



**EXECUTIVE SUMMARY**

# *CALCULATING THE ODDS:*

**COUNSELOR VIEWS ON MATH  
COURSETAKING AND COLLEGE ADMISSIONS**

By Pamela Burdman and Veronica Anderson

September 2022

**JUST // EQUATIONS**

**NACAC**

"The advice is to err on the side of more perceived rigor in math when possible. I'd love for that to change to a broader range of courses fitting the bill on the math front but that hasn't happened at the college level much at all and therefore not at high schools and certainly not in the views of students and families."

– independent counselor

# EXECUTIVE SUMMARY

Calculus is the study of change—continuous, infinitesimal change. It is the key to measuring phenomena as diverse as epidemics, acoustics, and planetary motion. But since calculus was catapulted to the top of the academic heap more than 50 years ago, little has changed in terms of the course’s role as a hallmark of intelligence and academic rigor. Selective colleges use it as a gatekeeper, and high school students scramble to take the course and succeed.

Math education leaders have challenged these patterns for years.<sup>1</sup> The fixation on calculus can interfere with development of foundational math skills, exacerbate educational inequities, and exert needless pressure on many students to rush through the math curriculum. It also reflects a preoccupation with exclusivity that is tainted by stereotypes about academic ability. Lastly, it interferes with development of substantive math options for the majority of college students—those not pursuing STEM majors and careers.

This report is the second in a series examining preferences for calculus in the college admissions process. The first, [A New Calculus for College Admissions](#), revealed that, even though colleges rarely require calculus for incoming students, many selective colleges still prefer that students have the course on their transcripts, significantly raising the stakes for students’ high school math enrollment decisions. Signals sent by elite colleges attract disproportionate attention, influencing the entire admissions landscape, including the practices of colleges that admit the majority of applicants.

## ABOUT THIS REPORT

The current report examines how high school counselors interpret admissions offices’ expectations, driving them to advise students to maximize calculus opportunities. Its conclusions are based on surveys and interviews conducted in partnership with the National Association for College Admission Counseling.

## HIGH SCHOOL MATH: THE COUNSELING CONTEXT

As long as calculus remains overvalued in college admissions, students without access to it can be at a disadvantage in the college application process. Calculus is not universally available, with students experiencing poverty and Black, Latinx, and Indigenous students facing the longest odds of taking the course. Students attending public schools are less likely to take the course than those attending private schools. Even at schools that offer calculus, placement practices and scheduling constraints can limit access.

Scant availability of counseling for college planning at some schools contributes to these barriers, especially for students and families who are not in the know about college expectations. The problem begins as early as middle school, because few high schools have pathways to calculus for students who didn’t take Algebra I in middle school.

This report underscores this inequitable dynamic by highlighting the support and guidance about math course selection available to students at schools that do emphasize college planning. These high schools and their counselors and students collectively help shape the competition for spots at in-demand colleges.

## INSIGHTS FROM COUNSELORS

The counselor interviews and surveys yielded insights into the role of math in the admissions process:

**For most high school counselors, calculus is a default recommendation.** Respondents valued calculus nearly universally, but particularly for students applying to selective institutions, even though they did not believe the course is academically necessary for all students. Most advise students with selective colleges in their sights to take at least one calculus course, ideally an Advanced Placement

<sup>1</sup> For citations, please see the main report.

course. The top reason was to ensure students are competitive for the colleges they want to attend—especially students seeking to major in STEM and business, but often even for those interested in the humanities or social sciences.

Counselors participating in the survey, who tend to represent high schools focused on selective college admissions, were even more likely than our sample of admissions officers to value calculus:

While **93 percent of high school counselors** said calculus gives students an edge in admissions, only **53 percent of admissions officers** in our prior study said the same.

Likewise, when asked whether not taking calculus in high school narrows students' college options, **73 percent of high school counselors** agreed or somewhat agreed, compared to just **34 percent of admissions officers**.

**Many counselors believe colleges covertly expect calculus.** Some selective institutions—including Stanford, Harvard, and the University of California—have made efforts to clarify that calculus is not an admissions requirement. Nevertheless, many counselors have concluded, based on their own experiences, that the course is at least strongly expected at highly selective schools. They and their students commonly discount claims from some institutions that calculus is not required. Skeptics point to the large proportion of selective college admits who have taken the course. However, admissions officials at some universities counter that students' coursetaking behavior, not colleges' practices, dictates those numbers. Most students seeking competitive admission take large numbers of advanced courses, including calculus, they say.

