De Anza College Office of Institutional Research and Planning

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To: Math Department

From: Mallory Newell, Office of Institutional Research and Planning

Subject: *STEM Calculus Pathway – Enrollment and Success – 2020-21 to 2023-24*

Introduction

Students pursuing a STEM major are required to complete the STEM Calculus series to meet transfer requirements. At De Anza the pathway usually begins with Precalculus 1 and 2 (MATH31 and MATH32) then students go on to complete the Calculus series which includes Calculus 1 and Calculus 2 (MATH1A and MATH1B articulate as Calculus 1), Calculus 3 (MATH1C), Calculus 4 (MATH1D), Differential Equations (MATH2A) and Linear Algebra (MATH2B). Each course is 5 units. Some students can enroll directly in Calculus 1 (MATH1A) using multiple measures placement or guided self-placement, bypassing the precalculus series (see methodology for placement rules). De Anza also offers additional support through the Math Performance Success (MPS) program for Precalculus 1 and 2 (MATH31 and MATH32) and Calculus 1 and 2 (MATH1A and MATH1B). These courses are 8 units each.

In 2019-20, the precalculus sequence transitioned from three courses to two and in the same timeframe COVID-19 came into play, therefore, this analysis includes a look at 2020-21 to 2023-24 to capture the years after these two large changes. Success includes A, B, C, and P grades including +/- grades. Courses include their corresponding honors sections. Students were included based on their first math course enrolled at De Anza. Cohorts exclude students who enrolled in MATH12 (Business Calculus).

Highlights

Enrollment Trends

Enrollment trends vary depending on the course. Over the past four years, enrollment in MATH1A, MATH1B, MATH2B and MATH31 have seen a decrease while MATH1D, MATH2B and MATH32 have seen an increase in enrollment, with MATH1C remaining flat.

- Enrollment in MPS sections decreased across all courses except for MATH1B where enrollment grew by 43%.

Enrollment in higher level Calculus courses is predominantly comprised of Asian and white students while enrollment in Calculus preparatory courses is predominantly comprised of Black and Latinx students. This same pattern exists for MPS Calculus preparatory sections as well.

- Enrollment in Calculus 1 through Calculus 4 courses are overrepresented by students who identify as Asian, between 8 % pts and 26 % pts, while Latinx students are underrepresented in these courses, between 12 % pts and 19 % pts.
- Latinx students are overrepresented in STEM preparatory course (MATH31 and MATH32 by 5 % to 7 % pts) while Asian and white students are underrepresented in these courses (by 2 % pts).
- Asian students are underrepresented in MATH31.MPS by 25 percentage points while Latinx students are overrepresented by 23 percentage points.

Course Success Trends

Success rates are highest for upper-level Calculus courses with success rates the highest for MATH2A and 2B with success rates decreasing for the Calculus preparatory courses, with the lowest rate for MATH31. Fluctuations in success rates vary by course with preparatory course success rates consistently declining. Success rates are highest for students who identify as Asian, Unknown and white, while lowest for students identifying as Latinx, Black and Native American across most courses.

- Success rates for Calculus 1A, 1B, 1C and 1D are consistently high, largely in the 80% range, however, success rates steadily decreased for MATH1A and 1B since 2020-21 while MATH1C and MATH1D remained stable.
- Success rates for MATH2A and 2B are also high, above 80%, and remained stable.
- Success rates for MATH31 are far lower, in the 60% range, and have decreased steadily over the past four years.
- Success rates for MATH32 are in the upper 70% range but decreased by 4%.
- Success rates in MPS sections tended to decrease at higher rates than the non-MPS section of the same course.

Successful Completion of Calculus 1 (MATH1A + MATH1B)

Completion of Calculus 1 improves the higher a student starts in the Calculus pathway. Additional improvements are seen in the completion of Calculus 1 the longer a student is given to complete, one year vs. two years.

- Completion of Calculus 1 within two years for students starting in MATH31 is 22% compared to 54% for students starting in MATH32 and 59% for students starting in Calculus 1.
- Two-year completion of Calculus 1 was similar for students starting in an MPS section or a corequisite section for MATH31 but higher for students starting in an MPS section of MATH32.

By Ethnicity

Across all student groups, one and two-year completion of Calculus 1 is the highest when they start in Calculus 1A.

Students starting in MATH31 and MATH1A who identify as Asian and Decline to State have the highest 2-year completion rate of Calculus 1 while Latinx and Black students have the lowest completion of Calculus 1.

