students who identify as Black, Hispanic, and first-generation. In its launch year, AP Precalculus attracted a higher percentage of students from all subgroups compared to AP Calculus AB and AP Statistics. Notably, 30% of AP Precalculus Exam takers were first-generation students, compared to 23% for AP Statistics and 23% for AP Calculus AB. Similarly, AP Precalculus had greater representation of Black (8%) and Hispanic (23%) students than AP Calculus AB (5% Black, 17% Hispanic) and AP Statistics (5% Black, 16% Hispanic). In addition, students in higher challenge high schools were more likely to take the AP Precalculus Exam than other AP Math Exams with differences among students in rural and town schools less noticeable.

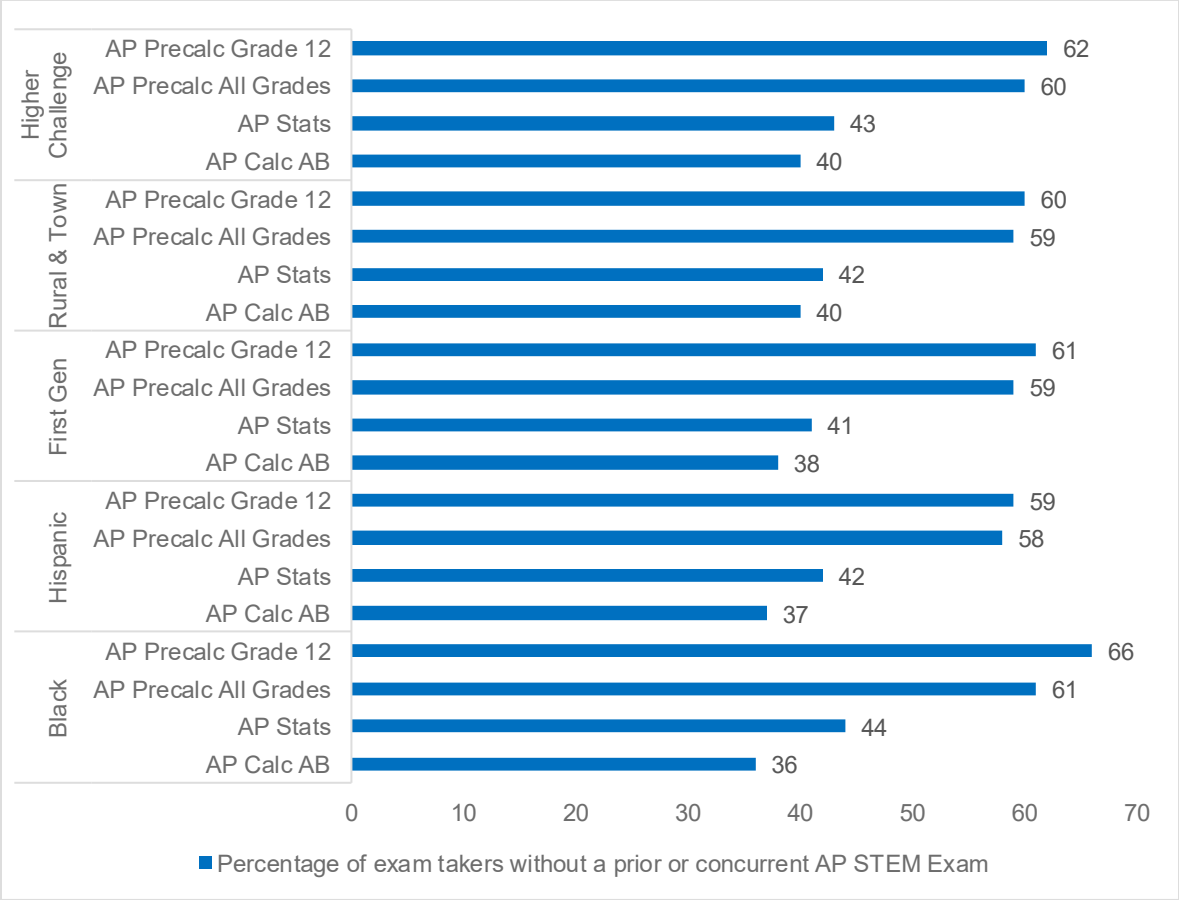
Figure 1: AP Exam Participation Rates by Student Characteristics and AP Math Subject Area, 2023-24



