

**Eastern West Virginia Community and Technical College
COURSE ASSESSMENT REPORT**

Course Title and Number: MTH 123 Intermediate Algebra	Academic Term and Year of Assessment Activity (Ex: Fall, 2014) Fall 2016
Report Submitted By: Andrea Williams	Number of Students Assessed: 17
Date Report Submitted: 1/2/2017	Number of Sections Included: 1
Course Delivery Format (list all modalities used in sections assessed. Ex: web based, VDL, traditional section, hybrid course, etc.): Traditional section	

Course Role in the Curriculum

Provide a description of the role the course serves in the curriculum (i.e. general education requirement, program technical core, restricted elective, etc.). Note all as appropriate.

MTH 123 Intermediate Algebra is a college-level general education elective. It is prerequisite to MTH 135 College Algebra. It is primarily taken by students seeking a transferrable degree (Associate of Arts or Associate of Science).

Assessment Methods

Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.

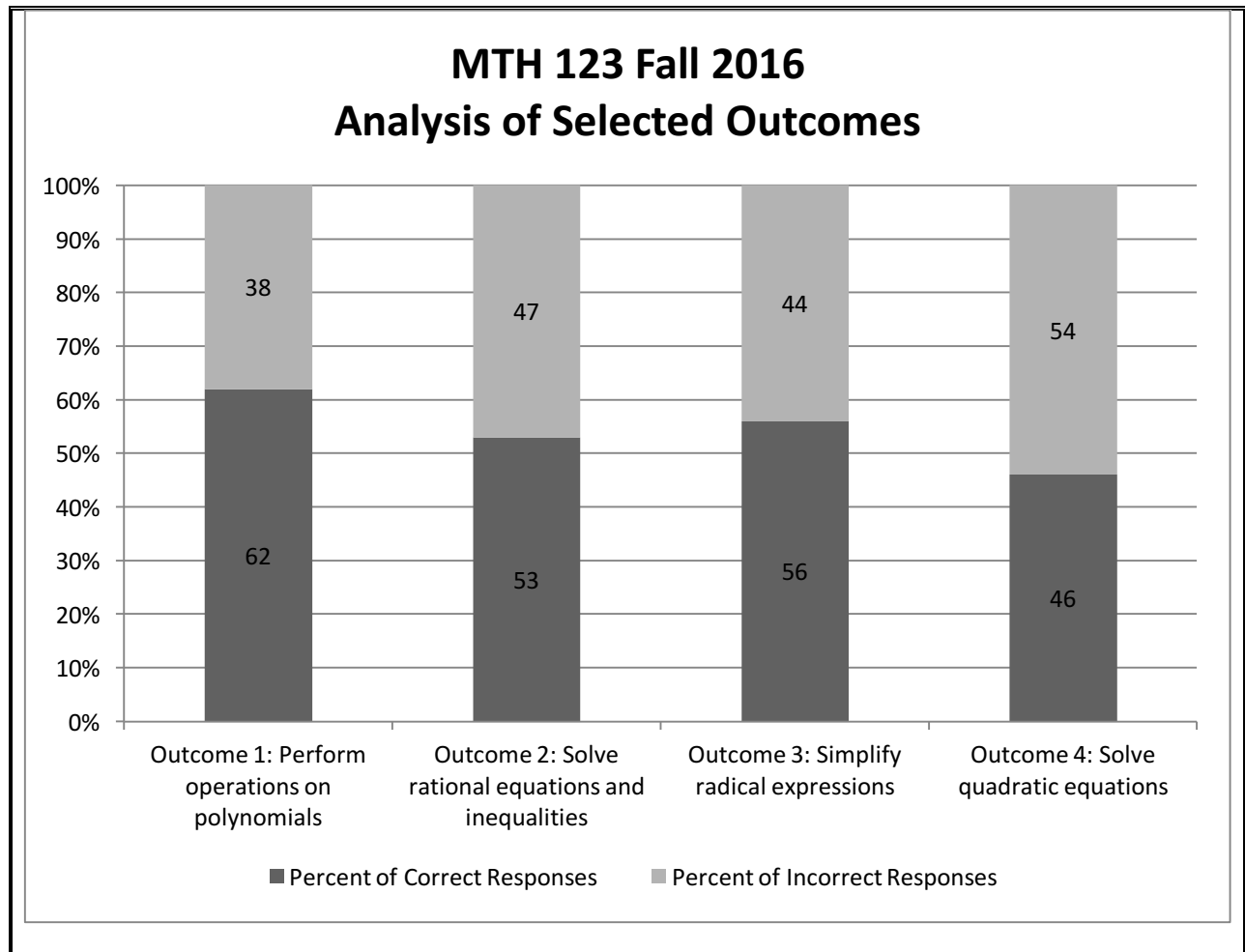
Final exam questions are used as a basis for this assessment. The final was a paper exam given in two parts on two days. Students were allowed to use a graphing calculator and a 3x5 index card of notes they created. Students were given partial credit based on the work they showed on their test paper. For purposes of this analysis, questions receiving full credit and questions receiving a minor reduction in points unrelated to the outcome (e.g. copying errors, leaving a fractional answer unreduced, etc.) are considered correct. Students were given a review assignment in MyMathLab two weeks prior to the final exam with similar questions. The review assignment counted as a test grade.

