Discipline	Course Number	Title
Mathematics	067	MTH 067 05/16/2023- Foundations of Mathematics
College	Division	Department
Math, Science and Engineering Tech	Math, Science and Engineering Tech	Math & Engineering Studies
Faculty Preparer		Jason Davis
Date of Last Filed Assessment Report		08/17/2021

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

Yes

Winter 2021

2. Briefly describe the results of previous assessment report(s).

During the Winter 2021 semester, the course-wide average for outcome #1 was 64.7%, outcome #2 84.7%, and 92.3%. This means students did not meet the standard of success for outcome #2. The course mentor attributed this in large part to the pandemic and the fact that all sections were taught virtually and assessed via an online system during the winter 2021 semester.

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

The action plan called for the assessment data to be shared, and professional development to be constructed, especially for those teaching virtual sections. The data was shared at a department meeting and Kalpa was used to hold a professional development session for MTH 067 faculty.

II. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving integers, fractions, decimals, percents and proportions.

- Assessment Plan

- o Assessment Tool: Outcome-related common final exam questions

- o Assessment Date: Winter 2024

- o Course section(s)/other population: All sections

- o Number students to be assessed: A random sample of approximately 30% of students

- o How the assessment will be scored: Departmentally-developed rubric

- o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

- o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
145	53

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2023 semester the course mentor received a total of 53 final exams from the four face-to-face sections of MTH 067 offered during the Winter 2023 semester. Common final exam questions were not collected from virtual sections due to lack of proctoring in this modality and the concern that this would pollute the data. All 53 exams received were blind graded and the data used for this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All face-to-face students were included. Due to the WCC policy of not allowing virtual students to use the WCC testing center there was no way to guarantee consistency or integrity in proctoring of the common final exam questions so those sections were excluded from the assessment process. The course mentor is hoping that that policy change will allow proper proctoring of virtual students in the future.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

> All final exams received (53 in total) were give a unique number and blind graded by the course mentor. In addition to this, the course mentor used transcript data to compare final course grades with students total scores on the ten final exam questions.
>
> A common final exam was used to assess all outcomes. Questions 1,2,3, and 4 were used to assess outcome #1. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

> Met Standard of Success: Yes
>
> 44 of the 53 students (approximately 83%) achieved an average score of 70% or better on outcome #1. This exceeds the standard of 75% of students scoring 70% or higher. This result is 4% lower than the results from the Winter 2019 (pre-pandemic) Assessment of Outcome #1 (approximately 87%). It is possible that this result is linked to the effects of K-12 learning loss due to the pandemic.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

> 83% of the students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application problems involving multiple steps. In assessing this outcome, the majority of students showed their ability to organize and label their work from beginning to end.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

> Although 83% of students met the standard for success which exceeds the standard for this outcome, there are improvements that could be made. The course will need continued monitoring to see if scores continue to trend downward. During the blind grading process, it was evident that students that did not meet this outcome struggled to understand multi-step problem solving processes. They also continue to struggle with organizing their work and clearly labeling their problems. More emphasis should be placed on; careful reading of problems, creating a plan before attempting a solution, teaching correct problem set up, organization, and labeling

of multi-step application problems. Faculty, especially part-time faculty, could also benefit from collaboration on how to successfully prep students for a cumulative test like our MTH 067 common final exam.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

    o   Assessment Tool: Outcome-related common final exam questions

    o   Assessment Date: Winter 2024

    o   Course section(s)/other population: All sections

    o   Number students to be assessed: A random sample of approximately 30% of students

    o   How the assessment will be scored: Departmentally-developed rubric

    o   Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o   Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
145	53

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2023 semester the course mentor received a total of 53 final exams from the four face-to-face sections of MTH 067 offered during the winter 2023 semester. Common final exam questions were not collected from virtual sections due to lack of proctoring in this modality and the concern that this would pollute the data. All 53 exams received were blind graded and the data used for this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

> All face-to-face students were included. Due to the WCC policy of not allowing virtual students to use the WCC testing center there was no way to guarantee consistency or integrity in proctoring of the common final exam questions so those sections were excluded from the assessment process. The course mentor is hoping that that policy change will allow proper proctoring of virtual students in the future.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

> A common final exam was used to assess all outcomes. Questions 6,7,8, and 9 were used to assess outcome #2. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

> Met Standard of Success: <u>Yes</u>
>
> 47 of the 53 students (approximately 89%) achieved an average score of 70% or better on outcome #2. This exceeds the standard of 75% of students scoring 70% or higher. This result was significantly higher than what was observed during the Winter 2019 semester assessment in which 80% of all randomly selected students were able to meet the standard of success. This result indicates that MTH 067 faculty are making progress in teaching MTH 067 algebraic equation solving skills.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

> Students showed their ability to correctly solve algebraic equations even when those equations involved: distribution, combing like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

> Though the success standard was exceeded one weakness was observed repeatedly. On question number nine, students have to distribute a negative

number across subtraction. Students struggled to achieve the correct sign of the number following the subtraction sign in this situation. The average score for question 6 through 8 was approximately 91% and for question number nine it was only 80%. This is an 11% decrease with the most common error found to be inaccurate distribution across the subtraction. More emphasis needs to be placed on foundational integer arithmetic by faculty teaching MTH 067 in the future.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan
    - Assessment Tool: Outcome-related mastery test questions
    - Assessment Date: Winter 2024
    - Course section(s)/other population: All sections
    - Number students to be assessed: A random sample of approximately 30% of students
    - How the assessment will be scored: Departmentally-developed rubric
    - Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the mastery test related to this outcome.
    - Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
145	53

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2023 semester the course mentor received a total of 53 final exams from the four face-to-face sections of MTH 067 offered during the winter 2023 semester. Common final exam questions were not collected from virtual sections due to lack of proctoring in this modality and the concern that this

would pollute the data. All 53 exams received were blind graded and the data used for this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All face-to-face students were included. Due to the WCC policy of not allowing virtual students to use the WCC testing center there was no way to guarantee consistency or integrity in proctoring of the common final exam questions so those sections were excluded from the assessment process. The course mentor is hoping that that policy change will allow proper proctoring of virtual students in the future.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Question 10 (a 4-part question) was used to assess outcome #3. This question was scored using the Mathematics department rubric (attached).

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

48 of the 53 students (approximately 91%) achieved an average score of 75% or better on outcome #3. This result is slightly higher than the winter 2019 result of 89%. These students were able to correctly interpret the X-coordinate and Y-coordinate of four given order pairs and place them on the rectangular coordinate system in the correct positions with the correct labels.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The standard for success was well exceeded for outcome #3 in Winter 2023. Most students who met the standard of success were able to correctly graph all four ordered pairs without any errors.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

MTH 067 students' performance is strong on outcome #3. A small percentage of students would benefit from more practice plotting points in the rectangular coordinate system. More emphasis still needs to be placed on teaching students to

be mindful during the graphing procedure so as to reduce the number of errors made due to lack of attention. This was evident as three of the five students who did not meet this objective were able to graph two of the four points correctly.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

   Comparing the assessment results from Winter 2019 and Winter 2023 it appears progress has may have been lost with respect to outcome #1, but considerable progress made outcome #2. Success rates for outcome #3 remain high and stable. The introduction of Kalpa sessions has improved faculty communication, but the course mentor believes that more improvement can still be made in faculty collaboration.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

   MTH 067 is successfully meeting the goal of teaching students problem solving and basic algebraic equation solving. Very few students had significant issues solving single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps. The slight decrease in outcome #1 should be monitored, but may well be an anomaly. Progress has been made over the last several assessment cycles in algebraic equation solving. The level of mastery of algebraic equation solving, increased considerably from Winter 2019 to Winter 2023. We continue to not only meet the standard of success for algebraic equation solving, but are making continual progress. MTH 067 is preparing students to advance to MTH 097.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

   Results of this assessment will be shared by the course mentor with both full time and part time faculty during Fall 2023 semester via a Kalpa session. It will also inform the email that is sent out to all faculty teaching MTH 067 at the beginning of each semester.

4.
   Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date

Assessment Tool	We are no longer using a mastery test. Instead, all outcomes will be assessed using outcome-related questions from a common final exam.	The mastery test was left behind years ago; the final exam questions are a superior tool.	2023
Other: Assessment population	Students from all sections will be included in future assessments.	The course will no longer be offered as a Distance Learning course, so students from all sections will be included in future assessments.	2023

5. Is there anything that you would like to mention that was not already captured?

> 6.

III. Attached Files

    Rubric
    Assessment Data

Faculty/Preparer: Jason Davis   **Date:** 05/16/2023
Department Chair: Nichole Klemmer **Date:** 06/07/2023
Dean: Tracy Schwab   **Date:** 06/09/2023
Assessment Committee Chair: Jessica Hale   **Date:** 11/06/2023

Discipline	Course Number	Title
Mathematics	067	MTH 067 06/02/2021-Foundations of Mathematics
College	Division	Department
	Math, Science and Engineering Tech	Math & Engineering Studies
Faculty Preparer		Jason Davis
Date of Last Filed Assessment Report		08/27/2018

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

Yes

MTH 067 was previously assessed using data from the Winter 2019 semester.