- Differences in completion for students starting in MATH31 result in a 12-percentage point difference between Asian and Black students successfully completing Calculus 1 in two years and a 19-percentage point difference between Asian and Latinx students successfully completing Calculus 1 in two years.
- Differences in completion for students starting in MATH1A result in a 24-percentage point difference between Asian and Black students successfully completing Calculus 1 in two years and a 21-percentage point difference between Asian and Latinx students successfully completing Calculus 1 in two years.

By High School Preparation

Most students in the STEM Calculus pathway are students with a HSGPA above 2.6.

- 77% of students starting in MATH31 have a GPA above 2.6
- 79% of students starting in MATH1A have a GPA above 2.6
- Students with an unknown HSGPA are largely starting in MATH32 (51%).

Calculus 1 completion rates are highest across all HSGPA bands for students starting in MATH1A over those starting in MATH31 or MATH32.

- 14% of students starting in MATH31 complete Calculus 1 in two years with a GPA of 2.59 or lower while 21% complete in two years with a GPA of 2.6 or higher.
- 27% of students starting in MATH32 complete Calculus 1 in two years with a GPA of 2.59 or lower while 37% complete in two years with a GPA of 2.6 or higher.
- 41% of students starting in MATH1A complete Calculus 1 in two years with a GPA of 2.59 or lower while 55% complete in two years with a GPA of 2.6 or higher.

Enrollment and Course Success

This section provides enrollment and success data by course and provides the percent change in enrollment and course success over the past four years. The intent of providing this information is to track shifts in enrollment and course success over time.

Table 1. Enrollment and Course Success, 2020-21 to 2023-24

	2020-21		2021-22		2022-23		2023-24		Pecent Change - 2020-21 to 2023-24		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment Change		Success Change
MATHD001A	2,336	85%	2,050	81%	2,250	78%	2,259	74%	-3%		-13%
MATHD001B	1,999	87%	1,539	79%	1,633	83%	1,820	79%	-9%		-9%
MATHD001C	1,338	85%	1,184	81%	1,263	82%	1,342	86%	0%		1%
MATHD001D	865	89%	752	85%	816	85%	964	87%	11%		-2%
MATHD002A	561	87%	436	80%	410	83%	489	86%	-13%		-1%
MATHD002B	527	91%	442	86%	520	87%	554	89%	5%		-2%
MATHD031.	1,436	69%	1,313	65%	1,344	61%	1,275	63%	-11%		-9%
MATHD032.	752	76%	1,012	77%	854	79%	951	73%	26%		-4%

Note: Includes honors sections.

Between 2020-21 and 2023-24:

- MATH1A enrollment has remained rather stable, dropping 3% from 2,336 to 2,259 while success rates decreased by 13% from 85% to 74%.
- MATH1B enrollment decreased 9% from 1,999 to 1,820, but is regaining enrollment post COVID, while success rates decreased 9% from 87% to 79%, though success rates have jumped around from year to year.
- MATH1C enrollment remained flat at around 1,330 with success rates remaining steady as well, with a 1% increase.
- MATH1D enrollment grew by 11% from 865 to 964 while success rates decreased by 2% from 89% to 87%.
- MATH2A enrollment decreased by 13% from 561 to 489 while success rates remained stable with a 1% decrease from 87% to 86%.
- MATH2B enrollment increased by 5% from 527 to 554 while success rates decreased by 2% from 91% to 89%.
- MATH31 enrollment decreased by 11% from 1,436 to 1,275, while success rates decreased by 9% from 69% to 63%.
- MATH32 enrollment increased by 26% from 752 to 951 while success rates decreased by 4% from 76% to 73%.