Note: Higher challenge is defined as high schools in third, fourth and fifth quintiles based on a composite index of educational opportunity at the census tract level. A student is characterized as first generation if neither parent obtained a baccalaureate degree

In addition to comparing student demographics characteristics across AP math subjects, we also examine students' prior exposure to AP STEM. Figure 2 shows that AP Precalculus is the first AP STEM Exam for a significantly higher percentage of students who attend higher challenge high schools and schools in rural and town areas as we all as for first generation, Black and Hispanic students compared to students taking other AP Math Exams. This pattern holds true not only for all AP Precalculus students but also specifically among 12th graders. The finding for 12th graders is especially notable because it highlights that, for many, AP Precalculus served as their first and only engagement with an AP STEM Exam before high school graduation.

Figure 2: Percentage of AP Exam Takers without Prior or Concurrent AP STEM exams by AP Math Subject Area and Student Characteristics, 2023-24



Note: Higher challenge is defined as high schools in third, fourth and fifth quintiles based on a composite index of educational opportunity at the census tract level. A student is characterized as first generation if neither parent obtained a baccalaureate degree

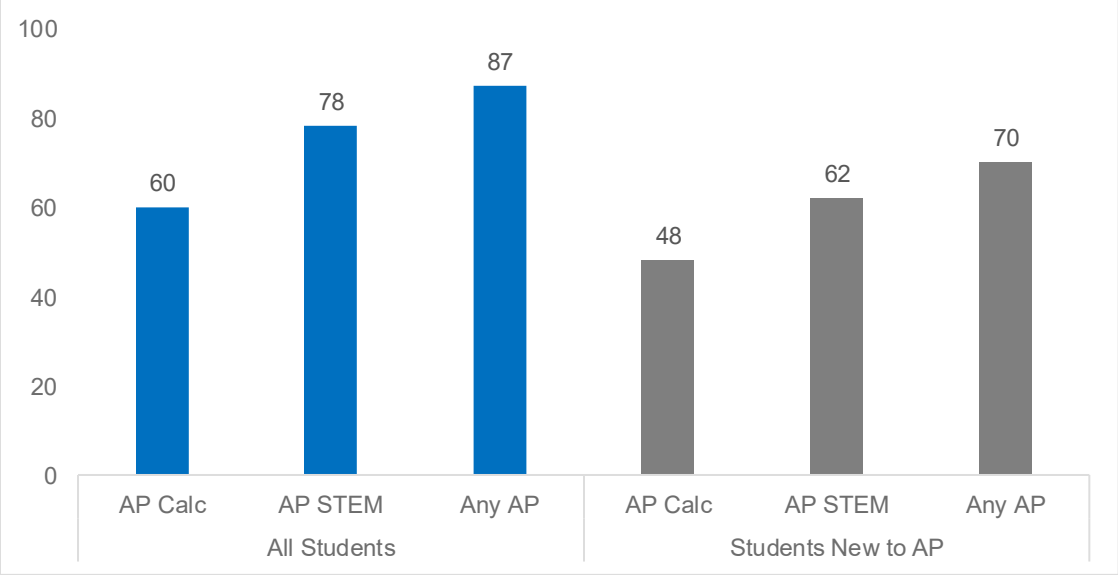
Student Progression Following AP Precalculus

AP Precalculus might serve multiple roles depending on a student's grade level and interests. For younger students, it can encourage further rigorous course taking both in mathematics and other fields. For older students, it can serve as a capstone experience by offering the chance to earn college credit while still in high school. It can also provide a valuable opportunity for students who develop an interest in STEM later in their academic journey to strengthen their foundation before pursuing STEM studies in college. A key research question we are beginning to track, and will continue to monitor, is what students do after taking AP Precalculus. While it's still too early to study 12th grade students and their postsecondary outcomes, we

can begin to examine the academic paths of students who take AP Precalculus before 12th grade, to better understand the advanced coursework experiences they pursue later in high school.

Figure 3 shows that 60% of AP Precalculus Exam takers enrolled in AP Calculus (AB or BC) the following year, 78% enrolled in any AP STEM, and 87% enrolled in at least one AP course in any subject area. Among students who were new to AP, those with no prior or concurrent AP Exams at the time they took AP Precalculus, 48% enrolled in AP Calculus, 62% enrolled in any AP STEM, and 70% enrolled in at least one AP course in any subject area the following year. These findings suggest that most students, including those new to AP, continued on a path of rigorous course taking after taking AP Precalculus.