2. Briefly describe the results of previous assessment report(s).

During the Winter 2019 semester, all learning objectives were met. Very few students had significant issues solving single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps but progress has been made over the last several assessment cycles in this area. The level of mastery of algebraic equation solving, increased slightly from Winter 2018 to Winter 2019 but not enough to be statistically significant. We continue to meet the standard of success for algebraic equation solving and MTH 067 is preparing students to advance to MTH 097.

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

In the previous report the course mentor stated that a professional development session would be held to discuss the assessment report with MTH 067 faculty. A faculty professional development session was scheduled during the Fall 2019 semester. All MTH 067 faculty were invited. Data from the Winter 2019 assessment report was shared and a discussion was held.

II. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving integers, fractions, decimals, percents and proportions.

- Assessment Plan

    o Assessment Tool: End-of-semester common final exam

    o Assessment Date: Winter 2020

    o Course section(s)/other population: All sections

    o Number students to be assessed: A random sample of approximately 30% of students

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2021	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
247	133

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Normally a random sample of 30% of all students would be used for this assessment. Due to the pandemic, an online system was used to deliver the common final exam. Because the Connect Math system generates test reports using section averages rather than individual student scores, data from all final exams completed was used for this assessment. Several students did not complete the final exam. Within the Connect Math system it is not possible to know whether these students withdrew from the course or simply chose not to take the final exam. One MTH 067 instructor who taught two sections of MTH 067 during the Winter 2021 semester did not use the common final exam that was built into the Connect math system so there was no data from these two sections.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Since all available data from every student who took the common final exam was used, all populations were included.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 1, 2, 3, and 4 were used to assess outcome #1. These questions were scored by the Connect Math system in a binary correct/incorrect fashion. The Connect math system produces mean scores for each question by section. These section wide mean scores were then multiplied by the number of students who took the final exam in each section to create a course wide mean average for each question. The scores for these four questions were then totaled and divided by four to achieve a mean score for outcome #1.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>

The course wide mean average for the four questions comprising outcome #1 was 64.7%. Two out of the nine sections (22.2%) for which the course mentor had data had a mean average of 70% or greater. The standard as outlined in the master syllabus is that 75% of students will score 70% or higher. Due to the virtual nature of the Winter semester, and the difficulty with accessing individual student scores, there was no reasonable way to assess the outcome in this fashion. Given the fact that the mean average for all students was 5.3% below the 70% goal, and the fact that only 22.2% of sections had a section mean average of 70% or higher, it appears the standard was not met. This result is disappointing given that 87% of students achieved an average score of 70% or better on outcome #1 during the Winter 2019 semester. Though this result is not what we would like to see, given the difficulties with teaching developmental mathematics in a virtual format, it is not surprising. It indicates that faculty are struggling to teach the challenging multi-step processes required to solve these types of applications to this developmental student population in the virtual learning environment.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

64.7% of all students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application problems involving

multiple steps. In assessing this outcome, the majority of students showed their ability to produce a correct result.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although 64.7% of students met the standard for success, this falls short of the standard for this outcome. I'm confident that when students are allowed to come back to the traditional classroom we will see a return to achieving our goals for outcome #1. There are also some improvements that could be made to the virtual environment. The primary concern of the course mentor was the method of delivery for this assessment. A return to proctored paper and pencil testing as well as the use of the departmental rubric is essential for accurate assessment in this course. Regardless of the delivery method of content, proctored paper and pencil testing should be used if the college is open to students. Those faculty who teach MTH 067 virtually in future semesters would benefit from professional development focused on how to teach multi-step problem solving remotely.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

    o Assessment Tool: End-of-semester common final exam

    o Assessment Date: Winter 2020

    o Course section(s)/other population: All sections

    o Number students to be assessed: A random sample of approximately 30% of students

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2021	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
247	133

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

There were 247 students registered for MTH 067 in Winter 2021.

Normally a random sample of 30% of all students would be used for this assessment. Due to the pandemic, an online system was used to deliver the common final exam. Because the Connect Math system generates test reports using section averages rather than individual student scores, data from all final exams completed was used for this assessment. Several students did not complete the final exam. Within the Connect Math system it is not possible to know whether these students withdrew from the course or simply chose not to take the final exam. One MTH 067 instructor who taught two sections of MTH 067 during the Winter 2021 semester did not use the common final exam that was built into the Connect math system so there was no data from these two sections.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Since all available data from every student who took the common final exam was used, all populations were included.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 7, 8, and 9 were used to assess outcome #2. These questions were scored by the Connect Math system in a binary correct/incorrect fashion. The Connect Math system produces mean scores for each question by section. These section wide mean scores were then multiplied by the number of students who took the final exam in each section to create a course wide mean average for each question. The scores for these three questions were then totaled and divided by three to achieve a mean score for outcome #2.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>

The mean average for the three questions (questions #7, #8, and #9) comprising outcome #2 was 84.7%. Nine out of the nine sections (100%) for which the course mentor had data, had a mean average of 70% or greater. The standard as outlined in the master syllabus is that 75% of students will score 70% or higher. Due to the virtual nature of the Winter semester, and the difficulty with accessing individual student scores, there was no reasonable way to assess the outcome in this fashion. Given the fact that the mean average for all students was 14.7% above the 70% goal, it appears the standard was met. Due to the differences in assessment methods, an accurate comparison cannot be made, but this result appears slightly higher than what was observed during the Winter 2019 semester assessment in which 80% of all randomly selected students were able to meet the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students showed their ability to correctly solve algebraic equations even when those equations involved distribution, combining like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Though the success standard was exceeded, students seemed to have much more difficulty with multi-step algebraic equation-solving involving distribution. The mean average for question #8, a multi-step equation that did not involve distribution, was 90.1%. The mean average for question #9, a multi-step algebraic equation that did involve distribution, was significantly lower at 76.2%. Though 76.2% is still well within the standard of success, and this result may be another impact of the virtual nature of the semester, more emphasis could be placed on methods of solving the more complex multi-step algebraic equations by faculty teaching MTH 067.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan
    - Assessment Tool: End-of-semester mastery test
    - Assessment Date: Winter 2020
    - Course section(s)/other population: All sections
    - Number students to be assessed: A random sample of approximately 30% of students

- o How the assessment will be scored: Departmentally-developed rubric

- o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the mastery test related to this outcome.

- o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2021	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
247	133

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

There were 247 students registered for MTH 067 in Winter 2021.

Normally a random sample of 30% of all students would be used for this assessment. Due to the pandemic, an online system was used to deliver the common final exam. Because the Connect Math system generates test reports using section averages rather than individual student scores, data from all final exams completed was used for this assessment. Several students did not complete the final exam. Within the Connect Math system it is not possible to know whether these students withdrew from the course or simply chose not to take the final exam. One MTH 067 instructor who taught two sections of MTH 067 during the Winter 2021 semester did not use the common final exam that was built into the Connect math system so there was no data from these two sections.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Since all available data from every student who took the common final exam was used, all populations were included.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 10, 11, 12 and 13 were used to assess outcome #3. These questions were scored by the Connect Math system in a binary correct/incorrect fashion. The Connect Math system produces mean scores for each question by section. These section wide mean scores were then multiplied by the number of students who took the final exam in each section to create a course wide mean average for each question. The scores for these four questions were then totaled and divided by four to achieve a mean score for outcome #3.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

The mean average for the four questions comprising outcome #3 (questions #10 through #13) was 92.3%. All nine sections (100%) for which the course mentor had data, had a mean average of 70% or greater. The standard as outlined in the master syllabus is that 75% of students will score 70% or higher. Due to the virtual nature of the Winter semester, and the difficulty with accessing individual student scores, there was no reasonable way to assess the outcome in this fashion. Given the fact that the mean average for all students was 22.3% above the 70% goal, it appears the standard was met. The vast majority of students were able to correctly interpret the X-coordinate and Y-coordinate of four given ordered pairs and place them on the rectangular coordinate system in the correct positions with the correct labels.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The standard of success was well exceeded for outcome #3 in Winter 2021. Most students who met the standard of success were able to correctly graph all four ordered pairs without any errors.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Due to the differences in assessment methods, an accurate comparison cannot be made between Winter 2019 and Winter 2021. Given the data we have, this result appears to show a 3% increase in the percent of students successfully meeting this outcome from the Winter 2019 to the Winter 2021 semester. MTH 067 students are excelling at this outcome and no changes or improvements are suggested at this time.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

   > Due to all sections of MTH 067 being forced into a virtual platform during the Winter 2021 semester, comparing the assessment results from Winter 2019 and Winter 2021 is difficult. It appears that success has fallen from Winter 2019 with respect to outcome #1. Outcomes #2 and #3 seem to be slightly higher. These results may be due to differences in testing methods, differences in assessment methods or a combination of the two. This was a single semester temporary solution to challenges placed upon us during the pandemic. The course mentor believes that results will likely improve as students move back into the traditional classroom setting. The results of the Winter 2022 assessment can then be used to more accurately assess student success in MTH 067 and make more accurate comparisons to previous (pre-pandemic) semesters.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

   > MTH 067 faculty are struggling to successfully teach students multi-step processes for solving applications in the virtual learning environment. MTH 067 faculty were successful in meeting the goals of teaching students basic algebraic equation solving and graphing of ordered pairs in the rectangular coordinate system. The level of mastery of algebraic equation solving and the plotting of ordered pairs increased slightly from Winter 2019 to Winter 2021, but the differences in testing and assessment methods makes these comparisons less useful.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

   > Results of this assessment will be shared by the course mentor with both full-time and part-time faculty. It will also inform the email that is sent out to all faculty teaching MTH 067 at the beginning of each semester. The course mentor is also considering how this data could be used to guide the creation of professional development sessions that would be useful for MTH 067 faculty, especially those teaching MTH 067 virtually.