Table 2. Enrollment and Course Success, 2020-21 to 2023-24, MPS Sections

		2020-21		2021-22		2022-23		2023-24		Pecent Change - 2020-21 to 2023-24			
		Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment Change		Success Change	
MATH31	MPS	151	68%	140	50%	186	54%	141	55%	-7%		-19%	
	Not MPS	1,285	69%	1,173	67%	1,158	62%	1,134	64%	-12%		-7%	
	Total	1,436	69%	1,313	65%	1,344	61%	1,275	63%	-11%		-9%	
MATH32	MPS	67	79%	95	84%	91	75%	66	76%	-1%		-4%	
	Not MPS	685	76%	917	76%	763	80%	885	73%	29%		-4%	
	Total	752	76%	1,012	77%	854	79%	951	73%	26%		-4%	
MATH1A	MPS			173	84%	119	77%	163	65%	-6%		-23%	
	Not MPS			1,866	81%	2,119	78%	2,082	74%	12%		-9%	
	Total			2,039	81%	2,238	78%	2,245	74%	10%		-9%	
MATH1B	MPS			69	86%	90	90%	99	81%	43%		-6%	
	Not MPS			1,456	79%	1,535	83%	1,707	78%	17%		-1%	
	Total			1,525	79%	1,625	83%	1,806	79%	18%		0%	

Between 2020-21 and 2023-24:

- MATH31.MPS enrollment decreased 7% from 151 to 141 while non-MPS sections decreased by 12%. Success rates for MPS sections decreased 19% from 68% to 55% while non-MPS sections decreased 7% from 69% to 64%. MPS success rates were consistently lower than non-MPS success rates each year.
- MATH32.MPS enrollment remained stable decreasing 1% from 67 to 66 while non-MPS enrollment increased 29%. Success rates for MPS sections decreased 4%, like non-MPS sections. Success rates for MPS sections were higher than non-MPS sections in three of the four years.
- MATH1A.MPS enrollment decreased 6% while non-MPS enrollment increased 12%. Success rates for MPS sections decreased 23% from 84% to 65% with non-MPS sections resulting in higher success rates than MPS sections.
- MATH1B.MPS enrollment increased 43% from 69 to 99 while non-MPS sections increased by 17%. Success rates for MPS sections decreased 6% from 86% to 81% and remained relatively higher than non-MPS sections.

Race/Ethnicity Disaggregation

The following section presents enrollment and course success in STEM Calculus pathway courses disaggregated by course and ethnicity. The 2023-24 academic year is used to compare the proportional representation of students in each course by ethnicity. A difference of 0 means the racial/ethnic group is equally represented in the course while a negative representation means the group has a lower enrollment in the course than their enrollment in the college overall. The intent of providing this information is to better understand who is enrolled in the courses and at what rate.

Table 3. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH1A (Calculus 1)

MATH1A/1AH	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH1A Population	Difference
Asian	1,253	89%	1,043	86%	1,153	81%	1,071	78%	39%	47%	8%
Black	61	74%	45	69%	36	58%	50	60%	4%	2%	-2%
Filipinx	128	83%	109	75%	132	72%	125	66%	6%	6%	0%
Latinx	336	74%	321	67%	343	63%	305	56%	26%	14%	-12%
Native American	6	83%	1	100%	3	100%	6	83%	0%	0%	0%
Pacific Islander	11	82%	11	64%	14	86%	13	69%	1%	1%	0%
Unknown	211	86%	246	87%	282	89%	388	80%	7%	17%	10%
White	330	84%	274	77%	287	74%	301	73%	17%	13%	-4%
Total	2,336	85%	2,050	81%	2,250	78%	2,259	74%	100%	100%	0%

- In 2023-24, Asian students are overrepresented in MATH1A by 8 percentage points while Latinx students are underrepresented by 12 percentage points.
- Success rates have decreased across all groups over the past four years, with success rates the highest for Asian, Native American and Unknown groups and lowest for Black and Latinx student groups.

Table 4. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH1B (Calculus 2)

| MATH1B/1BH | 2020-21 | | 2021-22 | | 2022-23 | | 2023-24 | | Representation | | |
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH1B Population	Difference
Asian	1,172	91%	842	83%	929	86%	977	82%	39%	54%	15%
Black	36	75%	33	64%	31	74%	25	76%	4%	1%	-3%
Filipinx	112	79%	68	72%	96	73%	91	71%	6%	5%	-1%
Latinx	236	75%	170	63%	194	71%	203	66%	26%	11%	-15%
Native American	2	100%	2	50%	1	100%	5	60%	0%	0%	0%
Pacific Islander	8	50%	13	69%	4	75%	15	67%	1%	1%	0%
Unknown	171	94%	191	90%	189	89%	291	79%	7%	16%	9%
White	262	87%	220	75%	189	86%	213	79%	17%	12%	-5%
Total	1,999	87%	1,539	79%	1,633	83%	1,820	79%	100%	100%	0%

- In 2023-24, Asian students are overrepresented in MATH1B by 15 percentage points while Latinx students are underrepresented by 15 percentage points.
- Success rates were again highest for Asian students followed by Unknown and white students while success rates were lowest for Latinx students.

