

## Short-Term Success in Math Pathways in the Florida College System

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This report examines first-year student success across different math pathways in the Florida College System. Using a cohort of first time in college students who initially enrolled in fall 2015. We examined course enrollment and passing rates across the four courses that satisfy the minimum math requirement for the AA degree in Florida. These courses are college algebra (MAC 1105), liberal arts math 1 (MGF 1106), liberal arts math 2 (MGF1107), and introductory statistics (STA 2023). The choice of math pathway is largely dependent on a student's intended major: MAC 1105 is the math course needed for STEM majors, while the others provide different training to meet the math requirements for non-STEM majors. Because of relatively low enrollment in the MGF 1106 and MGF 1107 courses, our analyses models these courses as one pathway. Further, in order to capture the enrollment patterns of students of students who did not enroll in any gateway math course their first, year we also model a "no gateway" pathway. The no gateway pathway accounts for students who did not enroll in any of the four gateway courses. In addition to overall course enrolment and passing rates across the math pathways, we also explore the composition of each pathway in terms of high school math course exposure and prior enrollment in pre-requisite math courses. Six research questions guide this report:

1. How do students distribute themselves among math pathways in the first year?
2. What are the characteristics of students who select each pathway?
3. How do enrollment rates in each gateway pathway differ by high school math course exposure?
4. How do course passing rates in each gateway pathway differ by high school math course exposure?
5. What percent of students in each pathway had previously taken intermediate algebra (MAT 1033) as a specific pre-requisite?
  - a. How do pathways vary by student race/ethnicity?
6. How do course passing rates in each gateway pathway differ based on prior enrollment in intermediate algebra (MAT 1033)?
  - a. How do course passing rates in each gateway pathway vary by student race/ethnicity?

**Q1: How do students distribute themselves among math pathways in the first year?**

The first analysis examines how students distribute themselves among the math pathways in their first year. As shown in Figure 1, the largest percent of students in this cohort did not enroll in a gateway course in their first year (59%). This category represents students who did not enroll in any gateway math course in the first year. Of the students who were enrolled in a gateway math course, College Algebra served as the most popular course for students and Introductory Statistics had the fewest enrollments, accounting for only 5% of enrollment.

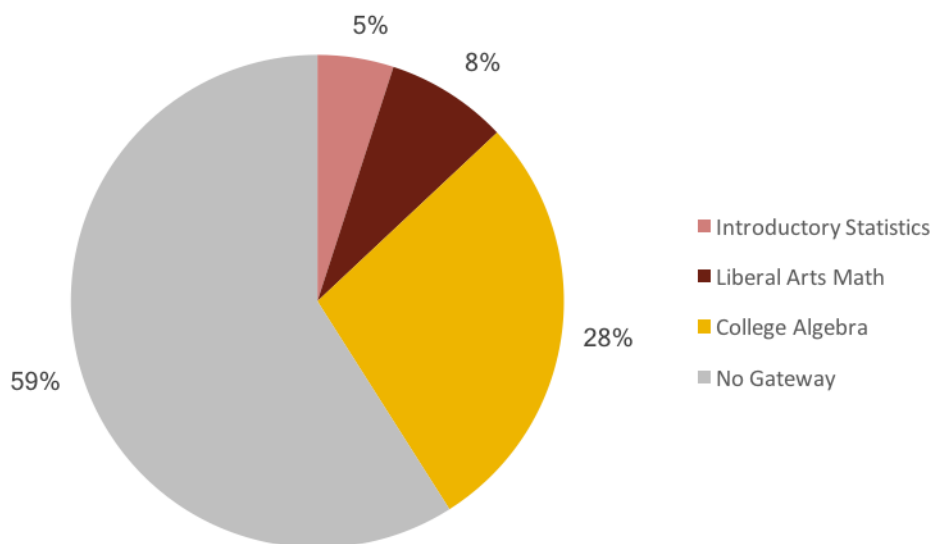


Figure 1. Percent of students enrolled in each math pathway in the first year

## Q2: What are the characteristics of students who select each pathway?

Figure 2 displays the characteristics of students who select each pathway. Female students are represented at a higher rate than males in the Liberal Arts Math pathway, as well as the Introductory Statistics pathway and no gateway pathway to a lesser extent. FRL eligible students are most highly concentrated in the Liberal Arts Math pathway, followed by the no gateway pathway. White students are the most represented race in all pathways, except the Liberal Arts Math pathway which has 40% Hispanic students selecting that pathway. Black students select the no gateway pathway more often than all gateway pathways for math courses.