4.
   Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	A department-wide discussion	Due to the pandemic Connect	2022

	regarding the use of the virtual platform for MTH 067 needs to take place. If it is decided that the department will continue to offer MTH 067 in a virtual format, then a policy needs to be put in place that students in virtual sections of MTH 067 will take the same paper and pencil version of the common final exam that students in traditional face-to-face sections are required to take. This exam needs to be proctored by the faculty member teaching the virtual section of the WCC testing center.	Math was used to deliver the common final exam. The course mentor found this to be problematic for assessment purposes. It is very difficult to access individual student data within the Connect Math system. It is not possible to use the math department rubric if Connect is used to deliver the common final exam as Connect only displays the answer the student gave, not the work done to arrive at the solution. This lack of ability to see student work does not give enough detail about the students' problem-solving process to produce an accurate assessment of the course and whether or not MTH 067 students are meeting its desired goals for the course.	
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Place more emphasis on teaching the more complex multi-step algebraic equations, especially those involving distribution.	Students seemed to struggle the most with this type of equation.	2022

5. Is there anything that you would like to mention that was not already captured?

> 6.

III. Attached Files

[exam data](#)

Faculty/Preparer:	Jason Davis	**Date:** 06/03/2021
Department Chair:	Lisa Manoukian	**Date:** 06/21/2021
Dean:	Victor Vega	**Date:** 06/29/2021
Assessment Committee Chair:	Shawn Deron	**Date:** 08/10/2021

Discipline	Course Number	Title
Mathematics	067	MTH 067 06/11/2019-Foundations of Mathematics
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Math & Engineering Studies	Jason Davis
Date of Last Filed Assessment Report		11/16/2017

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

Yes

Yes, Mth067 was last assessed in Winter 2018.

2. Briefly describe the results of previous assessment report(s).

The standard of success was met for all three outcomes during the Winter 2018 semester.

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

More faculty collaboration as well as emphasis on evaluating expressions, teaching correct problem set-up, organizing students' work on problems, and labeling of multi-step application problems was suggested. Results and suggestions from the assessment were shared with faculty during the Fall 2018 department meetings and emailed to all part-time Mth067 faculty.

II. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving; integers, fractions, decimals, percents and proportions.

- Assessment Plan
    - Assessment Tool: End of semester common final exam.
    - Assessment Date: Winter 2018

- o Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

- o Number students to be assessed: Approximately 60 students.

- o How the assessment will be scored: Departmentally-developed rubric

- o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

- o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size 65 tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 1, 2, 3, and 4 were used to assess outcome #1. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

57 of the 65 randomly selected students (approximately 87%) achieved an average score of 70% or better on outcome #1. This exceeds the standard of 75% of students scoring 70% or higher. This result is 9% higher than the results from the Winter 2018 Assessment of Outcome #1 (approximately 78%). This is an excellent result as it indicates that our faculty are doing an excellent job of adjusting to having students coming into their Mth067 classes with a lower math level and without the benefit of first having taken Mth034 which we no longer offer at WCC.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

87% of the randomly selected students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application problems involving multiple steps. In assessing this outcome, the majority of students showed their ability to organize and label their work from beginning to end. They were able to create a plan to solve the problem and move from one logical step to the next to produce a correct result.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although 87% of students met the standard for success which exceeds the standard for this outcome, there are still some improvements that could be made. During the blind grading process, it was evident that students who did not meet the standard of success had great difficulty in comprehending the questions being asked in multi-step application problems. They also struggled with organizing their work and clearly labeling their problems. This caused them to get lost in their work and, in some cases, to simply give up and turn in incomplete work. More emphasis should be placed on careful reading of problems, creating a plan before attempting a solution, teaching correct problem set up, organization, and labeling of multi-step application problems. Faculty, especially part time faculty, could also benefit from collaboration on how to successfully prep students for a cumulative test like our Mth067 common final exam.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

    o Assessment Tool: End of semester common final exam.

    o Assessment Date: Winter 2018

    o Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

    o Number students to be assessed: Approximately 60 students

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size 65 tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 6, 7, 8, and 9 were used to assess outcome #2. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>

52 of the 65 randomly selected students (approximately 80%) achieved an average score of 70% or better on outcome #2. This exceeds the standard of 75% of students scoring 70% or higher. This result was slightly higher than what was observed during the Winter 2018 semester assessment, in which 77% of all randomly selected students were able to meet the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students showed their ability to correctly solve algebraic equations even when those equations involved distribution, combing like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Though the success standard was exceeded, one weakness, which was also observed during the Winter 2017 and 2018 assessments, was once again present during this Winter 2019 assessment. Question number 6 asked students to evaluate an expression. Many students had trouble substituting the values correctly, and some had difficulty simplifying the expression once the substitution was completed. Of the 65 randomly selected students, 19 were not able to earn 70% of their credit for Problem #6. This gives a student success rate of approximately 70% for question #6 which barely meets the success standard for outcome #2 and is significantly lower than the overall success rate for outcome #2 of 80%. This

result for question #6 is much better than the result from Winter 2018 (58% meeting the success standard of 70% or higher) so progress is being made by faculty in fostering student understanding of evaluating expressions. That being said, more emphasis still needs to be placed on evaluation of expressions by faculty teaching Mth067 in the future.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan

  o Assessment Tool: End of semester mastery test.

  o Assessment Date: Winter 2018

  o Course section(s)/other population: Common final exams from all sections will be numbered, and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

  o Number students to be assessed: Approximately 60 students.

  o How the assessment will be scored: Departmentally-developed rubric

  o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

  o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size, 65

tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Question #10 was used to assess outcome #3. This question was scored using the Mathematics department rubric (attached).

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

58 of the 65 randomly selected students (approximately 89%) achieved an average score of 75% or better on outcome #3. These students were able to correctly interpret the X-coordinate and Y-coordinate of four given order pairs and place them on the rectangular coordinate system in the correct positions with the correct labels.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The standard for success was well exceeded for outcome #3 in Winter 2019. Most students who met the standard of success were able to correctly graph all four ordered pairs without any errors.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

It is troubling to see an 8% decrease in the percent of students successfully meeting this outcome from the Winter 2018 to the Winter 2019 semester. It appears that some students may not be getting enough practice with plotting coordinate pairs in the rectangular coordinate system. Additionally, more

emphasis needs to be placed on teaching students to be mindful during the graphing procedure so as to reduce the number of errors made due to lack of attention. This was evident as students were often able to graph two of the four points correctly.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

When comparing the assessment results from Winter 2018 and Winter 2019, it appears progress has been made with respect to outcome #1 and possibly outcome #2. There was a decrease of 8% in the success rate for outcome #3 though the level of success was still well surpassed (89%), and it is possible the exceptionally high level of success in Winter 2018 (97%) was an anomaly. The course mentor believes that more improvement can still be made in faculty communication and collaboration.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

Mth067 is successfully meeting the goal of teaching students problem solving and basic algebraic equation solving. Very few students had significant issues solving single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps, but progress has been made over the last several assessment cycles in this area. The level of mastery of algebraic equation solving increased slightly from Winter 2018 to Winter 2019 but not enough to be statistically significant. We continue to meet the standard of success for algebraic equation solving, and Mth067 is preparing students to advance to Mth097.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

Results of this assessment will be shared by the course mentor with both full time and part time faculty during Fall 2019 in-service meetings. It will also inform the email that is sent out to all faculty teaching Mth067 at the beginning of each semester. The course mentor is also considering how this data could be used to guide the creation of Kalpa sessions that would be useful for Mth067 faculty.