Table 5. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH2A (Calculus 3)

| MATH2A/2AH | 2020-21 | | 2021-22 | | 2022-23 | | 2023-24 | | Representation | | |
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH2A Population	Difference
Asian	408	90%	260	83%	269	86%	297	88%	39%	61%	22%
Black	15	73%	9	56%	4	75%	11	64%	4%	2%	-2%
Filipinx	14	93%	16	88%	9	44%	21	90%	6%	4%	-2%
Latinx	31	68%	36	75%	27	70%	37	65%	26%	8%	-18%
Native American	2	100%	2	50%			1	100%	0%	0%	0%
Pacific Islander			1	0%	1	0%	1	100%	1%	0%	-1%
Unknown	19	100%	50	86%	47	87%	61	87%	7%	12%	5%
White	72	75%	62	69%	53	79%	60	92%	17%	12%	-5%
Total	561	87%	436	80%	410	83%	489	86%	100%	100%	0%

- Students starting in MATH2A largely are represented by Asian students (61%) followed by Unknown (12%).
- In 2023-24, Asian students are overrepresented in MATH2A by 22 percentage points while Latinx students are underrepresented by 18 percentage points.

Table 6. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH2B (Calculus 4)

MATH2B/2BH	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH2B Population	Difference
Asian	422	92%	267	85%	357	91%	358	91%	39%	65%	26%
Black	11	73%	4	100%	12	75%	7	71%	4%	1%	-3%
Filipinx	11	91%	22	82%	8	63%	23	100%	6%	4%	-2%
Latinx	17	76%	35	80%	34	53%	41	68%	26%	7%	-19%
Native American	2	100%	1	100%	1	100%			0%	0%	0%
Pacific Islander					1	100%	1	100%	1%	0%	-1%
Unknown	9	100%	52	96%	46	96%	68	93%	7%	12%	5%
White	55	87%	61	87%	61	85%	56	86%	17%	10%	-7%
Total	527	91%	442	86%	520	88%	554	89%	100%	100%	0%

- Students starting in MATH2B largely are represented by Asian students (65%) followed by Unknown (12%).
- In 2023-24, Asian students are overrepresented in MATH2B by 26 percentage points while Latinx students are underrepresented by 19 percentage points.

Table 7. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH31 (Precalculus 1)

MATH31	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH31 Population	Difference
Asian	500	81%	470	76%	474	70%	455	76%	39%	36%	-3%
Black	63	49%	70	54%	47	51%	49	45%	4%	4%	0%
Filipinx	133	65%	96	66%	100	67%	80	54%	6%	6%	0%
Latinx	443	57%	396	54%	395	44%	399	47%	26%	31%	5%
Native American	7	86%	7	43%	3	100%	5	60%	0%	0%	0%
Pacific Islander	11	64%	15	47%	13	62%	12	50%	1%	1%	0%
Unknown	48	71%	58	79%	82	79%	95	69%	7%	7%	0%
White	231	72%	201	64%	230	66%	180	72%	17%	14%	-3%
Total	1,436	69%	1,313	65%	1,344	61%	1,275	63%	100%	100%	0%

- In 2023-24, Asian and white students are underrepresented in MATH31 by 3 percentage points while Latinx students are overrepresented by 5 percentage points.
- Success rates were highest for Asian students followed by Unknown students with the lowest success rates exhibited by Black and Latinx students.

Table 8. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH32 (Precalculus 2)

MATH32	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH32 Population	Difference
Asian	307	82%	427	82%	367	83%	379	74%	39%	40%	1%
Black	25	68%	31	52%	30	47%	22	55%	4%	2%	-2%
Filipinx	51	75%	68	81%	42	67%	49	61%	6%	5%	-1%
Latinx	157	61%	244	66%	163	67%	184	59%	26%	19%	-7%
Native American	3	100%	4	75%	6	50%	4	50%	0%	0%	0%
Pacific Islander	5	100%	4	100%	3	67%	3	67%	1%	0%	-1%
Unknown	83	78%	117	87%	116	92%	168	88%	7%	18%	11%
White	121	82%	117	73%	127	84%	142	80%	17%	15%	-2%
Total	752	76%	1,012	77%	854	79%	951	73%	100%	100%	0%

- In 2023-24, Unknown students are overrepresented in MATH32 by 11 percentage points while Latinx students are underrepresented by 7 percentage points.
- Success rates were highest for Unknown, white and Asian students and lowest for Black, Latinx and Native American students.

