

# De Anza College Office of Institutional Research and Planning

**To:** Jerry Rosenberg, Physical Science, Math and Engineering Dean, Mehrdad Kohsravi, Math Department Chair, and Yvette Alves-Campbell, STEM Director

**From:** Mallory Newell, De Anza Researcher

**Date:** 9/16/2020

**Subject:** Evaluation of the Pre-Calculus Pathway - Success and Throughput Rates

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## Purpose

This analysis is provided as an update on the success and throughput rates for courses in the Pre-Calculus pathway which includes MATH41 as a standalone course, MATH41 + MPS, MATH41 + MATH231 (corequisite), and MATH30 the pre-calculus preparation course, and MATH115 (intermediate algebra, degree-applicable but non-transferable) as well as the few sections of MATH210 and MATH212 still offered. AB 705 states that colleges have two years to pilot curriculum that places students into pre-transfer level courses. The 2019-20 academic year completed the first year of the two-year process. **Throughput rates** are calculated based on students who started in fall 2019 and tracked through winter, spring and summer. Under AB 705, students are given one academic year to complete the transfer level or degree applicable course and the clock starts at first enrollment in the sequence. This analysis tracks students who have no prior math enrollment and tracks their initial course enrollment through the transfer level course or degree applicable course based on their educational goal. Students who started in MATH41 are tracked to successful completion of MATH41. Students who started in MATH130, 114, 210 or 212 with an educational goal of transfer are tracked to successful completion of MATH41, 42, 43, 1A-1C, 2A-2B.

It should be noted that **online spring has impacted outcomes for students** in that students largely took an excused withdrawal rather than a standard withdrawal for spring 2020. For this reason, the EW grades were included in this analysis to ensure consistency across terms in regards to withdraws and how they are calculated within the success rate. A full analysis of EW grades and their impact on success rates in spring 2020 is available [here](#).

## AB 705 Context

AB 705 (Irwin), Title 5, § 55003 and 55522 requires California Community Colleges' placement methods to be designed to maximize the probability that students will enter and complete transfer-level coursework in English and mathematics (or quantitative reasoning) within one year. Colleges are required to evaluate the following scenarios:

1. Students enroll in a pre-transfer level course with an educational goal of transfer;
2. 2. Students enroll in a pre-degree-level course with an educational goal of degree; or
3. 3. Students enroll in a pre-degree-level course with an educational goal of certificate that requires transfer level English or degree-applicable math; or

4. 4. Students with a transfer or degree goal enroll in a multi-term sequence in which they take either (1) a pre-transfer-level course in one term and a transfer-level course in a following term or (2) a transfer-level course stretched over two terms (e.g. stretch curriculum).

### **Summary of Findings**

- Students who started in MATH41 in fall 2019 and passed by summer 2020 resulted in a four-term throughput rate of 71%.
  - Non-MPS sections had a throughput rate of 76%
  - MPS sections of MATH41 had throughput rate of 65%
  - MATH41 + MATH231 (corequisite) had throughput rate of 64%
- Students with an educational goal of transfer who started in a pre-transfer level course in the pre-calculus pathway had throughput rates of:
  - 33% for MATH130;
  - 16% for MATH114;
  - 6% for MATH210; and
  - 15% for MATH212.
- Students with an educational goal of degree who started in a pre-transfer level course in the pre-calculus pathway had throughput rates of:
  - 22% for MATH130;
  - 9% for MATH114;
  - 0% for MATH210; and
  - 0% for MATH212.
- At this time, with the current sample sizes and the impacts of COVID-19 on instruction, MATH130, MATH114, MATH210 and MATH212 are not meeting the intended purpose under title 5, § 55003.d.3. However, the law permits colleges to pilot pre-transfer level curriculum for two years. Students in the pre-transfer level courses should be exhibiting throughput rates at or above those of students in the corequisite or standalone course.
- The Calculus and Pre-calculus sequence strongly over represents the Asian student population while substantially underrepresenting the Latinx, Filipinx and African American student populations. While enrollment in basic skills courses including MATH114, 130, 210 and 212 is low, and lower than in prior years, it is still over enrolled by our most underserved student populations.