4.
   Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional practice with evaluating expressions.	The assessment results reveal this is consistently a difficult area for many students and requires extra emphasis from faculty teaching the course.	2019
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional emphasis on the process of solving multi-step application problems: careful reading of problems, planning before attempting a solution, problem set-up, organization, and labeling.	Students need more practice on each step of solving these types of problems.	2019
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional emphasis on mindfulness during graphing procedure, especially related to plotting coordinate pairs in the rectangular coordinate system.	Based on the assessment, students seem to need more practice in this area.	2019
Other: Faculty collaboration	Faculty collaboration on how to successfully prep students for cumulative tests such as the common final exam used in this course.	Faculty, especially part-time faculty could benefit from this kind of collaboration.	2019

5. Is there anything that you would like to mention that was not already captured?

6.

III. Attached Files

   mth067_assessment_data_winter_2019
   Mth067_common_final_winter_2019
   Random_data_set_selector
   sample_size_calc
   math_dept_rubric

Faculty/Preparer:	Jason Davis	**Date:** 06/11/2019
Department Chair:	Lisa Manoukian	**Date:** 06/12/2019
Dean:	Kimberly Jones	**Date:** 07/25/2019
Assessment Committee Chair:	Shawn Deron	**Date:** 09/10/2019
Faculty/Preparer:	Jason Davis	**Date:** 06/11/2019
Department Chair:	Lisa Manoukian	**Date:** 06/12/2019
Dean:	Kimberly Jones	**Date:** 07/25/2019
Assessment Committee Chair:	Shawn Deron	**Date:** 09/10/2019

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Mathematics	067	MTH 067 06/11/2019-Foundations of Mathematics
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Mathematics	Jason Davis
Date of Last Filed Assessment Report		11/16/2017

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

   Yes

   Yes, Mth067 was last assessed in Winter 2018.

2. Briefly describe the results of previous assessment report(s).

   The standard of success was met for all three outcomes during the Winter 2018 semester.

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

> More faculty collaboration as well as emphasis on evaluating expressions, teaching correct problem set-up, organizing students' work on problems, and labeling of multi-step application problems was suggested. Results and suggestions from the assessment were shared with faculty during the Fall 2018 department meetings and emailed to all part-time Mth067 faculty.

II. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving; integers, fractions, decimals, percents and proportions.

- Assessment Plan

    o Assessment Tool: End of semester common final exam.

    o Assessment Date: Winter 2018

    o Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

    o Number students to be assessed: Approximately 60 students.

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size 65 tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 1, 2, 3, and 4 were used to assess outcome #1. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>

57 of the 65 randomly selected students (approximately 87%) achieved an average score of 70% or better on outcome #1. This exceeds the standard of 75% of students scoring 70% or higher. This result is 9% higher than the results from the Winter 2018 Assessment of Outcome #1 (approximately 78%). This is an excellent result as it indicates that our faculty are doing an excellent job of adjusting to having students coming into their Mth067 classes with a lower math level and without the benefit of first having taken Mth034 which we no longer offer at WCC.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

87% of the randomly selected students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application problems involving multiple steps. In assessing this outcome, the majority of

> students showed their ability to organize and label their work from beginning to end. They were able to create a plan to solve the problem and move from one logical step to the next to produce a correct result.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

> Although 87% of students met the standard for success which exceeds the standard for this outcome, there are still some improvements that could be made. During the blind grading process, it was evident that students who did not meet the standard of success had great difficulty in comprehending the questions being asked in multi-step application problems. They also struggled with organizing their work and clearly labeling their problems. This caused them to get lost in their work and, in some cases, to simply give up and turn in incomplete work. More emphasis should be placed on careful reading of problems, creating a plan before attempting a solution, teaching correct problem set up, organization, and labeling of multi-step application problems. Faculty, especially part time faculty, could also benefit from collaboration on how to successfully prep students for a cumulative test like our Mth067 common final exam.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan
    - Assessment Tool: End of semester common final exam.
    - Assessment Date: Winter 2018
    - Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.
    - Number students to be assessed: Approximately 60 students
    - How the assessment will be scored: Departmentally-developed rubric
    - Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.
    - Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size 65 tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 6, 7, 8, and 9 were used to assess outcome #2. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

52 of the 65 randomly selected students (approximately 80%) achieved an average score of 70% or better on outcome #2. This exceeds the standard of 75% of students scoring 70% or higher. This result was slightly higher than what was observed during the Winter 2018 semester assessment, in which 77% of all randomly selected students were able to meet the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

> Students showed their ability to correctly solve algebraic equations even when those equations involved distribution, combing like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

> Though the success standard was exceeded, one weakness, which was also observed during the Winter 2017 and 2018 assessments, was once again present during this Winter 2019 assessment. Question number 6 asked students to evaluate an expression. Many students had trouble substituting the values correctly, and some had difficulty simplifying the expression once the substitution was completed. Of the 65 randomly selected students, 19 were not able to earn 70% of their credit for Problem #6. This gives a student success rate of approximately 70% for question #6 which barely meets the success standard for outcome #2 and is significantly lower than the overall success rate for outcome #2 of 80%. This result for question #6 is much better than the result from Winter 2018 (58% meeting the success standard of 70% or higher) so progress is being made by faculty in fostering student understanding of evaluating expressions. That being said, more emphasis still needs to be placed on evaluation of expressions by faculty teaching Mth067 in the future.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan
    - Assessment Tool: End of semester mastery test.
    - Assessment Date: Winter 2018
    - Course section(s)/other population: Common final exams from all sections will be numbered, and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.
    - Number students to be assessed: Approximately 60 students.
    - How the assessment will be scored: Departmentally-developed rubric
    - Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.
    - Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2019	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
228	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2019 semester, the course mentor received a total of 168 final exams. Hand-grading 168 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. Using a web-based sample size calculator, it was determined that for this group size, 65 tests should be blind-graded in order to achieve a confidence level of 95% with a margin of error of 10%.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (168 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 168. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor. Using this process, random tests were selected from all sections of Mth067 for the Winter 2019 semester.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Question #10 was used to assess outcome #3. This question was scored using the Mathematics department rubric (attached).

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>

58 of the 65 randomly selected students (approximately 89%) achieved an average score of 75% or better on outcome #3. These students were able to correctly interpret the X-coordinate and Y-coordinate of four given order pairs and place them on the rectangular coordinate system in the correct positions with the correct labels.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

The standard for success was well exceeded for outcome #3 in Winter 2019. Most students who met the standard of success were able to correctly graph all four ordered pairs without any errors.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

It is troubling to see an 8% decrease in the percent of students successfully meeting this outcome from the Winter 2018 to the Winter 2019 semester. It appears that some students may not be getting enough practice with plotting coordinate pairs in the rectangular coordinate system. Additionally, more emphasis needs to be placed on teaching students to be mindful during the graphing procedure so as to reduce the number of errors made due to lack of attention. This was evident as students were often able to graph two of the four points correctly.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

When comparing the assessment results from Winter 2018 and Winter 2019, it appears progress has been made with respect to outcome #1 and possibly outcome #2. There was a decrease of 8% in the success rate for outcome #3 though the level of success was still well surpassed (89%), and it is possible the exceptionally high level of success in Winter 2018 (97%) was an anomaly. The course mentor believes that more improvement can still be made in faculty communication and collaboration.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

Mth067 is successfully meeting the goal of teaching students problem solving and basic algebraic equation solving. Very few students had significant issues solving

single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps, but progress has been made over the last several assessment cycles in this area. The level of mastery of algebraic equation solving increased slightly from Winter 2018 to Winter 2019 but not enough to be statistically significant. We continue to meet the standard of success for algebraic equation solving, and Mth067 is preparing students to advance to Mth097.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

Results of this assessment will be shared by the course mentor with both full time and part time faculty during Fall 2019 in-service meetings. It will also inform the email that is sent out to all faculty teaching Mth067 at the beginning of each semester. The course mentor is also considering how this data could be used to guide the creation of Kalpa sessions that would be useful for Mth067 faculty.

4.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional practice with evaluating expressions.	The assessment results reveal this is consistently a difficult area for many students and requires extra emphasis from faculty teaching the course.	2019
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional emphasis on the process of solving multi-step application problems: careful reading of problems, planning before attempting a solution, problem set-up, organization, and labeling.	Students need more practice on each step of solving these types of problems.	2019
Course Materials (e.g. textbooks,	Additional emphasis on mindfulness during	Based on the assessment, students seem to	2019

handouts, on-line ancillaries)	graphing procedure, especially related to plotting coordinate pairs in the rectangular coordinate system.	need more practice in this area.	
Other: Faculty collaboration	Faculty collaboration on how to successfully prep students for cumulative tests such as the common final exam used in this course.	Faculty, especially part-time faculty could benefit from this kind of collaboration.	2019

5. Is there anything that you would like to mention that was not already captured?

> 6.