Table 9. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH1A.MPS (Calculus 1)

MATH1A.MPS	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH1A Population	Difference
Asian			74	89%	44	77%	58	76%	39%	36%	-3%
Black			7	86%	3	100%	7	71%	4%	4%	0%
Filipinx			9	89%	6	83%	10	40%	6%	6%	0%
Latinx			42	69%	30	53%	44	45%	26%	27%	1%
Native American					1	100%			0%	0%	0%
Pacific Islander									1%	0%	-1%
Unknown			16	94%	18	94%	18	83%	7%	11%	4%
White			25	88%	17	94%	26	69%	17%	16%	-1%
Total			173	84%	119	77%	163	65%	100%	100%	0%

- Asian students are underrepresented in MATH1A.MPS by 3 percentage points while Black and Latinx students are evenly represented in MATH1A.MPS.

Table 10. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH1B.MPS (Calculus 2)

MATH1B.MPS	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH1B Population	Difference
Asian			30	90%	40	90%	40	83%	39%	40.4%	1%
Black			3	67%	2	100%	2	100%	4%	2.0%	-2%
Filipinx			1	100%	6	100%	5	60%	6%	5.1%	-1%
Latinx			16	69%	18	83%	22	86%	26%	21.0%	-5%
Native American									0%	1.0%	1%
Pacific Islander					1	100%	1	100%	1%	1.0%	0%
Unknown			7	100%	9	100%	13	77%	7%	13.1%	6%
White			12	92%	14	86%	16	75%	17%	16.2%	-1%
Total			69	86%	90	90%	99	81%	100%	100%	0%

- Asian students are evenly represented in MATH1B.MPS while Latinx and Black students are underrepresented by 5 and 2 percentage points, respectively.

Table 11. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH31.MPS (Precalculus 1)

MATH31.MPS	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH31 Population	Difference
Asian	45	82%	34	65%	54	67%	19	84%	39%	14%	-25%
Black	7	43%	7	71%	9	67%	8	38%	4%	6%	2%
Filipinx	12	58%	5	60%	14	50%	7	43%	6%	5%	-1%
Latinx	60	52%	70	37%	66	35%	69	48%	26%	49%	23%
Native American	2	100%					1	0%	0%	0%	0%
Pacific Islander	1	0%	2	50%	2	0%			1%	0%	-1%
Unknown	5	100%	5	60%	15	60%	19	58%	7%	13%	6%
White	19	95%	17	59%	26	77%	18	67%	17%	13%	-4%
Total	151	68%	140	50%	186	54%	141	55%	100%	100%	0%

- Asian students are underrepresented in MATH31.MPS by 25 percentage points while Latinx students are overrepresented in MATH31.MPS by 23 percentage points.
- Success rates are highest for students who identify as Asian and white and lowest for Black, Latinx and Filipinx students.

Table 12. Enrollment and Course Success, 2020-21 to 2023-24, By Ethnicity, MATH32.MPS (Precalculus 2)

MATH32.MPS	2020-21		2021-22		2022-23		2023-24		Representation		
	Enrollment	Success	Enrollment	Success	Enrollment	Success	Enrollment	Success	2023-24 Population	MATH32 Population	Difference
Asian	26	88%	34	94%	39	72%	16	75%	39%	14%	-25%
Black	2	50%	2	100%	4	50%	2	100%	4%	3%	-1%
Filipinx	3	100%	6	67%	1	0%	4	75%	6%	6%	0%
Latinx	20	60%	35	77%	18	72%	24	71%	26%	36%	10%
Native American			1	100%	1	100%			0%	0%	0%
Pacific Islander			2	100%					1%	0%	-1%
Unknown	3	67%	5	80%	15	100%	6	67%	7%	9%	2%
White	13	92%	10	80%	13	69%	14	86%	17%	21%	4%
Total	67	79%	95	84%	91	75%	66	76%	100%	90%	-10%

- Asian students are underrepresented in MATH32.MPS by 25 percentage points while Latinx students are overrepresented in MATH31.MPS by 10 percentage points.

