Course-Level Assessment Project
Final Report

To complete the Final Report, type your responses to the prompts below. Share a copy of the document with your supervisor and the Associate Provost of Assessment and Institutional Research.

Faculty Name(s): Mary Virostek and Kristin Hadden
Division/Department: Mathematics and Engineering
Course Assessed: MAT 091 Prealgebra

Step 1. Define
Explain the purpose or rationale for assessing the selected course.
The purpose for assessing MAT 091 Prealgebra was to see if lowering the placement score in ALEKS to qualify for the course was in the best interest of the students and to find ways to improve the concepts and assignments of the course as we move from requiring just Prealgebra knowledge for majors that are not STEM (Science, Technology, Engineering, and Mathematics) pathways.

Identify which course objective(s) were assessed. Briefly explain why you selected these course objectives for assessment.
Data was collected based on students' ALEKS scores. Course completion of homework assignments in Hawkes Learning System, the online platform used for transitional math courses here at Carroll Community College, was also collected.

Identify to which program goal(s) selected course objective(s) align.
Since MAT 091 is not a General Education course, it does not have any program goals.

Step 2. Design
Describe the instrument (project/assignment) used to assess identified course objective(s).
What benchmarks and/or controls were established?
Explain how the assessment instrument was externally reviewed and validated.

Since this course is not a general education course but a prerequisite, the traditional instruments of assessing course objectives were not used. Instead, we altered some key components of the course and obtained feedback from both professors and students. This included using a Test Wrapper to ask questions about the use of notecards on a test and to gather the information from each transitional section in the fall.

Step 3. Implement

Explain how the assessment was implemented.

Data was collected on students taking MAT 091 that did not meet the ALEKS score of 5 to take MAT 091. Once the spring semester was over, students that passed MAT 091 in the fall were identified, and information using the Lynx Portal was used to obtain how they did in their next course and data gathered from the professors from Canvas.

Did any unexpected challenges arise in implementing the assessment?

An unexpected challenge surrounding this course level assessment was the way the transitional program changed course in the fall. We went from having students proceed from MAT 091 Prealgebra to MAT 095 Foundations to College Mathematics Part 1 to a general education class like MATH 115 Introduction to Statistical Methods, MATH 121 Intro to College Math or MATH 118 College Algebra or MATH 111 Fundamentals of Geometry/Measure or to MAT 099 Foundations of College Mathematics Part 2 is they were on a STEM pathway. Starting in Fall 2024, some students can proceed to MATH 115 with MAT 015 (Foundations for Statistics, 0 credits) or to MATH 113 Finite Math (formerly MATH 121) without having to take an additional transitional course. We used the information we found doing this course level assessment to help us make appropriate changes to MAT 091 with the goal of assisting our students to be successful in their general education course.

Step 4. Analyze

Explain the data that was collected and how the data was analyzed.

Summarize the results of implementing changes, re-administering the assessment, and collecting and analyzing new data.

The information on the left is for Fall 2023 and the next box is for Spring 2024. Jenelle Cutitta provided me with this data on students that scored below a 5 in ALEKS but went on to take MAT 091. Removing their student ID and name, this is the table Jenelle Cutitta provided. Only one student withdrew within a week and only one other student stopped coming after the first test. Both were in Mary's MAT 091 MWF 11:00 class which was a large class. 10 out of the 11 students that did not withdraw in the first week passed MAT 091. The first data below is separated into four distinct classes. Upon further review, of the ten, four did not take a math class in the spring but have signed up for MAT 094 for Fall 2024. Three of the fall cohort took their next math class and passed, and three took the next math course and failed.

Eligibility Details	Grade
Meet with Marsha	A
2022/2/24 ALEKS 4	B
Meet with Marsha	F
2023/6/1 ALEKS 5	C
Meet with Marsha	W

Eligibility Details	Grade
Meet with Marsha	A
2021/11/16 ALEKS 4	A

Eligibility Details	Grade
Meet with Marsha	A
2023/4/24 ALEKS 4	C
2023/5/31 ALEKS 5	A

Eligibility Details	Grade
2022/8/25 ALEKS 4	C
2021/8/2 ALEKS 1	C

Eligibility Details	Grade
2023/8/17 ALEKS 0	F
2023/6/28 ALEKS 0	F
2023/11/1 ALEKS 2	F
2024/1/2 ALEKS 5	C

Eligibility Details	Grade
Meet with Marsha	B+
Meet with Marsha	A
Meet with Marsha	A

For Spring 2024, of the seven documented, three did not pass MAT 091. However, one of the students was in the MAT 091 in the Fall, failed the course but continued the whole semester and took the course again in the spring. This same student stopped attending in February of 2024 the second time through.

