

Project	Performance Measure	Baseline/Target			Actual Performance Data		
		Raw	Ratio	%	Raw	Ratio	%
Task 2. Math Enhancement-Developmental Impact	Acquire Flash drives for Math 911 dissemination			100	900		100%
	Collaborate to disseminate Math 911 during Intake				200	200:200	100%
	Improve the performance of Graduation Math students initially placed in 08				147	147:151	97%
	Improve the performance of Graduation Math students at 092 placement level (C or better)	503 (092)	503:1369 (092)	36.7% (092)	68	68:90	76%
	Improve the level of Math Anxiety as measured by successful completion of a College level Math Course with a C or better	762 (100/101 /103)	762:1533 (100/101 /103)	49.7% (100/ 101/103)	151	109:151	72%
	Increase the placement for Math 092 (graduation impact) measured by students who passed College level math without fulfilling the Math 092 pre-requisite			NA	73	73:90	81%
	Efficacy of waiving Math 092 for the highly motivated Graduation Math cohort in Math 101 and Math 103; evaluated waived students taught by full time faculty with C or better			NA	55	55:66	83%
Graduation Math	Identify students who need Math to graduate— focus on students with 50+ credits				151	151:151	100%
	Select students with high degree of Math anxiety - defined as Repeaters and Avoiders				141	141:151	93.4%
	Accelerate graduation rate of students for students at MTH 092 placement by waiving MTH 092; measured by students who actually graduated				90	73/90	81.1%
	Graduate math avoiders and repeaters; thereby improving total number of graduates by increasing the number of students eligible by satisfying their Math requirement			ineligible	10%	151	120:151

Acquire Flash drives for Math 911 dissemination

- 900 Flash drives were purchased from CF Gear with the Math 911 software and PBI Grant prominently displayed on the case with the Essex Logo for dissemination to the appropriate students

Collaborate to disseminate Math 911 during Intake

- 200 Math 911 flash drives were disseminated during intake and advisement by Retention and Academic Advisement. All academic advisors were trained on the PBI grant program and were required to use the MTH 911 software at least once to enhance their understanding of the student experience with this software.

Improve the performance of Graduation Math students initially placed in 08

- **The majority (or 97%) of the 151 students who took a Graduation Math course during 2014-2015 period placed in the 08 level during initial placement**
 - 91 took 08-Level Math once
 - 27 took 08-level Math twice
 - 14 took 08-level Math three times
 - 6 took 08-level Math four times
 - 3 took 08-level Math five times or more

Improve the performance of Graduation Math students at 092 placement level

- Of the 90 students who took 101 or 103 without MTH 092, 68 (or 76%) received a C or better. This means that 68 students fulfilled their math requirements for graduation at least one semester in advance of their trajectory prior to the graduation math class.

Improve the level of Math Anxiety as measured by successful completion of a College level Math Course with a C or better

- A total of 109 (or 72%) of the 151 Graduation Math students received a C or better; 11 students passed the course with a D; 15 students failed the course and 16 were designated with "other" results

Increase the placement for Math 092 (graduation impact) measured by students who passed College level math without fulfilling the Math 092 pre-requisite

- 90 students were placed in Graduation Math sections through a waiver of the MTH 092 requirement
- 73 of the 90 students (81) successfully completed the course and were able to graduate at least one semester early because they were able to pass the college level math course without the developmental prerequisite and in many cases replace developmental credits with coursework that actually applied toward their degree.

Efficacy of waiving Math 092 for the highly motivated Graduation Math cohort in Math 101 and Math 103; evaluated waived students taught by full time faculty with C or better

- This model was tested using full time faculty to ensure that the waiving of Math 092 was pedagogically sound before any adjunct was permitted to teach these sections

- The difference between the success rate, that is a grade of C or better, of the waived students and the students that were not waived, overall was 5%;
- For Math 101, 33 of 35 students (or 94%) earned a C or better; the waived students had a higher success rate, that is had a grade of C or better, than the students who satisfied the pre-requisite;
- For Math 103, 22 of 31 students (or 71%) earned a C or better; the success rate, that is a grade C or better for the students who satisfied the pre-requisite was only 9% higher than the waived students, this difference was understandable, since the students with the highest level of math anxiety were placed in the 103 sections;