Calculus 1A and 1B Completion (Articulates as Calculus 1)

The section below tracks students from their first course enrolled to completion of the Calculus 1 series which includes Calculus 1A and Calculus 1B, which articulate as a sequence to meet CSU/UC Calculus 1 requirements. Calculus 1 completion is the metric used to evaluate against the three standards of AB 1705, as Calculus 1 is required for all STEM majors. A one and two-year completion window is provided. The completion rate is also referred to as the throughput rate. Data is disaggregated by starting level, ethnicity, corequisite course, MPS section and high school preparation. Cohorts are combined based on their first course of enrollment starting in fall 2020 through fall 2022 tracked for one or two years to completion of Calculus 1B by summer 2024. To support college's evaluation of AB 1705 standards, the state Chancellor's Office provided an analysis of De Anza's STEM pathway disaggregated by high school preparation, this report can be accessed here. See the Methodology section for details on how students are placed into courses along the Calculus pathway.

Table 13. Completion of Calculus 1B by First Course Enrollment, All Sections

Starting Course	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
MATH31	1,812	103	6%	1,812	389	21%
MATH32	537	213	40%	537	291	54%
MATH1A	2,648	1,385	52%	2,648	1,564	59%

- Students starting in MATH31 had a 6% completion rate of Calculus 1B in one year which increased to 21% in two years.
- Students starting in MATH32 had a 40% completion rate of Calculus 1B in one year which increased to 54% in two years.
- Students starting in MATH1A had a 52% completion rate of Calculus 1B in one year which increased to 59% in two years.

Table 14. Completion of Calculus 1B by First Course Enrollment, MPS Sections

Starting Course	One-Year Completion			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
MATH31	183	8	4%	183	33	18%
MATH32	27	14	52%	27	20	74%
MATH1A	60	40	67%	60	42	70%

Note: First course enrollment was an MPS section.

- Students starting in MATH31.MPS had a 4% completion rate of Calculus 1B in one year which increased to 18% in two years.
- Students starting in MATH32.MPS had a 52% completion rate of Calculus 1B in one year which increased to 74% in two years.
- Students starting in MATH1A.MPS had a 67% completion rate of Calculus 1B in one year which increased to 70% in two years.

Table 15. Completion of Calculus 1B by First Course Enrollment, Corequisite Sections (Q)

Starting Course	One-Year Completion			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
MATH31	270	14	5%	270	58	21%
MATH32	84	36	43%	84	45	54%

Note: First course enrollment was a corequisite (Q) section.

- Students starting in MATH31.Q had a 5% completion rate of Calculus 1B in one year which increased to 21% in two years.
- Students starting in MATH32.Q had a 43% completion rate of Calculus 1B in one year which increased to 54% in two years.

Calculus 1 Completion (MATH1A + MATH1B) by Ethnicity

Table 16. Completion of Calculus 1B by First Course Enrollment in MATH31, by Ethnicity

MATH31	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
Starting Course	Cohort	Completion	Rate	Cohort	Completion	Rate
Asian	702	56	8%	702	208	30%
Black	82	1	1%	82	10	12%
Filipinx	147	5	3%	147	19	13%
Latinx	497	9	2%	497	55	11%
Native American	11	1	9%	11	2	18%
Pacific Islander	13	2	15%	13	4	31%
White	288	18	6%	288	62	22%
Decline to State	72	11	15%	72	29	40%
Total	1,812	103	6%	1,812	389	21%

- Students starting in MATH31 who identify as Asian successfully complete Calculus 1B at a rate of 30% in two years. Compared to 12% for Black and 11% for Latinx students completing Calculus 1B in two years.
- This represents a 12-percentage point difference between Asian and Black students in two years and a 19-percentage point difference between Asian and Latinx students in two years.

Table 17. Completion of Calculus 1B by First Course Enrollment in MATH32, by Ethnicity

MATH32	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
Starting Course	Cohort	Completion	Rate	Cohort	Completion	Rate
Asian	264	117	44%	264	156	59%
Black	10	1	10%	10	2	20%
Filipinx	22	4	18%	22	6	27%
Latinx	58	8	14%	58	16	28%
Native American						0%
Pacific Islander	1	0	0%	1	0	0%
White	58	21	36%	58	28	23%
Decline to State	124	62	50%	124	83	67%
Total	537	213	40%	537	291	54%

- Two-year completion rates for Asian students are 59% compared to 20% for Black students and 27% for Filipinx, and 28% for Latinx students.
- This represents a 39-percentage point difference between Asian and Black students in two years and a 31-percentage point difference between Asian and Latinx students in two years.