**Table 1. Pre-Calculus Pathway Throughput Rates**

	Fall 2019			Winter 2020			Two-term Throughput Rate	Spring 2020			Three-term Throughput Rate	Summer 2020			Four-term Throughput Rate
	Fall 2019 Enrolled	Fall 2019 Passed	Fall 2019 Success Rate	Winter 2020 Enrolled	Winter 2020 Passed	Winter 2020 Success Rate		Spring 2020 Enrolled	Spring 2020 Passed	Spring 2020 Success Rate		Summer 2020 Enrolled	Summer 2020 Passed	Summer 2020 Success Rate	
<b>Transfer Level Completion</b>															
MATH41 Overall	424	268	63%	37	20	54%	68%	26	13	50%	71%	1	1	100%	71%
MATH41 + Standalone	254	172	68%	20	12	60%	72%	14	8	57%	76%	1	1	100%	76%
MATH41 + MPS	52	32	62%	7	2	29%	65%	1	0	0%	65%				65%
MATH41 + MATH231	118	64	54%	10	6	60%	59%	11	5	45%	64%				64%
MATH130	40	27	68%	16	10	63%	25%	3	3	100%	33%				33%
MATH114	131	75	57%	15	12	80%	9%	11	8	73%	15%	1	1	100%	16%
MATH210	34	18	53%				0%	2	2	100%	6%				6%
MATH212	34	18	53%	1	1	100%	3%	6	4	67%	15%				15%
<b>Degree Applicable or Transfer-Level Completion</b>															
MATH130	9	4	44%	3	2	67%	22%				22%				22%
MATH114	34	22	65%	1	1	100%	3%	2	2	100%	9%				9%
MATH210	7	2	29%								0%				0%
MATH212	8	4	50%								0%				0%

Note: Includes students with no prior math enrollment. Transfer level completion for MATH41 and MATH41 + 231 includes students with any educational goal as their course taking behavior indicates a transfer goal intention by enrolling in a transfer level course. Transfer level completion for the MATH41 includes students with any educational goal as their behavior indicates a transfer goal intention by enrolling in a transfer level course and tracked to completion of MATH41. Transfer level completion for MATH130, MATH114, MATH210 or MATH212 includes students with an educational goal of transfer tracked to completion of MATH1A, 1B, 1C, 1D, 1AH, 1BH, 1CH, 1DH, 2A, 2B, 2AH, 2BH, D041, 42, 43. Degree applicable completion includes students with a degree educational goal who completed a degree-applicable or transfer-level course in the pre-calculus pathway.

Table 1 displays the two, three and four-term throughput rates for the different pre-calculus pathways. Students who enrolled in a math class for the first time in fall 2019 are tracked to successful completion (A, B, C, P) of the transfer level or degree applicable (MATH114) course by winter and spring 2020.

- Students who started in MATH41 in fall 2019 and passed by summer 2020 resulted in a four-term throughput rate of 71%.

- MPS sections of MATH41 had throughput rate of 65% compared to 76% for non-MPS sections. Students who started in MATH41 + MATH231 (corequisite) and passed any MATH41 course by summer 2020 resulted in a four-term throughput rate of 64%.
- Students with an educational goal of transfer who started in fall 2019 and passed a transfer level math course in the pre-calculus pathway by summer 2020 resulted in a four-term throughput rate of:
  - 33% for MATH130;
  - 16% for MATH114;
  - 6% for MATH210; and
  - 15% for MATH212.
- Students with an educational goal of degree who started in fall 2019 and passed MATH114 by summer 2020 resulted in a four-term throughput rate of:
  - 22% for MATH130;
  - 9% for MATH114;
  - 0% for MATH210; and
  - 0% for MATH212.
- At this time, with the current sample sizes and the impacts of COVID-19 on instruction, MATH130, MATH114, MATH210 and MATH212 are not meeting the intended purpose under title 5, § 55003.d.3. However, the law permits colleges to pilot pre-transfer level curriculum for two years. Students in the pre-transfer level courses should be exhibiting throughput rates at or above those of students in the corequisite or standalone course.
  - The two-year timeframe can allow for larger sample sizes for comparison over time. If these rates are not met within two years, title 5 states: The Chancellor may order the district to relinquish the district method and adopt a method published by the Chancellor's Office under any of the following circumstances: the district's failure to demonstrate that the local method meets or exceeds the throughput rate of a method published by the Chancellor's Office.