Multiple questions are included in each outcome for analysis. A minimum satisfactory percent of correct responses for each outcome is 75%. Those failing to meet the standard are reviewed on an outcome-by-outcome basis.

Assessment Results

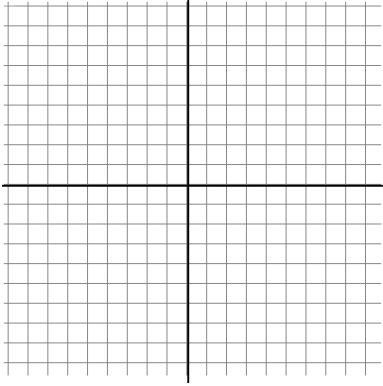
Provide a summary of results including tables/charts. Incorporate information from previous assessments as appropriate. Append additional pages if necessary. If appending, include notation in box to "See attached".

Four outcomes were analyzed, and none of the four met the 75% correct criterion. More details about the outcomes and the assessed questions are included in the action plan.



Course Level Assessment Summary of Outcomes, Indicators and Results Course Title and Number: MTH 123 – Intermediate Algebra Number of students in assessment sample = 17 Number of Sections in Assessment = 1 Add additional rows to table if necessary				
Learning Outcomes (Insert learning outcomes assessed during this cycle)	Indicator (Insert indicators used for each outcome: exam question, scoring rubric, etc. Be specific)	Percent of Correct Responses	Percent of Incorrect Responses	Performance Standard Met (75%)* (yes or no)
Outcome 1: Perform operations on polynomials	1.16. Simplify: $(8x^2 - 2x) - (4x - 2) + (5x^2 - 4)$. 1.17. Multiply: $(x + 3)(x^2 - 4x + 1)$.	62%	38%	No

	<p>1.18. Factor completely: $4x^6 - 100x^4$.</p> <p>1.19. Solve by factoring: $2x^3 + 17x^2 + 35x = 0$.</p> <p>2.2. Divide: $(4x^3 + 11x^2 + 5x - 8) \div (x + 2)$.</p>			
Outcome 2: Solve rational equations and inequalities	<p>1.5. Find the domain of $f(x) = \frac{4}{3-x}$. Write your answer in set notation.</p> <p>2.1. Solve $\frac{x-1}{x+4} = \frac{5}{7}$.</p> <p>2.3. Solve $\frac{x+7}{x-17} \geq 0$. Give your answer in interval notation.</p>	53%	47%	No
Outcome 3: Simplify radical expressions	<p>2.4. Simplify $\sqrt{45a^9}$.</p> <p>2.5. Simplify $8\sqrt{50} - 4\sqrt{2}$.</p> <p>2.6. Simplify $(2 + \sqrt{7})(5 - 7\sqrt{7})$.</p> <p>2.7. Simplify $(m^{3/2}n^{-4/3})^{6/7}$. Do not use any negative exponents in your final answer.</p> <p>2.8. Rationalize the denominator: $\frac{8}{5-\sqrt{6}}$.</p> <p>2.9. Solve $\sqrt[3]{y+6} - 2 = 2$.</p> <p>2.10. Multiply $(8 + 2i)(3 - 5i)$. Write your answer in the form $a + bi$.</p>	56%	44%	No
Outcome 4: Solve quadratic equations	<p>1.20. A wire is stretched from the ground to the top of an antenna tower. The wire is 40 feet long. The height of the tower is 8 ft greater than the distance d from the tower's base to the end of the wire. Find the height of the tower.</p> <p>2.11. Solve using the principal of square roots: $(x - 8)^2 = 12$.</p> <p>2.12. Solve by completing the square: $x^2 - 24x = 10$.</p> <p>2.13. Solve using the quadratic formula: $x^2 + 41 = 10x$.</p>	46%	54%	No

	<p>2.14. Solve $F = \frac{Lm_1m_2}{r^2}$ for r. Assume all variables represent positive numbers.</p> <p>2.15. Solve $x^4 - 25x^2 + 144 = 0$.</p> <p><i>For question 16, graph the function. Clearly indicate at least 5 points, including the vertex, that lie on the graph. Identify the vertex, axis of symmetry, maximum or minimum value, and the range of the function.</i></p> <p>2.16. $g(x) = -2(x + 1)^2 + 4$</p>  <p>2.17. Write $f(x) = x^2 - 6x + 10$ in the form $f(x) = a(x - h)^2 + k$.</p>			
--	--	--	--	--

* Please note if using a different minimum performance standard.

Conclusions
Provide a brief summary of conclusions derived based on analysis of data. Append additional pages if necessary. If appending, include notation in box to “See attached”.
While none of the outcomes were met at the 75% standard, overall the class did well as indicated by their final course grades. The areas of weakness are discussed in the Action Plan below, but the majority of the students are well-prepared to go on to take College Algebra if they so choose.