Table 18. Completion of Calculus 1B by First Course Enrollment in MATH1A, by Ethnicity

MATH1A Starting Course	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
Asian	1,554	871	56%	1,554	986	63%
Black	44	16	36%	44	17	39%
Filipinx	149	67	45%	149	77	52%
Latinx	313	112	36%	313	131	42%
Native American	3	1	33%	3	1	33%
Pacific Islander	13	4	31%	13	6	46%
White	343	172	50%	343	190	55%
Decline to State	229	142	62%	229	156	68%
Total	2,648	1,385	52%	2,648	1,564	59%

- Asian students exhibit the highest 1 and 2-year Calculus 1B completion rates in one and two years when starting in MATH1A.
- Two-year Calculus 1B completion rates are 63% for Asian students followed by 52% for Filipinx students, 42% for Latinx students and 39% for Black students.
- The difference in completion rates between Asian and Black students represents a 24-percentage point difference and a 21-percentage point difference between Asian and Latinx students.

Calculus 1 Completion by High School Grade Point Average (GPA)

Table 19. Distribution of HSGPA by Starting Course

Starting Course	2.59 or lower	%	2.6 or higher	%	Unknown	%	Total
MATH31	173	10%	1,387	77%	252	14%	1,812
MATH32	11	2%	251	47%	275	51%	537
MATH1A	29	1%	2,084	79%	535	20%	2,648

- The largest group of students in the 2.59 or lower GPA band are starting in MATH31, though still only 10% of the MATH31 population, a very small proportion of these students are enrolled in MATH32 (2%) and MATH1A (1%). Thus, most students in the STEM Calculus pathway are students with a HSGPA above 2.6.
  - o 77% of students starting in MATH31 have a GPA above 2.6
  - o 79% of students starting in MATH1A have a GPA above 2.6
  - o Students with an unknown HSGPA are largely starting in MATH32 (51%).

Table 20. Completion of Calculus 1B by First Course Enrollment in MATH31, by High School GPA

MATH31	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
2.59 and lower	173	7	4%	173	24	14%
2.6 and higher	1,387	72	5%	1,387	295	21%
Unknown	252	24	10%	252	70	28%

- By HSGPA, students starting in MATH31 with a HSGPA of 2.6 or higher have the highest completion rate of MATH1A in two years, though completion rates are still below 22% across the two GPA groups.

Table 21. Completion of Calculus 1B by First Course Enrollment in MATH32, by High School GPA

MATH32	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
2.59 and lower	11	3	27%	11	3	27%
2.6 and higher	251	57	23%	251	93	37%
Unknown	275	153	56%	275	195	71%

- By HSGPA, students starting in MATH32 with a HSGPA of 2.59 or lower have a MATH1B completion rate of 27% compared to 37% for students with a GPA of 2.6 or higher.
- Students with missing GPA information have a completion rate of 71% in two years.

Table 22. Completion of Calculus 1B by First Course Enrollment in MATH1A, by High School GPA

MATH1A	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
2.59 and lower	29	9	31%	29	12	41%
2.6 and higher	2,084	990	48%	2,084	1,138	55%
Unknown	535	386	72%	535	414	77%

- Completion rates are highest across all HSGPA bands for students starting in MATH1A over those starting in MATH31 or MATH32. Completion rates are:
  - 41% in two years for students starting in MATH31
  - 55% in two years for students starting in MATH32
  - 77% in two years for students starting in MATH1A
- By HSGPA, students starting in MATH1A, the one-year completion rates of MATH1B for those with a 2.59 GPA or lower are at 31% and improve to 41% when given two-years to complete.
- One and two-year completion rates are highest for students with missing HSGPA at 77% in two years.
- Students with a HSGPA above 2.6 have completion rates of 48% in one year and 55% in two years.

Focus on Athletes

De Anza College has a robust support network for students through learning communities, which include the REACH program and FAST program, both learning communities to support athletes. The intention of this section is to identify ways in which FAST and REACH programs can support athletes in STEM majors.