Taking this a step further, we investigated how much time homework was taking the average MAT 091 student and ways we could incorporate practice with success. The data that we obtained comes from the Hawkes Learning Software.

Also, according to the PowerBi dashboard, the overall MAT 091 pass rate for Fall 2022 was 60.76% and for Fall 2023 the pass rate was 80.95%! Spring increased from 58.9% in 2023 to 70.3% for 2024! Either the background of the student population changed, or our modifications are helping, or both.

The following charts shows the average number of attempts to Certify (the part that counts towards the homework grade) and the average time it took for the three parts of the homework, Learn, Practice, Certify, and overall time for students from both fall and spring for MAT 091. Section 4.5 was not a concept covered in MAT 091. The data is from the MAT 095 course. However, no other data in the snippets overlap with another transitional course. This data helps us to determine which sections need more explanation in class and/or adjustments in the homework assignment going forward.

			Average Time in Lesson (minutes)			
#	Lesson	Average Attempts	Learn	Practice	Certify	Overall
1	1.1 Introduction to Whole Numbers	1.31	6m 32s	11m 58s	17m 52s	36m 23s
2	1.2 Addition and Subtraction with Whole Numbers	1.09	3m 02s	6m 04s	9m 38s	18m 45s
3	1.3 Multiplication with Whole Numbers	1.1	3m 01s	7m 49s	11m 04s	21m 54s
4	1.4 Division with Whole Numbers	1.11	1m 19s	8m 55s	14m 11s	24m 25s
5	1.5 Rounding and Estimating with Whole Numbers	1.9	2m 29s	11m 59s	31m 56s	46m 25s
6	1.6 Problem Solving with Whole Numbers	1.15	1m 49s	9m 47s	15m 44s	27m 21s
7	1.7 Solving Equations with Whole Numbers (x + b = c and ax = c)	1.08	1m 56s	5m 02s	9m 18s	16m 16s
8	1.8 Exponents and Order of Operations	1.27	3m 34s	11m 08s	14m 02s	28m 44s
9	1.9 Tests for Divisibility	1.34	3m 07s	15m 59s	383m 01s	402m 07s
10	1.10 Prime Numbers and Prime Factorizations	1.34	5m 16s	17m 05s	23m 51s	46m 14s
11	Chapter 1 Review	1.17	0m 55s	20m 11s	37m 45s	58m 52s
12	2.1 Introduction to Integers	1.05	2m 10s	10m 59s	8m 05s	21m 15s
13	2.2 Addition with Integers	1.16	1m 13s	7m 59s	11m 32s	20m 46s
14	2.3 Subtraction with Integers	1.25	1m 34s	20m 43s	18m 59s	41m 16s
15	2.4 Multiplication, Division, and Order of Operations with Integers	1.14	2m 22s	10m 05s	19m 39s	32m 07s
16	2.5 Simplifying and Evaluating Expressions	1.67	4m 46s	25m 13s	33m 34s	63m 34s
17	2.6 Translating English Phrases and Algebraic Expressions	1.72	3m 54s	12m 52s	18m 44s	35m 31s
18	2.7 Solving Equations With Integers (ax + b = c)	1.08	2m 07s	8m 16s	10m 46s	21m 09s
19	Chapter 2 Review	1.15	0m 18s	18m 42s	21m 32s	40m 32s