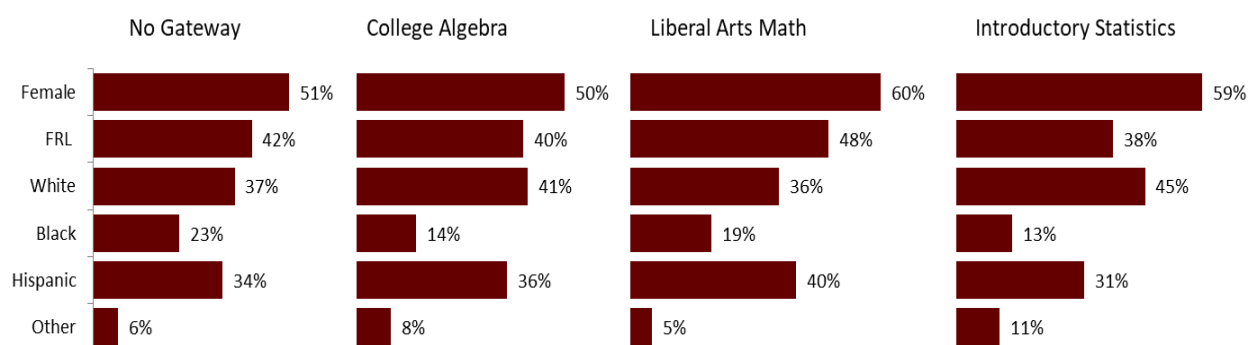


Figure 2. Student characteristics in each pathway

**Q3: How do enrollment rates in each gateway pathway differ by high school math course exposure?**

Pathway enrollment differences based on high school math course exposure is represented in Figure 3. The Below Algebra 2 course represents students who were enrolled in remedial, Algebra 1 or Geometry in 12<sup>th</sup> grade. The Elective course represents students enrolled in applied math, consumer math, explorations in math, business math, or special topics. As shown in Figure 3, the Elective course had the highest percentage of students in the no gateway pathway with 87%, followed by Below Algebra 2 with 76%. The high school course with the highest enrollment in any gateway math pathway was Pre-calculus (63%), followed closely by Calculus (62%) and Statistics (61%). The highest percentage of students enrolled in the College Algebra pathway followed a similar pattern with Pre-Calculus enrolling 48%, followed by Statistics (45%) and Calculus (44%). Students who were enrolled in Dual enrollment in 12<sup>th</sup> grade had the highest percentage of students in non-STEM gateway math pathways, with 27% total participating in the Liberal Arts Math and Introductory Statistics pathways. Of the gateway math pathways, only two high school courses, Dual and Elective, saw smaller percentages of students enrolling in College Algebra.