**Table 2. Pre-Calculus Pathway Throughput Rates by High School GPA Band**

Cumulative High School GPA	Course Type	Fall 2019			Winter 2020			Two-term Throughput Rate	Spring 2020			Three-term Throughput Rate	Summer 2020			Four-term Throughput Rate
		Fall 2019 Enrolled	Fall 2019 Passed	Fall 2019 Success Rate	Winter 2020 Re-Enrolled	Winter 2020 Passed	Winter 2020 Success Rate		Spring 2020 Re-Enrolled	Spring 2020 Passed	Spring 2020 Success Rate		Summer 2020 Re-Enrolled	Summer 2020 Passed	Summer 2020 Success Rate	
<b>3.4 or above</b>	MATH41 Overall	139	106	76%	10	7	70%	81%	4	2	50%	83%	1	1	100%	83%
	MATH41 + Standalone	117	86	74%	10	7	70%	79%	4	2	50%	81%	1	1	100%	82%
	MATH41 + MPS	8	6	75%				75%				75%				75%
	MATH41 + MATH231	14	14	100%				100%				100%				100%
	MATH130	4	3	75%	2	1	50%	25%				25%				25%
	MATH114	18	14	78%	2	1	50%	6%	4	4	100%	28%				28%
	MATH210 MATH212															
<b>2.6 - 3.39</b>	MATH41 Overall	176	108	61%	13	10	77%	67%	13	7	54%	71%				71%
	MATH41 + Standalone	102	61	60%	8	5	63%	65%	8	5	63%	70%				70%
	MATH41 + MPS	22	15	68%	2	2	100%	77%	1	0	0%	77%				77%
	MATH41 + MATH231	52	32	62%	3	3	100%	67%	4	2	50%	71%				71%
	MATH130	21	15	71%	8	6		29%	2	0	0%	29%				29%
	MATH114	62	36	58%	10	8	80%	13%	2	1	50%	15%	1	1	100%	16%
	MATH210 MATH212															
<b>2.5 or Below</b>	MATH41 Overall	74	27	36%	10	7	70%	46%	7	3	43%	50%				50%
	MATH41 + Standalone	9	4	44%	1	0	0%	44%	2	1	0%	56%				56%
	MATH41 + MPS	18	7	39%	5	0	0%	39%				39%				39%
	MATH41 + MATH231	47	16	34%	7	3	43%	6%	5	2	0%	11%				11%
	MATH130	10	5	50%	4	1	25%	10%	1	1	0%	20%				20%
	MATH114	27	6	22%	2	2	100%	7%	3	1	33%	11%				11%
	MATH210 MATH212															
<b>No GPA</b>	MATH41 Overall	35	27	77%	1	0	0%	77%	2	1	50%	80%				80%
	MATH41 + Standalone	26	21	81%	1	0	0%	81%				81%				81%
	MATH41 + MPS	4	4	100%				100%				100%				100%
	MATH41 + MATH231	5	2	40%				40%	2	1	50%	60%				60%
	MATH130	5	4	80%	1	1	100%	20%				20%				20%
	MATH114	24	19	79%	1	1	100%	4%	2	2	100%	13%				13%
	MATH210 MATH212	34	18	53%				0%	2	2	100%	6%				6%

Note: Includes students with no prior math enrollment. Transfer level completion for MATH41 and MATH41 + 230x includes students with any educational goal as their course taking behavior indicates a transfer goal intention by enrolling in a transfer level course. Transfer level completion for the MATH41 includes students with any educational goal as their behavior indicates a transfer goal intention by enrolling in a transfer level course and tracked to completion of MATH41. Transfer level completion for MATH130, MATH114, MATH210 or MATH212 includes students with an educational goal of transfer tracked to completion of MATH1A, 1B, 1C, 1D, 1AH, 1BH, 1CH, 1DH, 2A, 2B, 2AH, 2BH, D041, 42, 43. Degree applicable completion includes students with a degree educational goal who completed MATH114. High school GPA data was not available for 10% students in MATH41 standalone, 8% of students in MATH41 MPS, 4% for students in MATH42 + 231x, 13% of students in MATH130, 18% of students in MATH210 and 100% of students in MATH212. GPA is obtained from official transcripts first, then supplemented by self-reported if available.