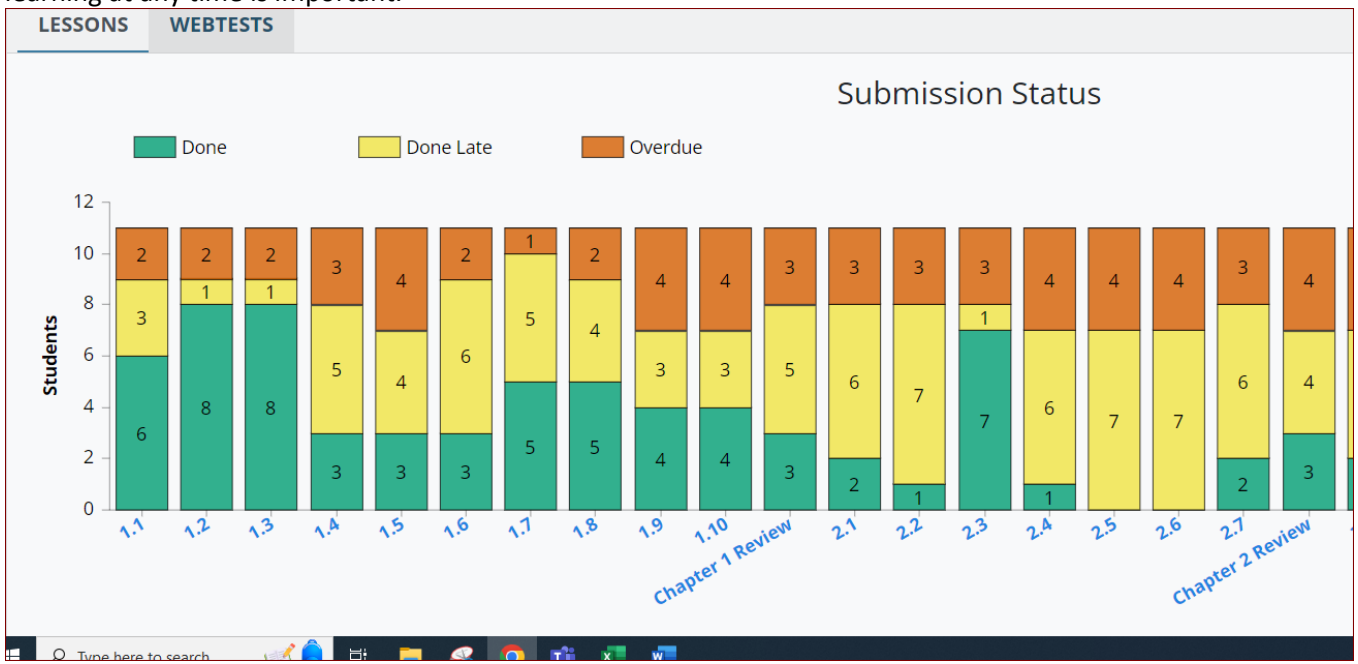
20	3.1 Introduction to Fractions and Mixed Numbers	1.2	3m 12s	6m 14s	10m 57s	20m 23s
21	3.2 Multiplication with Fractions	1.44	4m 15s	25m 26s	30m 31s	60m 13s
22	3.3 Division with Fractions	1.38	3m 44s	16m 13s	22m 04s	42m 00s
23	3.4 Multiplication and Division with Mixed Numbers	1.84	1m 18s	22m 20s	52m 30s	76m 08s
24	3.5 Least Common Multiple (LCM)	1.64	1m 59s	10m 37s	17m 30s	30m 07s
25	3.6 Addition and Subtraction with Fractions	1.01	3m 52s	9m 29s	12m 53s	26m 14s
26	3.7 Addition and Subtraction with Mixed Numbers	1.32	1m 14s	12m 35s	25m 42s	39m 31s
27	3.8 Comparisons and Order of Operations with Fractions	1.99	3m 31s	30m 35s	52m 36s	86m 43s
28	3.9 Solving Equations with Fractions	1.15	3m 21s	13m 41s	17m 58s	35m 00s
29	3.10 Ratios and Unit Rates	1.54	4m 10s	5m 53s	16m 19s	26m 22s
30	3.11 Proportions	1.12	0m 55s	4m 09s	8m 50s	13m 55s
31	3.12 Chapter 3 Part 1 Review	1.18	0m 35s	23m 28s	31m 07s	55m 11s
32	Chapter 3 Part II Review	1.2	4m 34s	19m 26s	33m 36s	57m 37s
33	4.1 Introduction to Decimal Numbers	1.68	4m 03s	13m 40s	21m 07s	38m 51s
34	4.2 Addition and Subtraction with Decimal Numbers	1.21	0m 43s	8m 07s	11m 51s	20m 41s
35	4.3 Multiplication and Division with Decimal Numbers	1.11	1m 31s	6m 06s	8m 19s	15m 57s
36	4.4 Estimating and Order of Operations with Decimal Numbers	1.92	1m 10s	10m 11s	19m 41s	31m 02s
37	4.5 Statistics: Mean, Median, Mode, and Range	1.26	11m 08s	10m 48s	24m 38s	46m 36s
38	4.6 Decimal Numbers and Fractions	1.13	2m 31s	10m 52s	15m 08s	28m 32s
39	4.7 Solving Equations with Decimal Numbers	0	0m 00s	0m 43s	0m 00s	0m 43s
40	Chapter 4 & 5 Review	1.27	0m 13s	6m 18s	14m 55s	21m 26s
41	5.1 Basics of Percent	1.44	0m 23s	13m 12s	22m 19s	35m 55s
42	5.2 Solving Percent Problems Using Proportions	1.15	1m 29s	5m 09s	10m 05s	16m 44s
43	5.3 Solving Percent Problems Using Equations	1.25	1m 00s	7m 44s	21m 11s	29m 56s