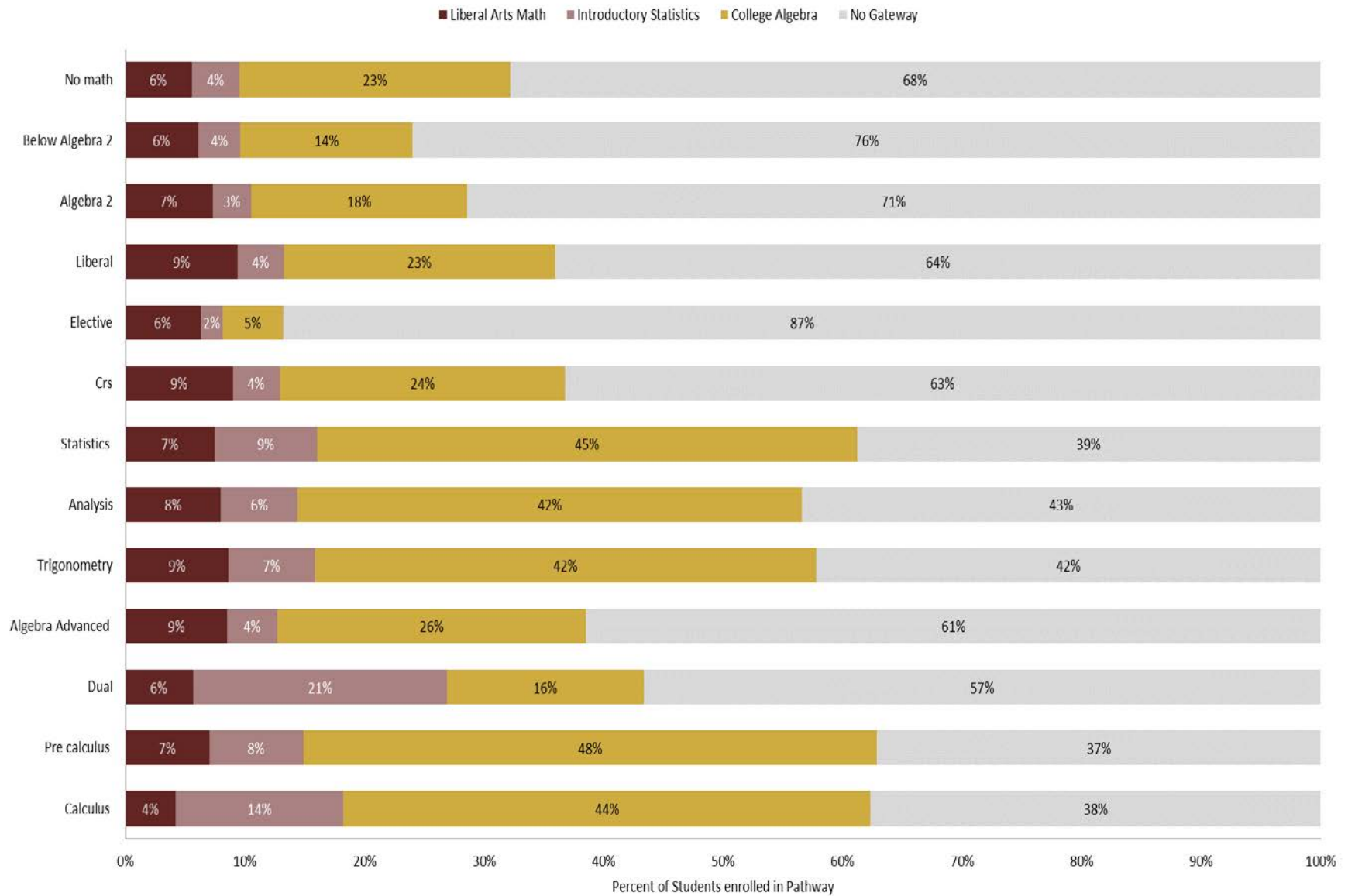


Figure 3. Percent of students enrolled in each pathway for 12<sup>th</sup> grade high school math course

#### Q4: How do course passing rates in each gateway pathway differ by grade 12 coursetaking?

Figure 4 represents the course passing rates in each gateway pathway by 12<sup>th</sup> grade math courses. For the College Algebra pathway, the highest passing rate of 88% included students who were enrolled in the Elective course in 12<sup>th</sup> grade. The lowest passing rate, 50%, for College Algebra is from students who were enrolled in Algebra 2 in 12<sup>th</sup> grade. Analysis and Calculus were the two high school courses with the highest passing rates in the Liberal Arts Math pathway with 79% for both. The lowest pass rate in the Liberal Arts Math pathway is 48% representing students enrolled in courses below Algebra 2 in 12<sup>th</sup> grade. In the Introductory Statistics pathway, the highest pass rate is 82% from students enrolled in Calculus in 12<sup>th</sup> grade. The lowest passing rate in Introductory Statistics, and among all the pathways, is 33% for students who took the Elective course in 12<sup>th</sup> grade.