Table 23. Completion of Calculus 1B by First Course Enrollment for Student Athletes

Starting Course	One-Year Completion of Calculus 1			Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate	Cohort	Completion	Rate
MATH31	34	1	3%	34	8	24%
MATH32	7	5	71%	7	7	100%
MATH1A	44	22	50%	44	25	57%

- A total of 85 athletes were enrolled in a STEM Calculus course over the timeframe of the study.
- 34 athletes stated in MATH31, of those, 24% successfully completed MATH1B in two years.
- 7 athletes started in MATH32, of those, 100% successfully completed MATH1B in two years.
- 44 athletes started in MATH1A, of those, 57% successfully completed MATH1B in two years.

Table 23. Completion of Calculus 1B by First Course Enrollment for Student Athletes

All Sections	Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate
Asian	23	16	70%
Black	5	0	0%
Filipinx	7	4	57%
Latinx	30	9	30%
Native American	0	0	
Pacific Islander	2	1	50%
White	13	5	38%
Decline to State	5	5	100%
Total	85	40	47%

- Of the 85 athletes who enrolled in a STEM Calculus course over the timeframe of the study, the majority identify as Asian, followed by Latinx, followed by white, Filipinx, Black and Decline to State.
- Asian athletes had the highest completion of MATH1B in two years at 70%.
- Latinx athletes had one of the lowest completion rates at 30%, with 9 of 30 athletes successfully completing MATH1B in two years.
- Of the 5 Black athletes who started in the STEM Calculus pathway, zero successfully completed MATH1B in two years.

Table 24. Completion of Calculus 1B by First Course Enrollment for Student Athletes, by Sport

All Sections	Two-Year Completion of Calculus 1		
	Cohort	Completion	Rate
Badminton	3	2	67%
Baseball	10	3	30%
Football	10	2	20%
Men Basketball	2	0	0%
Men XCountry	7	5	71%
Men Soccer	15	7	47%
Men Swim	7	6	86%
Men Track	13	3	23%
Men Water Polo	3	2	67%
Volleyball	4	3	75%
Women Basketball	2	2	100%
Women Xcountry	2	1	50%
Women Soccer	2	1	50%
Women Swim	1	1	100%
Women Track	3	2	67%
Women Water Polo	1	0	0%
Total	85	40	47%

- Of the 85 athletes, the largest team enrolled in a STEM Calculus pathway course were men's soccer (15) with a 47% completion rate of Calculus 1B in two years, followed by men's track (13) with a 23% completion rate, and baseball and football (10 each) with a 30% and 20% completion rate, respectively.

Methodology

Students were included based on their first math course enrolled at De Anza: MATH31, MATH32, or MATH1A/1AH from fall 2020 through fall 2023 and were tracked for two full years to complete by summer 2024. Only a student whose first course of enrollment was either MATH31, MATH32 or MATH1A/1H were included in each cohort. Successful completion includes A, B, C and P grades and corresponding +/- grades.

MPS sections include those with a section number including MP or MPS. Corequisite sections include those with a section number including a Q.

Course success includes the number of students who successfully complete the course in one term. Completion of calculus is defined as the number of students who start in MATH31, MATH32 or MATH1A and successfully complete

Calculus 1A and Calculus 1B in one or two years. Calculus 1 completion requires successful completion of both MATH1A and MATH1B, as the courses articulate together.

Students who are STEM majors are defined by behavior as those who enrolled in MATH31, MATH32 or MATH1A. Students who started in MATH31 or MATH32 and enrolled in MATH12 (Business Calculus) were removed from the cohort. There were 94 students who started in MATH31 and enrolled in MATH12 and 20 students who started in MATH32 and enrolled in MATH12.

Students are able to access STEM Calculus 1 in various ways, through high school transcripts, guided self-placement, transfer credits and a prerequisite challenge process. Any student has the option to self-place into any course, including Calculus 1A using the guided self-placement process, regardless of their high school preparation. All students with high school transcript data are given a placement based on the current (fall 2024) criteria:

- Calculus 1A: Any high school GPA but completed high school precalculus with a C or higher
- MATH32: Any high school GPA but enrolled in but did not pass high school precalculus
- MATH31: High school GPA 2.6 or above and never enrolled in high school precalculus
- MATH31.MPS: High school GPA less than 2.6 and never enrolled in high school precalculus

However, placement has shifted over time, in summer 2020, the following criteria was applied:

- Calculus 1A: High school GPA above 3.3 and any high school math
- MATH32 or MPS option: High school GPA 3.3 or below and passed precalculus with a C or higher
- MATH31 or MPS option: High school GPA 3.3 or below and did not pass precalculus or higher