III. Attached Files

mth067_assessment_data_winter_2019
Mth067_common_final_winter_2019
Random_data_set_selector
sample_size_calc
math_dept_rubric

Faculty/Preparer: Jason Davis **Date:** 06/11/2019
Department Chair: Lisa Manoukian **Date:** 06/12/2019
Dean: Kimberly Jones **Date:** 07/25/2019
Assessment Committee Chair: Shawn Deron **Date:** 09/10/2019

Discipline	Course Number	Title
Mathematics	067	MTH 067 06/04/2018-Foundations of Mathematics
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Mathematics	Jason Davis
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving; integers, fractions, decimals, percents and proportions.

- Assessment Plan

    o Assessment Tool: End of semester common final exam.

    o Assessment Date: Winter 2018

    o Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

    o Number students to be assessed: Approximately 60 students.

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
233	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

> At the end of the Winter 2018 semester, the course mentor received a total of 150 final exams. Hand grading 150 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all MTH 067 students. In consultation with a member of the math faculty well-versed in statistics, it was determined that for this group size 65 tests should be blind-graded in order to get a reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

> All final exams received (150 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 150. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

> A common final exam was used to assess all outcomes. Questions 1, 2, 3, and 4 were used to assess outcome #1. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

> Met Standard of Success: <u>Yes</u>
>
> 51 of the 65 randomly selected students (approximately 78%) achieved an average score of 75% or better on outcome #1. This exceeds the standard of 75% of students scoring 70% or higher. This result is identical to the results from the Winter 2017 Assessment of outcome #1. This is encouraging since we now have many more students enrolled in MTH 067 who did not have the benefit of taking our canceled MTH 034 course.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

78% of the randomly selected students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application problems involving multiple steps. In assessing this outcome, the majority of students showed their ability to organize and label their work from beginning to end. They were able to create a plan to solve the problem and move from one logical step to the next to produce a correct result.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although 78% of students met the standard for success, which exceeds the standard for this outcome, some improvements could be made. It was clear in the blind-grading process that students who did not meet the standard of success had great difficulty in organizing their work and clearly labeling their problems. This caused them to get lost in their work and in some cases to simply give up and turn in incomplete work. More emphasis should be placed on teaching correct problem set up, organization, and labeling of multi-step application problems. Faculty, especially part-time faculty, could also benefit from collaboration on how to successfully prep students for a cumulative test like our MTH 067 common final exam.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

    o Assessment Tool: End of semester common final exam.

    o Assessment Date: Winter 2018

    o Course section(s)/other population: Common final exams from all sections will be numbered and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.

    o Number students to be assessed: Approximately 60 students

    o How the assessment will be scored: Departmentally-developed rubric

    o Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)

	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
233	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2018 semester, the course mentor received a total of 150 final exams. Grading 150 exams by hand would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all MTH 067 students. In consultation with a member of the math faculty well-versed in statistics it was determined that for this group size, 65 tests should be blind-graded in order to get an reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (150 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 150. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 6, 7, 8 and 9 were used to assess outcome #2. These questions were scored using the Mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

50 of the 65 randomly selected students (approximately 77%) achieved an average score of 75% or better on outcome #2. This exceeds the standard of 75% of students scoring 70% or higher. This is lower than what was observed during the Winter 2017 semester assessment in which 84% of all randomly selected students

were able to meet the standard of success. Students showed their ability to correctly solve algebraic equations even when those equations involved distribution, combing like terms, and variables on both sides of the equation.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students showed their ability to correctly solve algebraic equations even when those equations involved distribution, combing like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Though the standard of success was exceeded, one weakness which was also observed during the Winter 2017 assessment was once again present during this Winter 2018 assessment. Question #6 asked students to evaluate an expression. Many students had trouble substituting the values correctly and some had difficulty simplifying the expression once the substitution was completed. Of the 65 randomly selected students, 27 were not able to earn 75% of their credit for question #6. This gives a student success rate of only 58% for question #6, which is well below the overall success rate for outcome #2 of 77%. More emphasis needs to be placed on evaluation of expressions by faculty teaching MTH 067 in the future.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan
    - Assessment Tool: End of semester mastery test.
    - Assessment Date: Winter 2018
    - Course section(s)/other population: Common final exams from all sections will be numbered, and a random sample of approx 30% of all students will be assessed. This will be approximately 60 students.
    - Number students to be assessed: Approximately 60 students.
    - How the assessment will be scored: Departmentally-developed rubric
    - Standard of success to be used for this assessment: 75% of all students assessed will achieve a mean score of 70% or higher for all questions on the common final exam related to this outcome.
    - Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
233	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2018 semester, the course mentor received a total of 150 final exams. Grading 150 exams by hand would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all MTH 067 students. In consultation with a member of the math faculty well-versed in statistics, it was determined that for this group size 65 tests should be blind-graded in order to get an reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (150 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 150. The tests matching this sequence of numbers were then pulled from the total and blind-graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Question #10 (a four-part question) was used to assess outcome #3. This question was scored using the Mathematics department rubric (attached). The scores for the four parts of this question were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>
63 of the 65 randomly selected students (approximately 97%) achieved an average score of 75% or better on outcome #3. These students were able to correctly interpret the X-coordinate and Y-coordinate of four given order pairs and place them on the rectangular coordinate system in the correct positions with the correct labels.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

During the Winter 2017 assessment, it was suggested in the report that success for Outcome #3 may be increased by increasing the number of ordered pairs students were asked to graph from one to four. This change was made during the Winter 2018 assessment and success did increase by 7%.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

There is very little room for improvement on this outcome. It is doubtful that anything could be done to increase the student success rate beyond 97%. This being the case, an effort does need to be made to continue this level of success while still making improvements to the other outcomes.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

MTH 067 is successfully meeting the goal of teaching students problem solving and basic algebraic equation solving. Very few students had significant issues solving single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps, but less than would have been expected. The level of mastery of algebraic equation solving, though positive, went down from the Winter 2017 assessment. This may well be an anomaly but the success of this outcome should be watched closely. MTH 067 is preparing students well to advance to MTH 097.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

Results of this assessment will be shared by the course mentor with both full-time and part-time faculty during Fall 2018 in-service meetings. It will also inform the email that is sent out to all faculty teaching MTH 067 at the beginning of each semester.

3.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
No changes intended.			

4. Is there anything that you would like to mention that was not already captured?

Three sections taught by the course mentor of Mth067 piloted an OER textbook during the Winter 2018 seemster.

III. Attached Files

random data set
math dept. rubric
assessment data
common final questions

Faculty/Preparer: Jason Davis **Date:** 06/04/2018
Department Chair: Lisa Rombes **Date:** 06/06/2018
Dean: Kristin Good **Date:** 06/06/2018
Assessment Committee Chair: Shawn Deron **Date:** 08/27/2018

Discipline	Course Number	Title
Mathematics	067	MTH 067 05/09/2017- Foundations of Mathematics
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Mathematics	Jason Davis
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving; integers, fractions, decimals, percents and proportions.

- Assessment Plan

    o Assessment Tool: End of semester common final exam

    o Assessment Date: Winter 2016

    o Course section(s)/other population: Common final exams from all sections will be numbered, and 30 will be selected using a random number generator.

    o Number students to be assessed: 30

    o How the assessment will be scored: departmentally-developed rubric

    o Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester common final exam.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
326	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

> At the end of the Winter 2017 semester, the course mentor received a total of 212 final exams. Hand grading 212 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. In consultation with a member of the math faculty well versed in statistics, it was determined that for this group size 65 tests should be blind graded in order to get a reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

> All final exams received (212 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 212. The tests matching this sequence of numbers were then pulled from the total and blind graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

> A common final exam was used to assess all outcomes. Questions 1,2,3, and 4 were used to assess outcome #1. These questions were scored using the mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

> Met Standard of Success: <u>Yes</u>
>
> 51 of the 65 randomly selected students (approximately 78%) achieved an average score of 75% or better on outcome #1. This exceeds the standard of 70% of students scoring 75% or higher. This result is both encouraging and significant as the prerequisite course (Mth034) was removed from the curriculum and so the course mentor was anticipating that the success standard may not be met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

> 78% of the randomly selected students were able to meet the standard of success. In order to meet this standard, students had to correctly complete application

problems involving multiple steps. In assessing this outcome the majority of students showed their ability to organize and label their work from beginning to end. They were able to create a plan to solve the problem and move from one logical step to the next to produce a correct result.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although 78% of students met the standard for success, which exceeds the standard for this outcome, some improvements could be made. It was clear in the blind grading process that students who did not meet the standard of success had great difficulty in organizing their work and clearly labeling their problems. This caused them to get lost in their work and in some cases to simply give up and turn in incomplete work. More emphasis should be placed on teaching correct problem set up, organization, and labeling of multi-step application problems.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

    o   Assessment Tool: End of semester common final exam

    o   Assessment Date: Winter 2016

    o   Course section(s)/other population: Common final exams from all sections will be numbered, and 30 will be selected using a random number generator.