Full time Faculty Pedagogical Pilot (Spring 2013, Fall 2013 for Math 101 only, and Spring 2014)				Students Waived 092	Waived Students A-C	Success Rate for Waived Students	Satisfied 092 Pre-requisite	Satisfied 092 A-C Grade	Success Rate for Satisfied	Difference Waived vs. Not Waived
Course	All Students (Waived & Satisfied 092)	Total of All Receiving A-C	Success Rate for All Students							
Math 101	57	49	86%	35	33	94%	22	20	91%	-3%
Math 103	41	31	76%	31	22	71%	10	8	80%	+9%
Overall for Full Time Faculty	98	80	82%	66	55	83%	32	28	88%	+5%

Full time Faculty Pedagogical Pilot of Waiving Math 092 (Spring 2013, Fall 2013 for Math 101 only, and Spring 2014)			
Course	Students waived 092	Total of All Receiving A-C	Success Rate
Math 101	35	33	94%
Math 103	31	22	71%
Overall for Full Time Faculty	66	55	83%

Identify students who need Math to graduate—focus on students with 50+ credits

- The average number of credits for all students who took this class were 50 credits.

Select students with high degree of Math anxiety-defined as Repeaters and Avoiders

- For the 2014-2015 period, 141 Students who took graduation math classes were either repeaters or avoiders. It is safe to assume that these students had a high level of math anxiety. Students from this sample were not cherry picked for their math acumen; on the contrary--rather than select a population comfortable with math and eager to take these courses, our sample was comprised of students who under normal circumstances have repeated or avoided this required pre-requisite course, thus preventing their graduation .
 - 90 never passed Math 092;
 - 117 attempted 092 once;

- 32 attempted 092 twice;
- 17 attempted 092 three times;
- 5 attempted 092 four times;
- 3 attempted 092 five times;
- 0 attempted 092 more than five times;
- 47 attempted 100 level twice;
- 28 attempted 100 level three times;
- 12 attempted 100 level more than three times; and
- The success rate (A-C) for Math 092 is about 45% for the entire college. Students must achieve a C in order to progress to a College level math. Many of these students have attempted 092 without success; **81% of the students successfully negotiated the college level math course without 092.**

Accelerate graduation rate of students by waiving Math 092

- **For 73 graduates, waiving the MTH 092 requirement meant they were able to graduate at least one semester early because they were able to pass the college level math course without the developmental prerequisite and in many cases replace developmental credits with coursework that actually applied toward their degree.**
- The success rate (A-C) for Math 092 is about 45% for the entire college. Students must achieve a C in order to progress to a College level math. Many of these students have attempted 092 without success; **81% of the students successfully negotiated the college level math course without 092.**

Graduate math avoiders and repeaters; thereby improving total number of graduates by increasing the number of students eligible by satisfying their Math requirement

- Total of 151 students had 50+ credits; 120 (or 80%) of these Graduation Math Students successfully completed their math requirement (A-D) and therefore were eligible to graduate;

Assess impact on transfer

- **Collated transfer information regarding transfer of Math 103 for 40 different institutions**
 - For years some of the faculty and the counselors have maintained that Math 103 does not satisfy the quantitative measurement requirement for general education at most of our main four-year receiving schools. The result is that some faculty and counselors will not recommend Math 103 and advise our students to take Math 100 instead. Institutional research shows that the Math 100 success rates are much lower than Math 103. Baseline ALL MATH MTH 100, 101 & 103 STUDENTS--886/1660 ALL MATH STUDENTS SUCCESS RATE 53.4% BREAK DOWN OF ALL MATH MTH 100 606/1283 (47.2%); MTH 101 167/248 (63.3%); MTH 103

113/129 (87.6%); WHEN GRADUATION MATH STUDENTS ARE NOT IN THE SAMPLE SUCCESS RATES DECLINE FOR MTH 101
110/196 (56.1%); MTH 103 53/63 (84.1%)

Course	Baseline	Success Rate	Baseline w/o Graduation Math	Success Rate	Graduation Math	Success Rate
Math 100	606/1283	47.2%	599/1274	47%	7/9	78%
Math 101	167/248	63.3%	110/196	56.1%	61/65	94%
Math 103	113/129	87.6%	53/63	84.1%	66/75	88%
total	886/1660	53.4%	762/1533	49.7%	134/149	90%

- A list of four-year institutions that accept Math 103 for transfer and institutions that accept this class to satisfy the general education quantitative requirement was assembled and disseminated to Faculty, Advisors and Counselors
- A table that identifies all of the schools that accept Math 103, both as a transfer credit in math and for satisfaction of the quantitative general education requirement. The table is based on Transfer.org the official site for NJ. You will note that the primary Rutgers Newark receiving schools-- Newark College of Arts and Science (NCAS), Rutgers Business School, School of Criminal Justice (SCJ), School of Public Affairs and Administration (SPAA), or University College--Newark (UC-N) accept this course as "Math for Liberal Arts" and it does indeed satisfy the general education 3 credit quantitative reasoning requirement. Other colleges and universities such as NJCU, William Patterson, Seton Hall, Farleigh Dickinson, The College of New Jersey, Caldwell College, Centenary College, Rutgers Camden College of Arts and Science, Rutgers Camden University College, Rutgers School of Nursing, College of Saint Elizabeth, Felician College, Georgia Court University, and Monmouth also accept this course to satisfy the quantitative general education requirement.