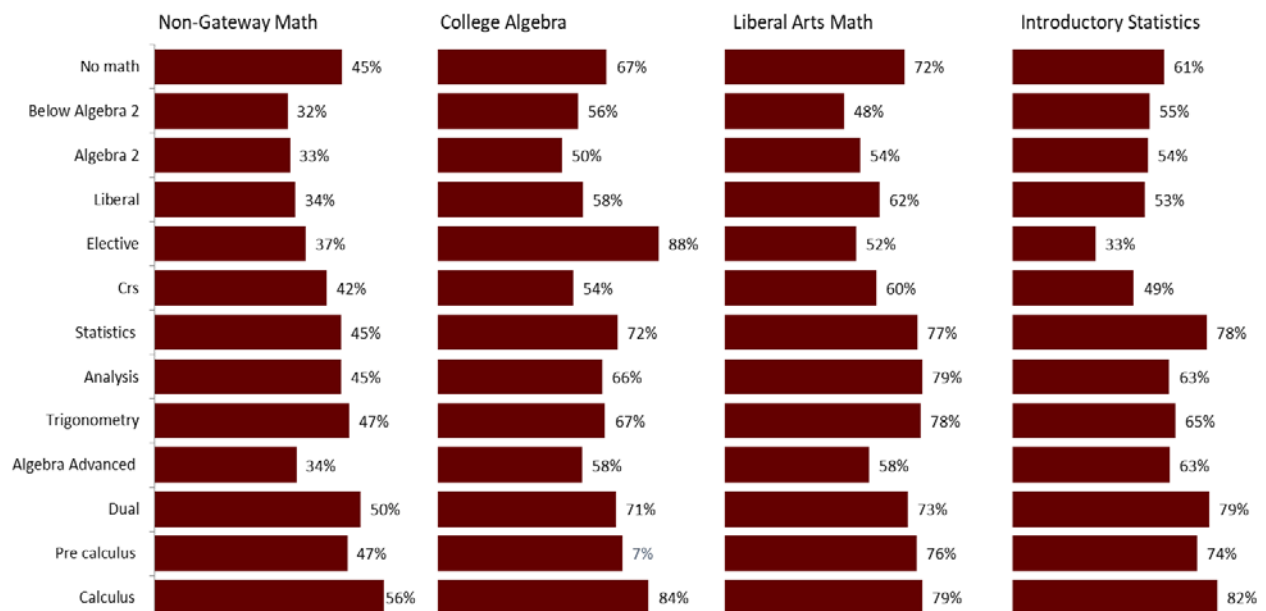


Figure 4. Passing rates of students in each math pathway for 12<sup>th</sup> grade high school math course

**Q5: What percent of students in each pathway had previously taken MAT 1033?**

Another interest in the gateway math pathways is how many of the students enrolled had prior enrollment in MAT 1033. Figure 5 represents the percent of students in each gateway math pathway that took MAT 1033 prior to the gateway math course. The College Algebra pathway had the highest percentage of students with prior MAT 1033 enrollment (66%). Both the Liberal Arts Math and Introductory Statistics pathways had the same enrollment in MAT 1033 (19%).