    o   Number students to be assessed: 30

    o   How the assessment will be scored: departmentally-developed rubric

    o   Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester mastery test.

    o   Who will score and analyze the data: course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
326	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2017 semester the course mentor received a total of 212 final exams. Hand grading 212 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. In consultation with a member of the math faculty, well versed in statistics, it was determined that for this group size 65 tests should be blind graded in order to get a reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (212 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 212. The tests matching this sequence of numbers were then pulled from the total and blind graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Questions 6,7,8, and 9 were used to assess outcome #2. These questions were scored using the mathematics department rubric (attached). The scores for these four questions were then totaled and divided by four to achieve a mean score for each test.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

55 of the 65 randomly selected students (approximately 84%) achieved an average score of 75% or better on outcome #2. This exceeds the standard of 70% of students scoring 75% or higher. This result is both encouraging and significant as the prerequisite course (Mth034) was removed from the curriculum and so the course mentor was anticipating that the success standard may not be met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

84% of all randomly selected students were able to meet the standard of success. This greatly exceeds the standard of success for this outcome. Students showed their ability to correctly solve algebraic equations even when those equations involved; distribution, combing like terms, and variables on both sides of the equation.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Though the success standard was far exceeded, one weakness was noticed during the blind grading process. Question number 6 asked students to evaluate an expression. Most students were able to substitute the values correctly but many had difficulty simplifying the expression once the substitution was completed. Of the 65 randomly selected students, 12 were not able to meet the standard for success. This gives the student a success rate of 81% which is still excellent but below the overall success rate for outcome #2 of 84%. More emphasis needs to be placed on evaluation of expressions by faculty teaching Mth067 in the future.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan

    o Assessment Tool: End of semester mastery test

    o Assessment Date: Winter 2016

    o Course section(s)/other population: Common final exams from all sections will be numbered, and 30 will be selected using a random number generator.

    o Number students to be assessed: 30

    o How the assessment will be scored: departmentally-developed rubric

    o Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester mastery test.

    o Who will score and analyze the data: course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
326	65

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

At the end of the Winter 2017 semester the course mentor received a total of 212 final exams. Hand grading 212 exams would be an overly cumbersome task to get a reasonably accurate picture of the success rate of all Mth067 students. In consultation with a member of the math faculty, well versed in statistics, it was determined that for this group size 65 tests should be blind graded in order to get an reasonably accurate view of the success rate of this population at the 95% confidence value.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All final exams received (212 in total) were given a unique number. The website random.org was then used to generate a sequence of 65 random numbers 1 through 212. The tests matching this sequence of numbers were then pulled from the total and blind graded by the course mentor.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A common final exam was used to assess all outcomes. Question #10 was used to assess outcome #3. This question was scored using the mathematics department rubric (attached). The score for this question (a value between 0 and 1) was then converted into a percent.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

59 of the 65 randomly selected students (approximately 90%) achieved an average score of 75% or better on outcome #3. This exceeds the standard of 70% of students scoring 75% or higher.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

90% of randomly selected students were able to meet the success standard for this outcome. These students were able to correctly interpret the x-coordinate and Y-coordinate of the given order pair and place them on the rectangular coordinate system in the correct position.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Though the successful result of this outcome was outstanding (90% meeting the standard of success), I do think that the rate of success may well have been even higher if the common final exam were to have asked students to graph more than one point. This being the case, the course mentor will change the exam for future semesters asking the students to graph four points rather than just one.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

Mth067 is successfully meeting the goal of teaching students problem solving and basic algebraic equation solving. Students had no significant issues solving single step applications. Some had difficulty organizing their work and/or starting a solution path for the application problems involving multiple steps, but less than would have been expected. The level of mastery of algebraic equation solving was both positive and surprising. Mth067 is preparing students well in order to advance to Mth097.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

Results of this assessment will be shared by the course mentor with both full time and part time faculty during Fall 2017 in-service meetings. It will also be included in the email that will be sent out to all faculty teaching Mth067 at the beginning of each semester.

3.
Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
No changes intended.			

4. Is there anything that you would like to mention that was not already captured?

Though the current assessment looks good it must be stressed that there is no way to predict if the cancelation of Mth034 will have an effect on future success in Mth067. This means assessment of Mth067 should be done yearly for at least the next few years so that the course mentor can respond to issues and adjust the course if the needs does arise.

III. Attached Files

random data set
common final questions
rubric
assessment data

Faculty/Preparer:	Jason Davis	**Date:** 05/09/2017
Department Chair:	Lisa Rombes	**Date:** 05/10/2017
Dean:	Kristin Good	**Date:** 05/11/2017
Assessment Committee Chair:	Michelle Garey	**Date:** 11/15/2017

Discipline	Course Number	Title
Mathematics	067	MTH 067 05/28/2013-Foundations of Mathematics
Division	Department	Faculty Preparer
Math, Science and Health	Mathematics	Jason Davis
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Solve application problems involving; integers, fractions, decimals, percents and proportions.

- Assessment Plan

    o Assessment Tool: End of semester mastery test.

    o Assessment Date: Fall 2013

    o Course section(s)/other population: sample of four from at least twelve sections.

    o Number students to be assessed: 50

    o How the assessment will be scored: departmentally-developed rubric

    o Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester mastery test.

    o Who will score and analyze the data: Course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2013	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
344	30

3. If the number of students assessed differs from the number of students enrolled,

please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

> Each test was given a unique number and a random number generator was used to select a sample of 30 tests.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

> All students took a pencil and paper 10 question department created common final exam. All students took the test in a face-to-face classroom environment.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

> Questions 1,2,3, and 4 of the common final were used to assess this outcome. Questions were scored using the departmentally-developed rubric with each question given a score from 0 (problem not attempted) to 4 (all work complete and correct). Each question was graded individually and then the average score for each question was found. Once the average for each question was calculated then the four question total mean score for this outcome was calculated.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

> Met Standard of Success: <u>Yes</u>
>
> Met Standard of Success: Yes, the standard of success was met. For each of the individual questions (1, 2 ,3, and 4) the percent of students scoring 75% or higher were as follows; 63.3%, 73.3%, 93.3%, and 80%. The four question average for outcome 1 was 77.4%.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

> Students performed well, meeting the 75% goal for questions 3 and 4. This shows that most students were able to solve complex application problems involving multiple steps. Students seemed to perform better as the questions became more difficult. This is most likely due to the fact that they were forced to slow down and concentrate on the more challenging problems.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although students met the standard of success for outcome 1, there were two questions (questions #1 & 2) where they did not meet the standard of success. These questions were not dissimilar to the other two questions but they were shorter, less complex questions. Students need to be reminded to slow down, read each problem thoroughly, and not get overly confident on problems they perceive as easy.

Outcome 2: Solve algebraic equations that involve more than two steps.

- Assessment Plan

  o Assessment Tool: End of semester mastery test

  o Assessment Date: Fall 2013

  o Course section(s)/other population: Sample of four from at least twelve sections.

  o Number students to be assessed: 50

  o How the assessment will be scored: departmentally-developed rubric

  o Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester mastery test.

  o Who will score and analyze the data: course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2013	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
344	30

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Each test was given a unique number and a random number generator was used to select a sample of 30 tests.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your

selection criteria.

All students took a pencil and paper 10 question department created common final exam. All students took the test in a face-to-face classroom environment.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Questions 6, 7, 8, and 9 of the common final were used to assess this outcome. Questions were scored using the departmentally-developed rubric with each question given a score from 0 (problem not attempted) to 4 (all work complete and correct). Each question was graded individually and then the average score for each question was found. Once the average for each question was calculated then the four question total mean score for this outcome was calculated.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Met Standard of Success: Yes, the standard of success was met. For each of the individual questions (6, 7 ,8, and 9) the percent of students scoring 75% or higher were as follows; 83.3%, 96.6%, 96.6%, and 80%. The four question average for outcome 2 was 89.1%.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students performed well above expectations on outcome 2. For each of the four questions used to assess this outcome, they met the standard of success. These questions involved evaluating algebraic expressions as well as solving equations involving distribution and combining like terms. Questions 8 and 9 involved manipulating variables on both sides of the equation and students managed this very well.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although students met the standard of success, in grading these questions it became apparent that some students could improve their ability to write out their work in a clear and organized fashion. This issue will be discussed during the Fall 2013 in-service meeting with all MTH 067 faculty.

Outcome 3: Graph coordinate pairs in the Cartesian coordinate plane.

- Assessment Plan

  - Assessment Tool: End of semester mastery test.

  - Assessment Date: Fall 2013

  - Course section(s)/other population: Sample of four from at least twelve sections.

  - Number students to be assessed: 50

  - How the assessment will be scored: departmentally-developed rubric

  - Standard of success to be used for this assessment: The average score on the test questions for each outcome will be 75% or higher on the end of semester mastery test.