NJ Transfer Website information on Essex County College Math 103 course equivalencies

Institution	Equivalency	Min Grade	Accepted for credit	Accepted as Math	Accepted as General Ed
Berkeley College	MAT271 (SPECIAL TOPICS IN MATHEMATICS)	C	Min 04.00 Max 04.00	Y	no
Bloomfield College	MTH103 (UNDERSTANDING OUR QUANTITATIVE WORLD)	C	Min 04.00 Max 04.00	Y	no
Caldwell University	MA112 (CONCEPTS/MATHEMATICS)	C	Min 04.00 Max 04.00	Y	Mathematics
Centenary College	MTH1111 "E0" (QUANTITATIVE LITERACY) ¹	C-	Min 04.00 Max 04.00	Y	Mathematics
College of Saint Elizabeth	MATH999 (MATHEMATICS ELECTIVE)	C	Min 04.00 Max 04.00	Y	Mathematics and Computer Science
DeVry University	Not Yet Evaluated				No
Drew University	Not Yet Evaluated				no

Fairleigh Dickinson- Florham	MATH1126 (CONTEMPORARY MATHEMATICS)	C	Min 04.00 Max 04.00	Y	Mathematics
Fairleigh Dickinson- Metropolitan	MATH1101 (COMPREHENSIVE MATHEMATICS)	C	Min 03.00 Max 03.00	Y	Quantitative Analysis
Felician College	MATH112 (Quantitative Reasoning)	C	Min 04.00 Max 04.00	Y	Mathematics
Georgian Court University	GENED "G6" (GENERAL ED) ₂	C	Min 04.00 Max 04.00	Y	Mathematics
Kean University	MATHX1001 (MATHEMATICS - GESM) As of Fall 2010	C	Min 03.00 Max 03.00	Y	
Monmouth University	MA100 (Quantitative Reasoning and Problem)	C	Min 04.00 Max 04.00	Y	Mathematics
Montclair State University	EC (ELECTIVE CREDIT)	C-	Min 04.00 Max 04.00	Y	
New Jersey City University	MATH102 (Fund Of Math)	C	Min 04.00 Max 04.00	Y	All University Requirements
NJ Institute of Tech	Not transferable		0.00 cr	N	No
Ramapo College	MATH199 (TRANSFER ELECTIVE)	C	Min 04.00 Max 04.00	Y	
Raritan Valley Community College	Not Yet Evaluated		Min 04.00 Max 04.00		
Richard Stockton College	TRCREC (ELECTIVE TRANS CREDIT)	C	Min 04.00 Max 04.00	Y	Elective Credit, Quantitative Reasoning Intensive Course
Institution	Equivalency	Min Grade	Accepted for credit	Accepted as Math	Accepted as General Ed
Rider University	MTH102 (Finite Mathematics)	C	Min 04.00 Max 04.00	Y	
Rowan University	MATH01115 (CONTEMP MATHEMATICS)	D-	Min 03.00 Max 03.00	Y	
Rutgers Business School - New Brunswick	Not transferable		0.00 cr	N	No
Rutgers-Camden- CCAS-Camden College of Arts and Science, UC-University College, Nursing	50640103 (FUNDAMENTAL MATHEMATICS SYSTEMS I (R))	C	Min 04.00 Max 04.00	Y	Mathematics (Graduation Requirement), Quantitative Skills (Gen Ed Area 2b)
Rutgers-Camden-School of Business	50640103 (FUNDAMENTAL MATHEMATICS SYSTEMS I (R))	C	Min 04.00 Max 04.00	Y	
Rutgers-Edward Bloustein Sch of Planning & Policy	Not transferable		0.00 cr	N	No