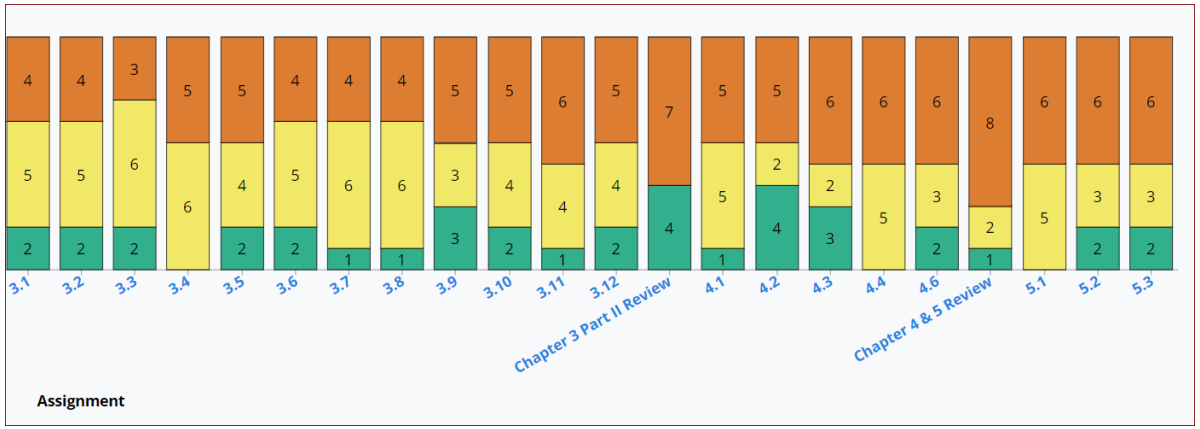
The following two tables give both the mean and the median of the data for just the part of the homework that is graded. We used this data to change some of the homework problems, modify the guided notes, and to create a different way to study for the unit test. Instead of having reviews in the Certify mode which considers mastery to be 80% of the material but will not let you continue if you do not meet this benchmark, we are creating electronic reviews using Hawkes Learning System WebTest feature. This feature allows students to skip problems, pause in completion without penalty, and calculates what percent of the problems they have correct without having to prove mastery. Students will be able to attempt the WebTest more than once and the highest grade will be averaged into their overall Hawkes grades.