Figure 3: Percentage of AP Precalculus Exam Takers Enrolling in AP courses the following year for all students in grades 9-11 and for students new to AP

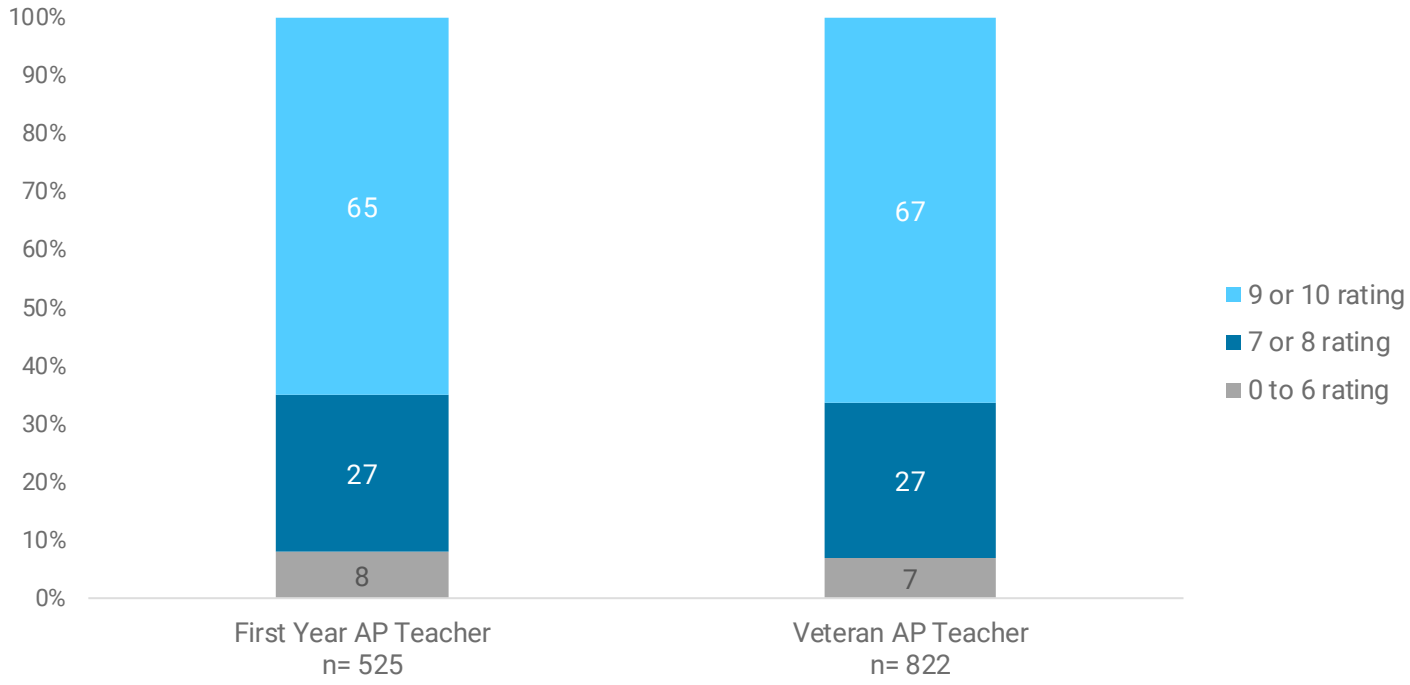


Teacher Perceptions about AP Precalculus

Toward the end of 2023-24 academic year, we asked AP Precalculus teachers to tell us about their experiences teaching the course for the first time and whether they would recommend the course to other teachers. We presented teachers with the following scenario: "*Suppose a teacher at another school approached you and said they were considering teaching AP Precalculus. On a scale from 0 to 10, where 0 is "not at all likely" and 10 is "extremely likely," how likely would you be to recommend*

that they teach AP Precalculus?" The overwhelming majority of teachers (93%) provided a rating of at least 7 out of 10 with two-thirds of teachers providing a rating of 9 or 10 and nearly half of teachers providing the highest rating of 10. The likelihood of recommending the course did not vary by teaching experience. As Figure 4 shows, both veteran AP teachers and new AP teachers were equally likely to express support for the AP Precalculus course.