Table 2 above displays the two, three and four-term throughput rates for the different pre-calculus pathways by high school GPA band. Students who enrolled in a math class for the first time in fall 2019 are tracked to successful completion (A, B, C, P) of the transfer level or degree applicable course by winter, spring and summer 2020.

**Table 3. Pre-Calculus Pathway Success Rates by Course Type and Term**

Fall 2019	Success		Non Success		Withdraw		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
MATH1A	527	70%	141	19%	90	12%	758	100%
MATH1B	231	63%	58	16%	80	22%	369	100%
MATH1C	200	79%	22	9%	31	12%	253	100%
MATH1D	168	76%	22	10%	32	14%	222	100%
MATH41 Non-MPS	294	57%	122	24%	101	20%	517	100%
MATH41 MPS	65	67%	26	27%	6	6%	97	100%
MATH41 + MATH231	71	61%	35	30%	10	9%	116	100%
MATH42	180	74%	41	17%	23	9%	244	100%
MATH42 + Corequisite	18	62%	6	21%	5	17%	29	100%
MATH43	171	64%	59	22%	37	14%	267	100%
MATH43 + Corequisite	27	75%	8	22%	1	3%	36	100%
MATH114 Non-MPS	141	54%	61	23%	61	23%	263	100%
MATH114 MPS	21	68%	6	19%	4	13%	31	100%
MATH130	38	64%	18	31%	3	5%	59	100%
MATH210	32	53%	20	33%	8	13%	60	100%
MATH212	41	47%	35	40%	12	14%	88	100%

Winter 2020	Success		Non Success		Withdraw		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
MATH1A	541	77%	58	8%	102	15%	701	100%
MATH1B	467	79%	36	6%	85	14%	588	100%
MATH1C	186	76%	20	8%	40	16%	246	100%
MATH1D	210	86%	8	3%	26	11%	244	100%
MATH41 Non-MPS	222	63%	70	20%	63	18%	355	100%
MATH41 MPS	50	76%	11	17%	5	8%	66	100%
MATH41 + MATH231	11	44%	4	16%	10	40%	25	100%
MATH42 Non-MPS	254	78%	34	10%	37	11%	325	100%
MATH42 MPS	53	93%	1	2%	3	5%	57	100%
MATH42 + Corequisite	19	76%	5	20%	1	4%	25	100%
MATH43	156	69%	27	12%	43	19%	226	100%
MATH114 Non-MPS	170	70%	20	8%	52	21%	242	100%
MATH114 MPS	12	63%	1	5%	6	32%	19	100%
MATH210	17	74%	6	26%			23	100%
MATH212	37	67%	5	9%	13	24%	55	100%

Spring 2020	Success		Non Success		Withdraw		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
MATH1A	376	90%	18	4%	23	6%	417	100%
MATH1B	468	86%	20	4%	55	10%	543	100%
MATH1C	326	84%	20	5%	41	11%	387	100%
MATH1D	150	90%	6	4%	11	7%	167	100%
MATH41 Non-MPS	219	67%	42	13%	65	20%	326	100%
MATH41 MPS	27	90%	1	3%	2	7%	30	100%
MATH42 Non-MPS	177	74%	28	12%	33	14%	238	100%
MATH42 MPS	44	77%	6	11%	7	12%	57	100%
MATH43 Non-MPS	204	79%	21	8%	32	12%	257	100%
MATH43 MPS	63	88%	1	1%	8	11%	72	100%
MATH114	179	72%	34	14%	37	15%	250	100%
MATH130	9	64%	3	21%	2	14%	14	100%
MATH210	20	74%	5	19%	2	7%	27	100%
MATH212	32	70%	10	22%	4	9%	46	100%

Table 3 above displays success rates for fall 2019, winter 2020 and spring 2020 for courses in the pre-calculus sequence. For a comparison of enrollment and success rates in transfer level math between 2015-16 and 2019-20 see [here](#).