Lesson Name	Time in Certify					Total Time			
	Students	Min	Max	Mean	Median	Min	Max	Mean	Median
1.1 Introduction to Whole Numbers	93	1m 22s	56m 56s	12m 33s	7m 50s	3m 29s	191m 17s	28m 02s	18m 57s
1.2 Addition and Subtraction with Whole Num	92	0m 00s	50m 54s	9m 17s	6m 39s	0m 09s	93m 46s	18m 40s	12m 04s
1.3 Multiplication with Whole Numbers	89	0m 22s	50m 50s	10m 49s	7m 40s	2m 34s	98m 32s	21m 25s	13m 51s
1.4 Division with Whole Numbers	87	2m 36s	75m 51s	13m 59s	10m 44s	3m 02s	116m 42s	24m 42s	18m 15s
1.5 Rounding and Estimating with Whole Numl	87	0m 00s	156m 54s	22m 52s	14m 13s	4m 19s	202m 51s	36m 49s	26m 18s
1.6 Problem Solving with Whole Numbers	88	0m 00s	97m 03s	15m 03s	11m 31s	0m 21s	158m 57s	26m 33s	17m 57s
1.7 Solving Equations with Whole Numbers (x	89	0m 00s	42m 07s	8m 46s	6m 16s	0m 44s	95m 12s	15m 42s	8m 53s
1.8 Exponents and Order of Operations	86	3m 59s	45m 29s	12m 39s	9m 40s	4m 39s	185m 13s	27m 32s	18m 21s
1.9 Tests for Divisibility	84	1m 08s	17032m 55s	218m 53s	12m 33s	1m 08s	17032m 55s	237m 23s	19m 37s
1.10 Prime Numbers and Prime Factorizations	84	0m 00s	97m 10s	21m 51s	15m 52s	2m 43s	325m 48s	42m 33s	24m 04s
Chapter 1 Review	84	0m 00s	205m 15s	33m 58s	26m 06s	0m 14s	354m 16s	56m 10s	37m 42s
2.1 Introduction to Integers	85	0m 00s	36m 01s	7m 54s	6m 01s	3m 20s	221m 45s	21m 31s	13m 15s
2.2 Addition with Integers	83	0m 00s	57m 07s	10m 52s	6m 45s	1m 31s	192m 51s	20m 31s	12m 47s
2.3 Subtraction with Integers	83	0m 00s	93m 09s	17m 50s	12m 57s	2m 03s	348m 35s	41m 12s	22m 42s
2.4 Multiplication, Division, and Order of Ope	83	0m 00s	80m 48s	18m 29s	13m 12s	1m 10s	266m 27s	31m 01s	17m 15s
2.5 Simplifying and Evaluating Expressions	86	0m 00s	162m 55s	26m 35s	16m 11s	0m 08s	303m 09s	52m 36s	23m 46s
2.6 Translating English Phrases and Algebraic	82	0m 00s	58m 08s	16m 07s	12m 48s	2m 50s	202m 55s	32m 05s	23m 05s
2.7 Solving Equations With Integers (ax + b = c	83	0m 00s	62m 46s	10m 28s	6m 37s	0m 18s	156m 23s	21m 14s	8m 26s
Chapter 2 Review	72	1m 23s	100m 31s	19m 22s	14m 05s	1m 23s	295m 29s	38m 41s	18m 16s
3.1 Introduction to Fractions and Mixed Numb	83	0m 00s	49m 22s	9m 35s	6m 42s	0m 25s	122m 34s	19m 48s	13m 07s
3.2 Multiplication with Fractions	82	0m 00s	120m 15s	26m 07s	20m 20s	0m 34s	509m 25s	56m 12s	39m 14s
3.3 Division with Fractions	81	0m 00s	73m 50s	19m 50s	12m 55s	3m 44s	379m 11s	40m 33s	24m 50s
3.4 Multiplication and Division with Mixed Nu	79	0m 00s	313m 05s	42m 43s	32m 39s	0m 52s	508m 47s	64m 03s	36m 53s
3.5 Least Common Multiple (LCM)	75	0m 00s	84m 28s	12m 16s	8m 23s	3m 44s	147m 57s	21m 27s	13m 42s
3.6 Addition and Subtraction with Fractions	78	0m 00s	55m 33s	12m 51s	9m 51s	1m 02s	182m 12s	26m 22s	17m 41s
3.7 Addition and Subtraction with Mixed Numl	76	0m 00s	135m 05s	23m 15s	15m 37s	0m 42s	181m 24s	36m 04s	23m 55s
3.8 Comparisons and Order of Operations witl	74	0m 00s	271m 04s	32m 21s	22m 35s	0m 46s	438m 47s	54m 33s	35m 01s
3.9 Solving Equations with Fractions	71	0m 56s	89m 18s	17m 41s	12m 31s	2m 53s	341m 04s	34m 52s	16m 58s
3.10 Ratios and Unit Rates	71	1m 52s	93m 45s	14m 05s	8m 56s	1m 52s	120m 15s	23m 27s	14m 39s
3.11 Proportions	72	0m 00s	42m 08s	8m 41s	6m 48s	1m 28s	53m 30s	13m 57s	9m 19s
3.12 Chapter 3 Part 1 Review	72	0m 00s	140m 16s	30m 34s	24m 43s	0m 08s	520m 22s	55m 18s	36m 40s
Chapter 3 Part II Review	63	0m 00s	128m 25s	30m 28s	22m 33s	0m 05s	445m 20s	55m 38s	25m 14s
4.1 Introduction to Decimal Numbers	74	0m 00s	71m 30s	17m 42s	12m 02s	4m 23s	183m 08s	32m 23s	18m 32s
4.2 Addition and Subtraction with Decimal Nu	71	1m 44s	61m 29s	10m 46s	6m 51s	1m 44s	106m 51s	17m 46s	9m 55s
4.3 Multiplication and Division with Decimal I	71	1m 25s	39m 26s	8m 09s	5m 09s	1m 58s	142m 23s	15m 53s	6m 27s