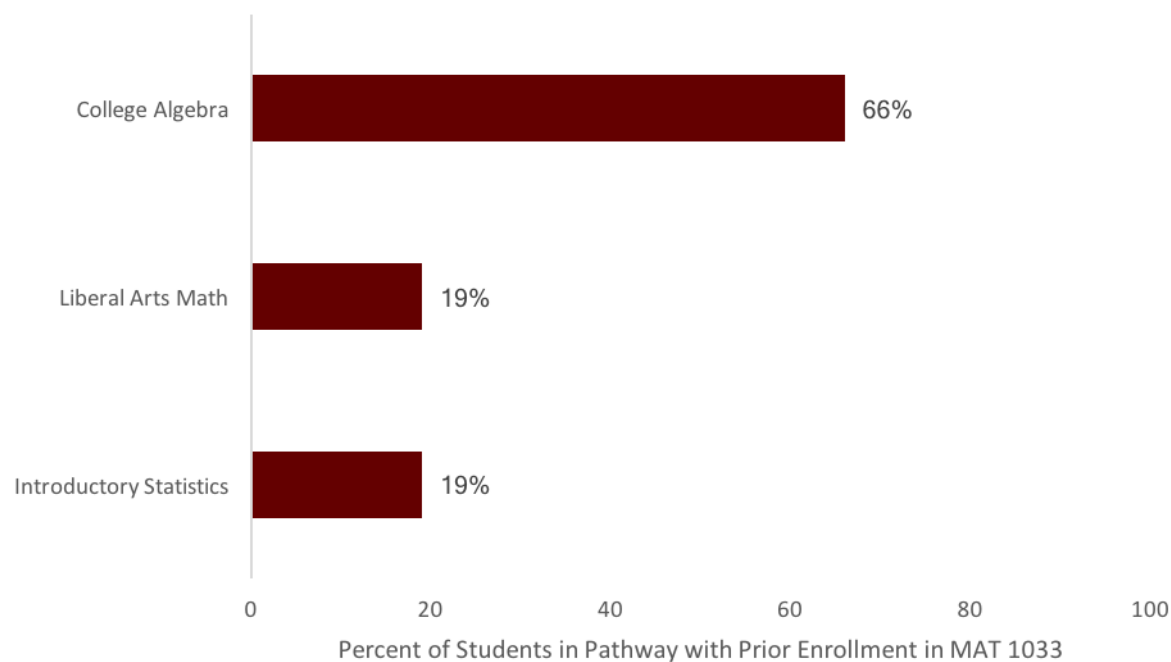


Figure 5. Percent of students in the gateway math pathways with prior enrollment in MAT 1033

### Q5a: How do pathways vary by student race/ethnicity?

After examining the percent of students in each pathway that had previously taken MAT 1033, we examined these pathways by students' race. Figure 6 displays the characteristics of students across each pathway with prior enrollment in MAT 1033. As shown, there are very similar percentages across the pathways, particularly College Algebra and Liberal Arts Math. The Introductory Statistics pathway did have a few differences, particularly there were fewer Hispanic students in that pathway (31%) and more students of other races (12%) compared to the College Algebra and Liberal Arts Math pathways.

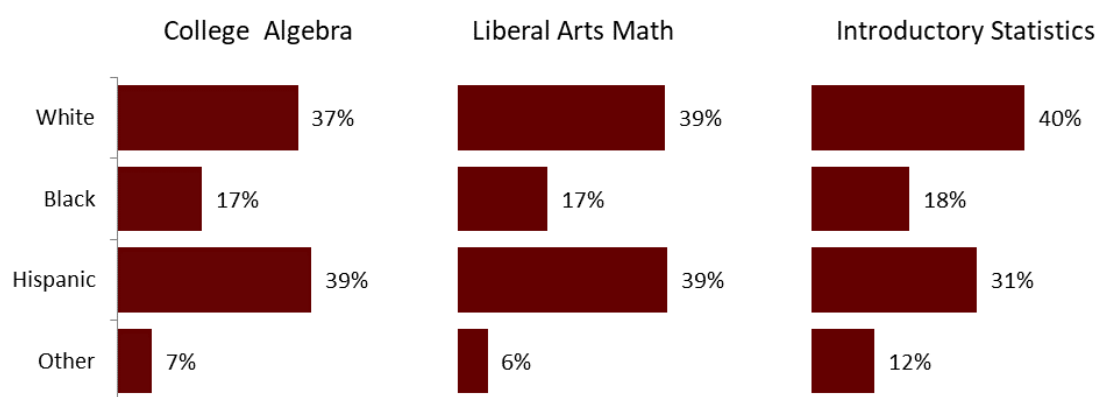


Figure 5a. Student characteristics in each pathway for students with prior enrollment in MAT 1033



**Q6: How do course passing rates in each gateway pathway differ based on prior enrollment in MAT 1033?**

Figure 7 displays the passing rates in each gateway based on prior enrollment in MAT 1033. As shown in the figure, prior MAT 1033 enrollment has a higher passing rate in the Liberal Arts Math pathway only with 69%, compared to no MAT 1033 enrollment with 65%. In the College Algebra and Introductory Statistics pathways, no MAT 1033 enrollment had higher passing rates, 72% and 67% respectively, and prior MAT 1033 enrollment had a 60% passing rate in the College Algebra pathway and 55% passing rate in the Introductory Statistics pathway.