**Table 4. Pre-Calculus Pathway Enrollment by Race/Ethnicity**

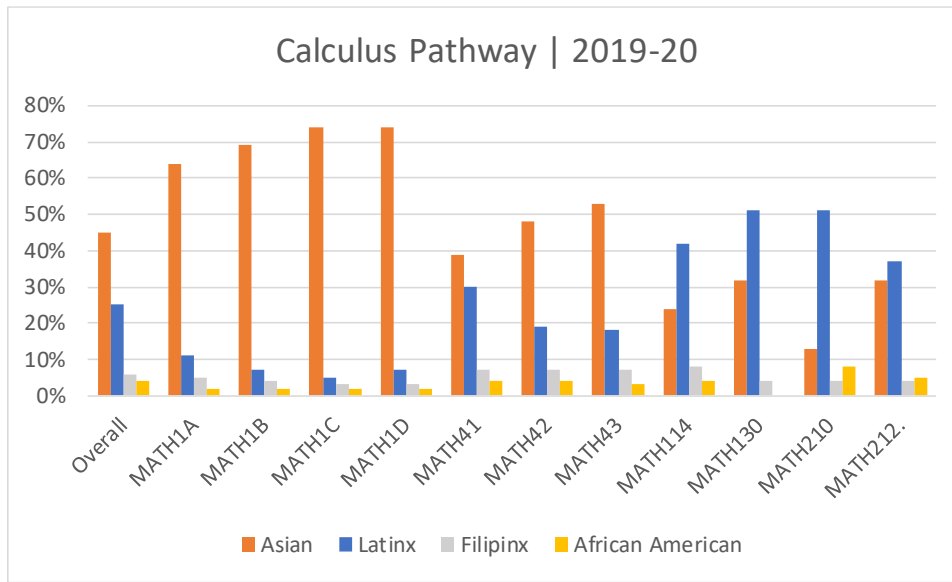
	Overall Population		MATH1A		MATH1B		MATH1C		MATH1D		MATH41		MATH42		MATH43		MATH114		MATH130		MATH210		MATH212					
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent				
<b>Fall 2019</b>																												
African American	712	4%	19	3%	13	4%	3	1%	4	2%	26	4%	9	3%	6	2%	7	2%			5	8%	5	6%				
Asian	7,746	44%	498	66%	257	70%	185	73%	167	75%	307	42%	140	51%	177	58%	78	27%	19	32%	7	12%	33	38%				
Filipinx	1,257	6%	33	4%	17	5%	6	2%	8	4%	52	7%	15	5%	22	7%	22	7%	3	5%	2	3%	4	5%				
Latinx	5,174	27%	78	10%	26	7%	18	7%	19	9%	208	28%	53	19%	44	15%	126	43%	31	53%	31	52%	32	36%				
Native American	59	0%	1	0%	1	0%					1	0%			1	0%	1	0%	1	2%								
Pacific Islander	156	1%	1	0%							3	0%			4	1%	3	1%			3	5%	1	1%				
White	3,387	16%	113	15%	46	12%	38	15%	21	9%	124	17%	46	17%	48	16%	50	17%	5	8%	12	20%	12	14%				
Decline to State	396	2%	15	2%	9	2%	3	1%	3	1%	9	1%	10	4%	1	0%	7	2%					1	1%				
<b>Total</b>	<b>18,887</b>	<b>100%</b>	<b>758</b>	<b>100%</b>	<b>369</b>	<b>100%</b>	<b>253</b>	<b>100%</b>	<b>222</b>	<b>100%</b>	<b>730</b>	<b>100%</b>	<b>273</b>	<b>100%</b>	<b>303</b>	<b>100%</b>	<b>294</b>	<b>100%</b>	<b>59</b>	<b>100%</b>	<b>60</b>	<b>100%</b>	<b>88</b>	<b>100%</b>				
<b>Winter 2020</b>																												
African American	620	4%	9	1%	10	2%	5	2%	6	2%	18	4%	14	3%	5	2%	10	4%			1	4%	2	4%				
Asian	7,316	45%	442	63%	416	71%	184	75%	179	73%	161	36%	201	49%	117	52%	60	23%			3	13%	14	25%				
Filipinx	1,130	6%	32	5%	22	4%	12	5%	5	2%	38	9%	31	8%	18	8%	19	7%			2	9%	1	2%				
Latinx	4,421	25%	79	11%	37	6%	14	6%	15	6%	141	32%	75	18%	42	19%	112	43%			11	48%	22	40%				
Native American	53	0%	2	0%	2	0%					2	0%			1	0%					1	4%						
Pacific Islander	127	1%	2	0%	2	0%					4	1%	1	0%	2	1%	3	1%			1	4%						
White	3,200	16%	95	14%	85	14%	27	11%	36	15%	70	16%	64	16%	34	15%	50	19%			4	17%	16	29%				
Decline to State	483	3%	40	6%	14	2%	4	2%	3	1%	12	3%	21	5%	7	3%	7	3%							23	100%	55	100%
<b>Total</b>	<b>17,350</b>	<b>100%</b>	<b>701</b>	<b>100%</b>	<b>588</b>	<b>100%</b>	<b>246</b>	<b>100%</b>	<b>244</b>	<b>100%</b>	<b>446</b>	<b>100%</b>	<b>407</b>	<b>100%</b>	<b>226</b>	<b>100%</b>	<b>261</b>	<b>100%</b>			<b>23</b>	<b>100%</b>	<b>55</b>	<b>100%</b>				
<b>Spring 2020</b>																												