42	4.1 Introduction to Decimal Numbers	74	0m 00s	71m 30s	17m 42s	12m 02s	4m 23s	183m 08s	32m 23s	18m 32s	
43	4.2 Addition and Subtraction with Decimal Nu	71	1m 44s	61m 29s	10m 46s	6m 51s	1m 44s	106m 51s	17m 46s	9m 55s	
44	4.3 Multiplication and Division with Decimal I	71	1m 25s	39m 26s	8m 09s	5m 09s	1m 58s	142m 23s	15m 53s	6m 27s	
45	4.4 Estimating and Order of Operations with D	70	0m 00s	62m 11s	15m 19s	12m 00s	2m 09s	127m 16s	25m 31s	13m 49s	
46	~~4.5 Statistics: Mean, Median, Mode, and Range~~	~~161~~	~~0m 00s~~	~~175m 47s~~	~~22m 29s~~	~~15m 29s~~	~~0m 03s~~	~~1027m 35s~~	~~44m 37s~~	~~20m 52s~~	
47	4.6 Decimal Numbers and Fractions	72	0m 00s	67m 04s	14m 34s	9m 52s	0m 47s	261m 01s	28m 31s	15m 36s	
48	4.7 Solving Equations with Decimal Numbers	1	0m 00s	0m 00s	0m 00s	0m 00s	0m 43s	0m 43s	0m 43s	0m 43s	
49	Chapter 4 & 5 Review	57	3m 44s	85m 39s	13m 47s	10m 41s	4m 21s	162m 28s	20m 44s	13m 32s	
50	5.1 Basics of Percent	70	0m 00s	86m 46s	20m 24s	16m 18s	3m 53s	200m 06s	33m 27s	18m 55s	
51	5.2 Solving Percent Problems Using Proportior	68	0m 00s	46m 00s	8m 31s	5m 34s	0m 06s	80m 17s	15m 01s	6m 45s	
52	5.3 Solving Percent Problems Using Equations	69	0m 00s	152m 04s	16m 55s	9m 32s	0m 04s	191m 34s	25m 17s	11m 57s	

Going deeper into the data, we noticed that students are completing their homework but not necessarily by the time they take a Unit Test. By requiring the WebTest to be completed before the day of the test, we are hoping that more students are prepared to take the unit test on test day though learning at any time is important.





Step 5. Modify/Maintain

Based on analysis of data, describe changes made to the course and/or course materials.

As mentioned above, we used this data to change some of the homework problems, modify the guided notes, and to create a different way to study for the unit test. Instead of having reviews in the Certify mode which considers mastery to be 80% of the material but will not let you continue if you do not meet this benchmark, we are creating electronic reviews using Hawkes Learning System WebTest feature. This feature allows students to skip problems, pause in completion without penalty, and calculates what percent of the problems they have correct without having to prove mastery. Students will be able to attempt the WebTest more than once and the highest grade will be averaged into their overall Hawkes grades.

As for using notecards on tests, those students that used them did well on the tests. Some students did well on the tests and did not use the notecard. However, all those that scored less than 70% on any one of the tests in the fall did not use a notecard. Helping students fill out a notecard on the review day will be incorporated into the study skills for this class.

Final Results and Recommendations

We and our fellow colleagues are making many changes to transitional and general education courses. The data shows that some students can be successful in MAT 091 even without meeting the minimal score in ALEKS. Those that score below a 5 in ALEKS will be asked to sign up for tutoring at the start of the semester though this could help all students that begin their college career at this level of mathematic understanding. Students should start where they will be most successful so they will continue with their studies. We recommend revisiting how MAT 091 students do in their next course two years from now when the new math pathways to their intended degree are solidified.

Supervisor Signature __Brianna L. McGinnis_____ Date __06/03/24_____

Please forward a copy of the signed report to the Associate Provost of Assessment and Institutional Research.