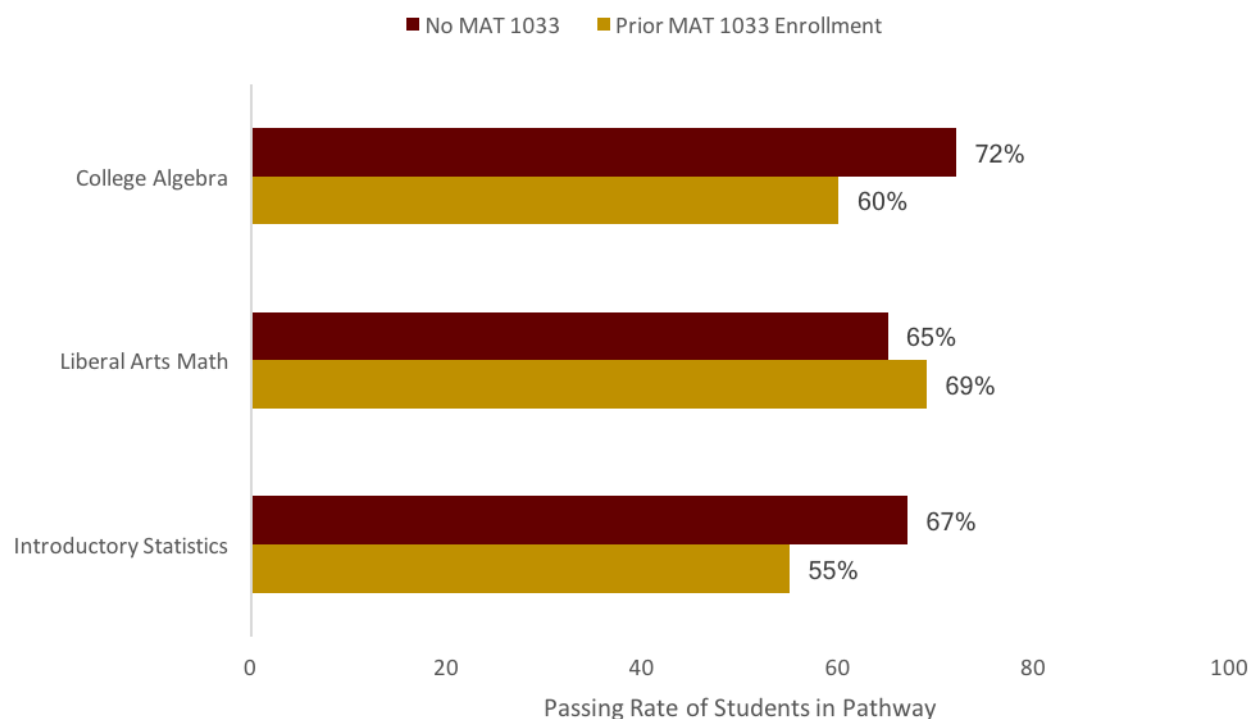


Figure 6. Passing rates of students in each gateway pathway based on prior enrollment in MAT 1033

**Q6a: How do course passing rates in each gateway pathway vary by student race/ethnicity?**

Figure 8 displays the passing rates of students in each gateway pathway based on prior enrollment in MAT 1033 and race. As shown, there are similarities to the findings in Figure 7 across the gateway pathways. There was one shift in the higher passing rates between students with no MAT 1033 and those with prior enrollment, students of other races in the Liberal Arts Math pathway. These students with no MAT 1033 had higher passing rates (65%) than those with prior enrollment (51%).

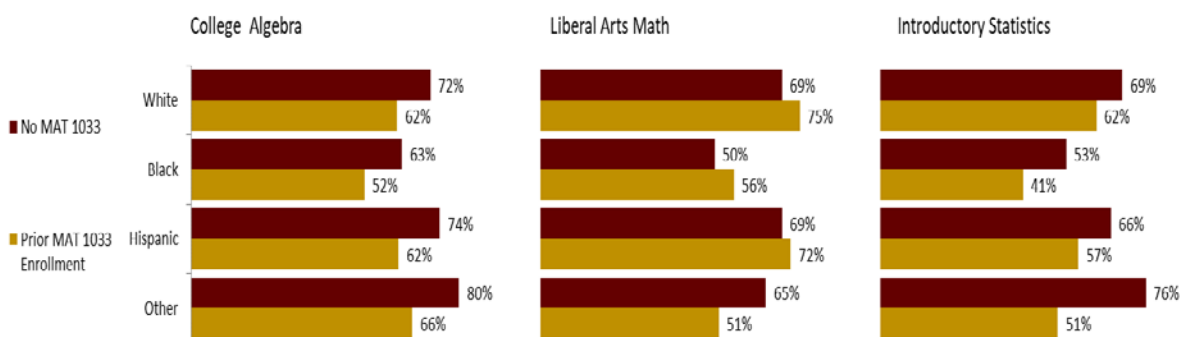


Figure 6a. Passing rates of students in each gateway pathway based on prior enrollment in MAT 1033 and race