African American	595	4%	6	1%	11	2%	7	2%	4	2%	10	3%	12	4%	13	4%	15	6%			3	11%	3	7%				
Asian	7,059	45%	258	62%	359	66%	288	74%	121	72%	130	37%	130	44%	158	48%	53	21%	4	29%	4	15%	13	28%				
Filipinx	1,052	6%	25	6%	23	4%	12	3%	8	5%	19	5%	21	7%	22	7%	26	10%					2	4%				
Latinx	4,170	24%	45	11%	38	7%	13	3%	10	6%	116	33%	62	21%	70	21%	98	39%	6	43%	14	52%	15	33%				
Native American	65	0%	1	0%	1	0%	1	0%			1	0%			2	1%					1	4%						
Pacific Islander	122	1%	1	0%	1	0%					2	1%	3	1%			1	0%					1	2%				
White	2,867	16%	53	13%	80	15%	53	14%	21	13%	67	19%	50	17%	48	15%	52	21%	2	14%	4	15%	8	17%				
Decline to State	688	4%	29	7%	31	6%	12	3%	3	2%	11	3%	17	6%	18	5%	3	1%	2	14%	1	4%	4	9%				
<b>Total</b>	<b>16,618</b>	<b>100%</b>	<b>417</b>	<b>100%</b>	<b>543</b>	<b>100%</b>	<b>387</b>	<b>100%</b>	<b>167</b>	<b>100%</b>	<b>356</b>	<b>100%</b>	<b>295</b>	<b>100%</b>	<b>329</b>	<b>100%</b>	<b>250</b>	<b>100%</b>	<b>14</b>	<b>100%</b>	<b>27</b>	<b>100%</b>	<b>46</b>	<b>100%</b>				

Legend: Salmon color represents underrepresentation of the group based on their enrollment in the course compared to the overall enrollment on campus in the same term. Blue indicates an overrepresentation in enrollment.

Table 4 displays the total percent of each racial/ethnic group in each term followed by their proportion of enrollment in each Math course in the calculus pathway. The data is displayed graphically below in Graph 1.



**Chart 1. Calculus Pathway Enrollment by Race/Ethnicity – 2019-20**



As displayed above in Table 4 and Chart 1, Asian student enrollment in the calculus sequence is highest in the Calculus 1A-1D series, which is where Latinx, Filipinx and African American students have the lowest rates of enrollment. Asian enrollment is the lowest in pre-transfer level courses including MATH130 and MATH210, which is where Latinx and African American students have the highest enrollment. The Calculus sequence strongly over represents the Asian student population while substantially underrepresenting the Latinx, Filipinx and African American student populations. While enrollment in basic skills courses including MATH114, 130, 210 and 212 is low, and lower than in prior years, it is still over enrolled by our most underserved student populations which impacts their ability to complete a transfer level course when factoring attrition through a sequence.