  - Who will score and analyze the data: course mentor

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2013	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
344	30

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Each test was given a unique number and a random number generator was used to select a sample of 30 tests.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All students took a pencil and paper 10 question department created common final exam. All students took the test in a face-to-face classroom environment.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Question 10 of the common final was used to assess this outcome. The question was scored using the departmentally-developed rubric with a score from 0

(problem not attempted) to 4 (all work complete and correct). The average score for this question was used to calculate a total mean score for this outcome.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Met Standard of Success: Yes, the standard of success was met. For question #10 the percent of students scoring 75% or higher was 83.3%.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students exceeded the standard of success by a large margin. 22 of the 30 students in the sample scored a perfect 4 indicating that they had mastered the processes necessary to correctly plot an ordered pair in the rectangular coordinate plane.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Although most students performed exceptionally well there were still a few who confused the x and y coordinates. More focus may be needed on slowing down the graphing process and labeling the ordered pair with the correct x and y before plotting the point. This will be discussed during the Fall 2013 in-service meeting.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

The level of success exceeded expectations, especially for outcome 2. Students are doing exceptionally well at solving algebraic equations involving multiple steps. There are a few areas relating to student test taking skills that I would say need continued attention, these include; teaching students to read application problems carefully, managing overconfidence on less complex problems, and organizing work in a clear and linear fashion.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

This information will be shared with all MTH 067 faculty during the Fall 2013 in-service meeting.

3.
   Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
No changes intended.			

4. Is there anything that you would like to mention that was not already captured?

III. Attached Files

rubric
sample data

Faculty/Preparer: Jason Davis   **Date:** 6/4/13
Department Chair: Kristin Good   **Date:** 6/5/13
Dean: Martha Showalter   **Date:** 6/13/13
Assessment Committee Chair: Michelle Garey   **Date:** 7/16/13

COURSE ASSESSMENT REPORT

I. Background Information
1. Course assessed:
   Course Discipline Code and Number: **MTH 067**
   Course Title: **Foundations of Mathematics**
   Division/Department Codes: **12200**

2. Semester assessment was conducted (check one):
   ☐ Fall 20__
   ☒ Winter 2011
   ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   ☐ Portfolio
   ☐ Standardized test
   ☐ Other external certification/licensure exam (specify):
   ☐ Survey
   ☐ Prompt
   ☒ Departmental exam
   ☐ Capstone experience (specify):
   ☐ Other (specify):

4. Have these tools been used before?
   ☒ Yes
   ☐ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.
   Yes, the common final exam questions are altered each semester. Questions are changed but they are similar in both content and difficulty to questions used in previous semesters.

5. Indicate the number of students assessed/total number of students enrolled in the course.
   30 students were accessed / 151 students were enrolled.

6. Describe how students were selected for the assessment.
   All 151 final exams were given a unique number. A random number generator was then used to select 30 of the numbered exams.

II. Results
1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.
   More emphasis has been placed on communication with part-time faculty with regard to the outcomes of the master syllabus. A final exam evaluation form was created so that each faculty member teaching the course is assessing how their own students are doing with regard to the three outcomes of this course. The course mentor is then aggregating that data and presenting it during in-service meeting so that strengths and weaknesses in the MTH 067 curriculum can be identified and addressed.

2. List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.
   Outcome #1: Solve application problems involving; integers, fractions, decimals, percents, and proportions.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*
   To assess this outcome, three common final exam questions were created. Questions from this common final exam were then graded with each step in the problem-solving process being given one point. Question one was graded on a two point scale. Questions two and three were both graded on a 4 point scale. Of the 30 students who were assessed, 40% of all students were were able to solve all three problems with an average score of 75% or higher. This number is significantly lower than expected due

to low performance on question #2. If this question is removed from the data set then the percent increases to 73.3%.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*

   The standard of success used was that 75% of those students assessed would solve application problems involving integers, fractions, decimals, percents, and proportions. Of the students assessed, 40% achieved this level of success if all three of the assessment questions are included. Students did significantly worse on question #2 which suggests one of two possible issues; the question was poorly worded, or students were not given sufficient practice with these sorts of multi-step percent problems. If this question is removed from the data set, then of the students assessed, 73.3% achieved the desired level of success.

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

   Strengths: **Overall, students performed incredibly well. 80% of all students assessed were able to solve problem #1 from the three question problem set at the 75% level or better with many achieving 100% success of this problem. For problem #3, 73.3% of all students were able to solve this problem at the 75% level or better. The MTH 067 curriculum was revised this year, and this was the first time outcome #1 has been assessed. Given the increase in application complexity, these results are very promising.**

   Weaknesses: **Only 50% of all students assessed were able to answer question #2 from the three question problem set correctly. As stated before, this could be due to the question being poorly worded, but it could also be due to a lack of exposure to percent problems which require more than one step. This issue will need to be addressed at the Fall 2011 in-service meeting with both full- and part-time instructors.**

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

   The 75% success goal was not met. If question #2 is removed from the data set, the percent of students that successfully met this outcome is 73.3 which is close to the desired goal. From this assessment, it is clear that question wording needs to be extensively reviewed before the questions are used. For this assessment, two full time faculty reviewed the questions, but in the future, the number of reviewers needs to be expanded. Also, meetings need to be held with both full and part-time faculty to discuss a potential issue with student exposure to percent problems requiring more than one step.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.
   a. ☐ Outcomes/Assessments on the Master Syllabus
      Change/rationale:

   b. ☐ Objectives/Evaluation on the Master Syllabus
      Change/rationale:

   c. ☐ Course pre-requisites on the Master Syllabus
      Change/rationale:

   d. ☐ 1st Day Handouts
      Change/rationale:

   e. ☐ Course assignments
      Change/rationale:

COURSE ASSESSMENT REPORT

⬐ Handouts

☐ Other:

Xg. ☐ Instructional methods

Change/rationale: **More exposure to percent problems requiring more than one step. This is being implemented based on the large difference in the percent of students who were successful in completing problems 1 and 3 (problem three being a far more complex problem requiring several steps to complete) versus the results for problem 2 on this assessment.**

h. ☐ Individual lessons & activities

Change/rationale:

3. What is the timeline for implementing these actions?
   Changes will be implemented starting Fall 2011.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course. **The assessment method was effective in that is clearly shows the percent of students who can successfully solve one-step applications as well as those involving more than one step.**

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.
   It is possible that wording played a role in the poor performance on question #2. **A greater effort will be made in the future to make sure that question wording is clear and meaningful to students.**

3. Which outcomes from the master syllabus have been addressed in this report?
   All _____ Selected **Outcome #1**
   If "All", provide the report date for the next full review: _____.

   If "Selected", provide the report date for remaining outcomes: **Outcome #3 will be assessed Winter 2012, Outcome #2 will be assessed Winter 2013.**

Submitted by: Jason Davis

Print: _____ Signature _____ Date: 7·13·11
Faculty/Preparer

Print: Kristin Chatas Signature _____ Date: 6.13.11
Department Chair

Print: Martha Showalter Signature _____ Date: JUL 1 3 2011
Dean/Administrator

logged 7/18/11 s√
Approved by the Assessment Committee 11//08

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
   Course Discipline Code and Number: **Mth067**
   Course Title: **Foundations of Mathematics**
   Division/Department Codes: ~~12200~~ MTH ᵗᵒ

2. Semester assessment was conducted (check one):
   X☐ Fall 2010
   ☐ Winter 20__
   ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   ☐ Portfolio
   ☐ Standardized test
   ☐ Other external certification/licensure exam (specify):
   ☐ Survey
   ☐ Prompt
   X☐ Departmental exam
   ☐ Capstone experience (specify):
   ☐ Other (specify):

4. Have these tools been used before?
   ☐ Yes
   X☐ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.

5. Indicate the number of students assessed/total number of students enrolled in the course.
   321 students were accessed / 471 students were enrolled.

6. Describe how students were selected for the assessment.
   All students who took the final exam were selected for assessment.

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.
   The Master syllabus was reviewed, less emphasis was placed on rote arithmetic and more emphasis was placed on multi-step problem-solving.

2. List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.
   Outcome #2: Solve algebraic equations which involve more than two steps.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*
   To assess this outcome, a common final was created for all sections. Question 9 from this common final exam was then graded with no partial credit being assigned (answers were counted as correct or incorrect). Of the 321 students who were assessed, 63% of them were able to solve the problem correctly.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*
   The standard of success used was that 75% of those students assessed would be able to solve an algebraic equation involving four steps. Of the students assessed 63% achieved this level of success.