**Increasingly, colleges expect courses beyond introductory calculus, counselors say.** Expectations that students take the most rigorous or most advanced courses available at their schools have contributed to the continuous redefinition of rigor. While an introductory calculus course may have been sufficient in the past, participating counselors increasingly assume that, to be competitive at the most selective institutions, students must successfully complete AP Calculus BC, which fewer than a third of high schools offer. Some ambitious high schools offer higher-level courses such

as Multivariable Calculus, Linear Algebra, Differential Equations, and even Knot Theory. These patterns contribute to an arms-race mentality.

**Many counselors value statistics courses but say admissions offices don't.** Counselors overwhelmingly value statistics preparation, but only 5 percent of survey respondents said they recommend statistics equally with calculus for admissions purposes. Rapid expansion of data and access to technology have made statistics classes increasingly relevant and changed the way they are taught. About one in six high school students takes a class in statistics, and statistics was mentioned by survey respondents more than any other non-calculus path course. But among students applying to selective colleges, the shift toward statistics has been slow. For students applying to selective colleges, counselors often recommend statistics or AP Statistics only to those students who struggled in precalculus.



**Most counselors believe calculus is not necessary for all students, yet many say pressure to accelerate to calculus is excessive.** “Math unfortunately seems to rule our building,” said one high school counselor. Counselors tended to blame colleges for pushing calculus, saying that colleges don’t defend or explain the preference. Many urged colleges to broaden their expectations and increase transparency. Some argued that expectations should align with curricular needs in students’ intended areas of study, meaning that statistics or other options would be valued for students pursuing social sciences and humanities, for example.

## TIME FOR CHANGE

For real change to happen, education leaders, policymakers, and professional organizations must update policies and ensure transparency. Here are some recommended next steps:

### FOR COLLEGES AND UNIVERSITIES:

**Adopt clear admissions policies and specific guidelines about math expectations for various schools and majors.** In collaboration with faculty, admissions offices should reconsider how they weigh various math courses on students’ transcripts in alignment with students’ college goals.

**Implement the policies consistently.** Counselors, teachers, and families won’t trust that policies have changed unless they see them translated into practice.

**Commit to transparency.** Admissions offices can also take the lead on enhancing transparency around expectations. Instead of opaque advice to “maximize what’s available,” colleges can communicate that students should, for example, have x years of progressively advanced math aligned with their academic interests.

**Develop shared resources.** Colleges, math associations, and professional organizations can create shared materials with up-to-date information and infographics on alignment of math sequences with various majors and careers to support conversations about refining admissions criteria.



### FOR STATE EDUCATION DEPARTMENTS, SCHOOL DISTRICTS, HIGH SCHOOLS, AND MIDDLE SCHOOLS:

**Expand math offerings to include rigorous and relevant options aligned with college majors and careers.** For example, students seeking to pursue most STEM majors would focus on the pathway to calculus, while students with an interest in the social sciences could pursue statistics and/or data science courses.

**Articulate college counseling with academic counseling as early as the transition to middle school.** This would raise awareness of majors and careers to support students’ choices and ensure that no students are placed into dead-end sequences or prematurely tracked out of STEM opportunities.

**Attend to students’ mental health and well-being.** High schools can consider ways of minimizing the emphasis on acceleration, such as setting limits on the number of AP courses offered or the number students are allowed to take. Those providing multiple levels of advanced mathematics can reconsider the need for those offerings, while also ensuring more equitable access to those courses they continue to offer.

$$\sqrt{a^2} = |a| = \begin{cases} a, & a \geq 0 \\ -a, & a < 0 \end{cases}$$

$$(x^n)' = nx^{n-1}$$

$$\sqrt{\sum_{i=1}^n (x_i - y_i)^2}$$

“As college admissions has been more frenzied, calculus becomes the checkbox. Never mind if you enjoy math or not. I would like to change that dialogue.”

– independent college counselor

$$(a^2 + ab + b^2) =$$

1,2

$$2a$$

$$y = 2x$$

$$\sin \alpha = 2 \sin \frac{\alpha}{2} \cdot \cos \frac{\alpha}{2}$$

$$M = \frac{1}{2} \sum_{i=1}^{2q} i_i \sum_{j=1}^{2q} i_j$$

$$\frac{\pi}{2} - \text{ArcSin}(x)$$

$$\int x^\alpha \cdot dx = \frac{x^{\alpha+1}}{\alpha+1} + c$$



---

**[justequations.org](https://justequations.org)**

Copyright 2021 Just Equations. All rights reserved.