Rutgers-Ernest Mario School of Pharmacy	Not transferable		0.00 cr	N	No
Rutgers-Mason Gross School of Arts	Not transferable		0.00 credits	N	No
Rutgers-Newark- NCAS-Newark Campus School of Arts and Sciences, RBS—Rutgers Business School, SCJ-School of Criminal Justice, SPAA-School of Public Affairs and Administration, UC-N-University College Newark	21640106 (MATH FOR LIBERAL ARTS)	C	Min 04.00 Max 04.00	Y	Quantitative Reasoning
Rutgers-NB School of Arts and Sciences	Not transferable		0.00 cr	N	No
Rutgers-School of Engineering	Not transferable		0.00 credits	N	No
Rutgers-School of Env Biological Sciences	Not transferable		0.00 cr	N	No
Rutgers-School of Man and Labor Relations	Not transferable		0.00 cr	N	No
Rutgers-School of Nursing	Not transferable		0.00 cr	N	No
Institution	Equivalency	Min Grade	Accepted for credit	Accepted as Math	Accepted as General Ed
Saint Peter's University	MA105 (FINITE MATHEMATICS I)	C	Min 03.00 Max 03.00	Y	
Seton Hall University	MATH1102 (MATHEMATICAL PERSPECT)	C	Min 03.00 Max 03.00	Y	Arts & Sciences: Mathematics - BA
The College of New Jersey	MAT101 (APPLIED LIBERAL ARTS MATHEMATICS)	C	Min 04.00 Max 04.00	Y	Quantitative Reasoning
Thomas Edison State College	"112"	D	Min 0.00 Max 04.00	Y	See Footnote ³
William Paterson University	MATH1100 (CONTEMPORARY MATH)	C	Min 04.00 Max 04.00	Y	Ways of Knowing: Quantitative Thinking

¹ This course is equivalent to 4 credit hours at Centenary College. Therefore students will receive 3 credits for this course and must take an additional 1 credit elective.

² This course will not fulfill a Gen Ed requirement if taken after the student is enrolled at Georgian Court University.

³ 112 Thomas Edison State College will accept credit in transfer for courses completed at colleges and universities accredited by the six regional accrediting agencies recognized by the U.S. Department of Education. In addition, the College offers a host of ways to earn credit for knowledge obtained in noncollegiate settings. For more information, please visit www.tesc.edu/academics/catalog/Transfer-Credit.cfm

Going forward

- Math retests after the dissemination of the Math911 software needs to occur contemporaneously with completion of the program. The Testing Center plans to retest the students at will. This should eliminate some of these problems.
- Data regarding the efficacy of waiving Math 092 will be shared with the Mathematics Department to confirm the effectiveness of their initial suggestion to waive Math 092 for Math 101 and Math 103.
- The Transfer information concerning Math 103 has been disseminated to the Student body and incorporated in all Advisement discussions with students. Retention and Academic Advisement, collaborating partners on this activity, actively incorporates this information in their advisement activities.
- We will continue to improve the distribution of Math911 software before the semester begins.

Summary

The Graduation Math courses were originally designed for math repeaters whose graduation and progress was delayed by either the need to repeat Math 092 and/or a college level Math. Later, the name was changed from Repeaters Math to a more positive name—Graduation Math. This change was based on student feedback. Instead of focusing solely on repeaters, avoiders were added, since it was clear that anyone who waited until the last couple of semesters to tackle math and some very high levels of anxiety and were dreading the math requirement. Research also confirmed that some students actually thought about delaying their graduation because of their fear of taking or repeating the required math classes. The goal of Graduation Math is to increase the number of graduates and improve retention by offering students who are struggling with math more tutoring and smaller class sizes; reducing their anxiety levels to improve their success. Graduation Math successfully increased the number of graduates and students eligible for graduation by moving them from developmental placement to satisfaction of their college level general education math requirement. Graduation Math classes are unique because the class sizes are small; Teaching Assistants are assigned to the specific courses and shadow the professor; and the developmental math requirement of Math 092 is waived for students taking Math 101 and 103. The Graduation Math student is part of a highly motivated cohort close to graduation. The pedagogical soundness of the practice of waiving Math 092 was piloted by full time Math faculty before any adjunct faculty were assigned to teach these sections. Waiving Math 092 for these highly motivated individuals had no appreciable negative impact. Instead, students who would have been delayed at least one semester from graduation successfully negotiated the college level math class and graduated. The students who participated in this activity were students with a high level of anxiety about math. Yet, they clearly benefited from the small class size and individualized tutoring from the Teaching Assistants hired with the funding from this grant. In all categories, these students represented the challenged end of the spectrum; initial placement, subsequent performance in developmental and college level math courses, lack of persistence in math courses, and moderate to high math anxiety. Yet, their success rates exceeded all of the college's baseline indicators.