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

Strengths: **This was the first semester that mth067 students were asked to solve such complex algebraic equations. As an initial effort, 63% of all students being able to correctly solve a four step equation is certainly progress. It was also noticed that some sections preformed significantly better than other sections. This gives us the opportunity to discuss what methods faculty for these sections used to achieve such a high level of success with respect to outcome #2 and then implement these methods throughout the course.**

Weaknesses: **Although 63% of all students successfully met the goal of outcome #2, many sections performed well below this level. Of the 18 sections assessed, seven had below a sixty percent level of success. It is apparent that meetings need to be held with those who teach mth067 to discuss successful strategies for teaching multi-step algebraic problem-solving so that instruction is more consistent from section to section.**

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.
   The 75% success goal was not met. An initial meeting was held to discuss possible solutions to lower than desired student performance. Several potential solutions were discussed and it was decided that equations need to be emphasized throughout the curriculum rather than being isolated in a single unit within the course. Increasing student understanding of algebraic equation solving will continue to be a primary topic at faculty meetings to further explore successful instructional methods for teaching multi-step equation solving.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.
   a. ☐ Outcomes/Assessments on the Master Syllabus
      Change/rationale:

   b. ☐ Objectives/Evaluation on the Master Syllabus
      Change/rationale:

   c. ☐ Course pre-requisites on the Master Syllabus
      Change/rationale:

   d. ☐ 1st Day Handouts
      Change/rationale:

   e. ☐ Course assignments
      Change/rationale:

   f. ☐ Course materials (check all that apply)
      ☐ Textbook
      ☐ Handouts
      ☐ Other:

   Xg. ☐ Instructional methods
      Change/rationale: **More emphasis on integration of equation solving throughout the various units within the course. This change is being implemented based on discussion with instructors whose students had a high level of success with this outcome.**

   h. ☐ Individual lessons & activities
      Change/rationale:

3. What is the timeline for implementing these actions?
   Changes will be implemented starting Winter 2011.

COURSE ASSESSMENT REPORT

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course. **The assessment method was effective in that is clearly shows the percentage of students who can successfully solve a multi-step equation.**   ✗

2. If the assessment tools were not effective, describe the changes that will be made for future assessments. **One issue with the assessment method is that it does not allow for degrees of understanding. Many students had shown an understanding of the problem-solving process but made simple arithmetic mistakes at some point in the process. These students were omitted as successes even though they had learned much of the problem-solving process correctly. In the future, a new rubric needs to be created to better reflect the level of understanding for this outcome.**   ✗

3. Which outcomes from the master syllabus have been addressed in this report?

    All _____   Selected **Outcome #2**

    If "All", provide the report date for the next full review: _____.

    If "Selected", provide the report date for remaining outcomes: **Outcome #3 will be assessed Winter 2011, Outcome #1 will be assessed Spring 2011.**

Submitted by:

Print: ___Jason Davis___   Signature _____   Date: _1/7/2011_
Faculty/Preparer

Print: ___Kristin Chatas___   Signature _____   Date: _1. 7.11_
Department Chair

Print: _Martha A. Showalter_ Signature _____   Date: _JAN 1 0 2011_
Dean/Administrator

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
   Course Discipline Code and Number: MTH 067
   Course Title: Foundations of Mathematics (Basic Math)
   Division/Department Codes: MN B / MTH D

2. Semester assessment was conducted (check one):
   ☒ Fall 20_09_
   ☐ Winter 20__
   ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   ☐ Portfolio
   ☐ Standardized test
   ☐ Other external certification/licensure exam (specify):
   ☐ Survey
   ☐ Prompt
   ☒ Departmental exam
   ☐ Capstone experience (specify):
   ☐ Other (specify):

4. Have these tools been used before?
   ☒ Yes
   ☐ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made. Equations were added.

5. Indicate the number of students assessed/total number of students enrolled in the course. 22 out of 400

6. Describe how students were selected for the assessment. One random test was selected from each of 22 sections.

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment. Equations were added as an emphasis.

2. List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.

See attached

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*

See attached

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*
   See attached

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.
   Strengths: All other operations except as shown in chart next

Approved by the Assessment Committee 11//08

Weaknesses: The questions that did not meet this goal tested the following topics:

Question Number	Topic	Mitigation Strategy
4	Order of ops	Alert instructors: more practice in class
7	Divide fractions	Alert instructors: more practice in class; rewrite problem in vertical form
9	Subtract mixed numbers	Alert instructors: more practice in class
11	Subtract decimals	Alert instructors: more practice in class
13	Fraction to terminating decimal	Alert instructors: more practice in class
14	Subtract two negative integers	Alert instructors: more practice in class

III. Changes influenced by assessment results
1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

Course is being redesigned to include calculators to perform all of the functions listed above. A lower level course for no credit will be offered through Life Long learning.
Jason Davis, the new mentor, is completely changing this course because, in a nutshell, students who come in without the skills above are not given enough time to master them. Others who simply need a refresher would be better served with a course designed to apply the concepts.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.
   a. ☒ Outcomes/Assessments on the Master Syllabus
      Change/rationale: Course is being redesigned

   b. ☒ Objectives/Evaluation on the Master Syllabus
      Change/rationale: Course is being redesigned

   c. ☒ Course pre-requisites on the Master Syllabus
      Change/rationale: Course is being redesigned. Level

   d. ☒ 1st Day Handouts
      Change/rationale: Course is being redesigned

   e. ☒ Course assignments
      Change/rationale: Course is being redesigned

   f. ☒ Course materials (check all that apply)
      ☒ Textbook Course is being redesigned
      ☒ Handouts Course is being redesigned
      ☒ Other: Course is being redesigned

    g. ☐ Instructional methods
       Change/rationale:

    h. ☒ Individual lessons & activities
       Change/rationale:

3. What is the timeline for implementing these actions? Fall 2010

IV. Future plans
1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.
Extremely. This helped us see trends in topics that students struggle with and make decisions about future offerings.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

3. Which outcomes from the master syllabus have been addressed in this report?
    All __x___   Selected _____
    If "All", provide the report date for the next full review: _____.

    If "Selected", provide the report date for remaining outcomes: _____.

Submitted by:

Print:_____Lisa Rombes_____   Signature_____Lisa Rombes_____
Date:_____4/22/2010_____
    Faculty/Preparer
Print:_____K.Chatas_____   Signature_____   Date:_____
    Department Chair
Print: M. Showalter_____   Signature___M Showalter_____   Date: 4/22/10
    Dean/Administrator

ASSESSMENT RESULTS   **MATH 067**   **Winter 2010**

April 2010 (data from Fall 09)

To Whom It May Concern:

I, Lisa Rombes, and Brenda Foster completed the assessment as outlined in the Master Syllabus for Math 067.

METHODOLOGY , A Quick Summary:
WE took the first test in the stack for each of 22 sections of math 067 after shuffling the tests.

This produced **22 tests.**

The scoring rubric for each question used was:
0 = no significant knowledge demonstrated
1 = some knowledge demonstrated
2 = correct in all aspects

logged 4/26/10 sjj

COURSE ASSESSMENT REPORT

Background Information

1. Course assessed:

   Course Discipline Code and Number: Mth 067
   Course Title: Foundations of Math
   Division/Department Codes: ??

2. Semester assessment was conducted (check one):
   - ☐ Fall 20__
   - ☒ Winter 20*06*
   - ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   - ☐ Portfolio
   - ☐ Standardized test
   - ☐ Other external certification/licensure exam (specify):
   - ☐ Survey
   - ☐ Prompt
   - ☒ Departmental exam
   - ☐ Capstone experience (specify):
   - ☐ Other (specify):

4. Have these tools been used before?
   - ☐ Yes
   - ☒ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.

5. Indicate the number of students assessed/total number of students enrolled in the course.
   46/486

6. Describe how students were selected for the assessment.
   see attached

Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.
   N/A

2. State each outcome from the master syllabus that was assessed.
   Students will complete arithmetic calculations with whole numbers, integers, fractions and decimals.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. Please attach a summary of the data collected.
   see attached

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success.
   see attached

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.
   Strengths: whole numbers, adding integers, decimals except division

Please return completed form to the Office of Curriculum & Assessment, SC 247.

COURSE ASSESSMENT REPORT

Weaknesses: subtracting integers, subtracting whole numbers, dividing

Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses, along with a timeline for these actions.
   Course instructors will be reminded to practice repetetively

2. Identify any other intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.
   ☐ Master syllabus
   Change/rationale:

   ☐ Curriculum
   Change/rationale:

   ☐ Course syllabus
   Change/rationale:

   ☐ Course assignments
   Change/rationale:

   ☐ Course materials (check all that apply)
      ☐ Textbook
      ☐ Handouts
      ☐ Other:
   Change/rationale:

   ☐ Instructional methods
   Change/rationale:

   ☐ Other:
   Change/rationale:

Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.
   Very effective...gave us topics to focus on

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

Submitted by:

Name: _Lisa Kombes_   Date: _5-29-06_

Department Chair: _____   Date: _6.6.06_

Dean: _M. Shum_   Date: _6/15/06_

Please return completed form to the Office of Curriculum & Assessment, SC 247.