Figure 4: Percentage of AP Precalculus Teachers Likely to Recommend the Course to Other Teachers by Teaching Experience, 2023-24



Note: survey question asks, "Suppose a teacher at another school approached you and said they were considering teaching AP Precalculus. On a scale from 0 to 10, where 0 is "not at all likely" and 10 is "extremely likely," how likely would you be to recommend that they teach AP Precalculus?" Veteran AP teachers are those who have taught an AP course in any subject area for more than one year.

When we asked AP Precalculus teachers who provided a rating of 7 out of 10 to explain why they would recommend the course, six common themes emerged capturing the majority of teacher responses (79%):

Theme 1: AP Precalculus supports student preparation for future math courses.
(26% | 286 responses)

> "I LOVE the way that AP Precalculus sets students up for success in Calculus."
> "I believe my students are more prepared for Calculus than past years!"
> "The AP Precalculus curriculum is much more comprehensive and in-depth versus the traditional Precalculus curriculum currently taught at my school."

Theme 2: AP Precalculus features a thoughtfully designed and seamless course structure.
(17% | 189 responses)

> "The course investigates rich topics, sequences them seamlessly…"
> "A new, better approach to teaching precalculus."
> "This course was a breath of fresh air and truly enhanced major concepts…"

Theme 3: AP Precalculus teachers expressed general positive experiences with the course.
(16% | 178 responses)

> "I loved the course this year and think as many students as possible should experience it."
> "I've learned so much and grown so much as a math teacher this year…"
> "It became the most fulfilling math course I've taught."
> "This was my first year to teach an AP class and I loved it!"

Theme 4: AP Precalculus is accessible and achievable for a broad range of students.
(8% | 87 responses)

> "It is accessible to all seniors or anyone enrolled in precalculus."
> "Challenging, but still attainable for students…"
> "AP Precalculus is highly accessible to ALL students."

Theme 5: AP Precalculus has a strong community of educators and high-quality resources to support teacher success.
(7% | 74 responses)

> “Community of educators is amazing. Everyone is so helpful, it made the prep work much less daunting.”
> “Great course with lots of resources in AP Classroom.”
> “College Board provided GREAT materials.”

Theme 6: Teaching AP Precalculus is demanding but fulfilling.
(5% | 58 responses)

> **“**It was a challenge but worthwhile.”
> “It is hard work but also rewarding.”
> “It was a great course that really challenged me as a teacher.”
> “After having taught it a year I feel like I better understand the whole picture.”

These six themes offer an understanding of the factors contributing to educator enthusiasm for AP Precalculus and its perceived value for students and schools. Educators report improvements in readiness and conceptual understanding. They value the thoughtful sequencing, pacing, and depth of the curriculum and describe the course as modern, coherent, and more engaging than traditional precalculus offerings. Many teachers describe AP Precalculus as being enjoyable to teach, citing personal growth and student engagement, while also acknowledging it can be demanding. Despite its rigor, AP Precalculus is seen as inclusive and attainable. Teachers report that students from a wide range of backgrounds can succeed.

Although they represented a small minority (7%), teachers who were less enthusiastic about recommending the course most commonly cited concerns such as the lack of a textbook and other resources, specific aspects of the course design, uncertainty about college credit opportunities, or felt their recommendation would depend on a school’s context and a teacher’s background.

Conclusion

The inaugural year of AP Precalculus demonstrated promise in expanding access to rigorous mathematics education in high school. With over 184,000 AP Precalculus Exam takers, the course has not only achieved the largest launch in AP history but has also reached higher percentage of Black, Hispanic, and first-generation students than other AP math courses. The data show that AP Precalculus is serving multiple roles both preparing younger students for further STEM coursework and offering older students a meaningful capstone experience. Encouragingly, a majority of students continued on to take additional AP courses, particularly in STEM, and teachers overwhelmingly endorsed the course for its structure, accessibility, and impact on student readiness.

These early indicators suggest that AP Precalculus is on its way to fulfilling its mission to broaden participation in advanced coursework and support college readiness. As data become available, additional research will examine longitudinal outcomes to understand how students who took AP Precalculus use any college credit they earn from their AP Precalculus exam, how they perform in advanced math courses, and if they are more likely to persist and succeed in STEM majors than similar students without AP Precalculus.

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