Previous Assessment Reports and Results
Date of Previous Assessment: Fall 2014
List of Outcomes Not Met: Perform operations on complex numbers, solve quadratic applications
Summary of Actions Taken to Address Unmet Learning Outcomes: Append additional pages if necessary. If appending, include notation in box to “See attached”.
Note that the Master Course Record has been revised since the previous course assessment. Each of these outcomes now fall under a broader, course-level outcome:

- “perform operations on complex numbers” is included in Outcome 3
- “solve quadratic applications” is included in Outcome 4.

When these specific outcomes are examined individually, the percent of correct responses becomes

- perform operations on complex numbers: 82% (a 15% *increase* from 2014 and above the desired performance standard)
- solve quadratic applications: 29% (a 4% *increase* from 2014 but still well below the desired performance standard). As suggested on the previous assessment, a more straight-forward question testing this outcome was used on the final exam, and a similar problem was included on the final exam review, but this continues to be an area of difficulty for the students.

The instructor also attempted to implement the review time before class on test days as discussed in the last assessment, but so few students took advantage of the opportunity that it was discontinued. With this section, it proved to be more effective to continually encourage the students to come to office hours when necessary.

Another change implemented since the last assessment was a required final exam review. Previously, it was offered as an option for extra credit, and very few students even attempted it. The review is now required as a test grade, which has proven to motivate the students to do well on it. The students are also required to conduct a tutoring session with tutor.com early in the semester with the intent that they will continue to use it throughout the semester. Both of these changes seem to have had a positive effect on student performance and will continue to be used in future semesters.

Action Plan and Date for Reassessment

Identify action plan for improvement or maintaining current performance levels including outcomes identified for re-assessment, curriculum revision, LOT proposal, new or revised course activities to reinforce learning outcomes, etc. Append additional pages if necessary. If appending, include notation in box to “See attached”.

The exam questions with the lowest number of correct responses included

- 1.19 – The majority of students *factored* the left side of the equation correctly but omitted the additional step of setting each factor equal to zero to solve the equation. The difference between *factoring an expression* and *solving an equation by factoring* will be emphasized in upcoming sections.
- 2.3 – Solving a rational inequality has always proven to be a difficult topic for this course. Consideration will be given to omitting this topic from MTH 123 altogether and waiting to cover it in College Algebra.
- 2.4 – The students did well with this type of question when it was first covered but apparently did not retain the information. It will be ensured that a similar question is included on the final exam review.
- 1.20 – This was the quadratic application problem discussed above in the Previous Assessment Results. More problems related to this outcome will be added to the homework and the final exam review.
- 2.12 – Most students knew how to find the number to “complete the square” but then forgot how to finish the problem from there. Since this is likely the first time most students are exposed to completing the square, more in-class examples and homework problems on the topic would be beneficial.

To better assess “simplify radical expressions” in the future, the final exam questions like 2.5, 2.6, and 2.8 need revision. Several students had the correct answer to these questions but lost points for not showing work; there are certain calculators that can simplify expressions such as these. Several strategically-placed variables would show whether the students truly understand these types of problems or are relying on the calculator to do the work for them.

Consideration also needs to be given to reducing the number of outcomes in MTH 123. For the past several semesters, very little, if any, of the outcome “solve problems involving exponential and logarithmic functions” has been covered due to time constraints. Is this a topic that needs to continue to be a part of MTH 123 (the last course assessment for MTH 135 indicates it does), and if so, what other outcomes could be omitted or at least pared down to ensure time for exponents and logarithms at the end of the semester?

The last two semesters of MTH 123 have been the first to include students that completed MTH 103. While students testing out of developmental math perform the best in MTH 123 by far, thus far completion of MTH 103 seems to be as indicative of success in MTH 123 as any of the 90-level developmental math courses (See Attachment 1). A correlation between previous coursework and performance in MTH 123 will continue to be monitored in upcoming semesters.

Proposed date for the next assessment is Fall 2018.

**Assessment Committee Recommendation/Approval
(To be posted by Assessment Committee Chair)**

- Approved as presented
- Approved with recommendations for future reports (Explanation Required)
- Resubmission Required. Reason for Resubmission:

Date: 02/10/17

Attachment 1: Performance in MTH 123 Based on Previous Coursework (Includes Spring and Fall 2016)

	Final Grade in MTH 123					Total	Average
	A	B	C	D	F/UF		
Students who took and passed MTH 103	1	5	10	3	8	27	1.56
Students who took and passed MTH 99			1	2		3	1.33
Students who took and passed MTH 97	1	1	1		2	5	1.80
Students who took and passed MTH 96	1				4	5	0.80
Students who were not required to take any dev math courses	7	2			3	12	2.83
	10	8	12	5	17	52	1.79

A = 4.0

B = 3.0

C = 2.0

D = 1.0

F/UF=0.0