Eastern West Virginia Community and Technical College
COURSE ASSESSMENT REPORT
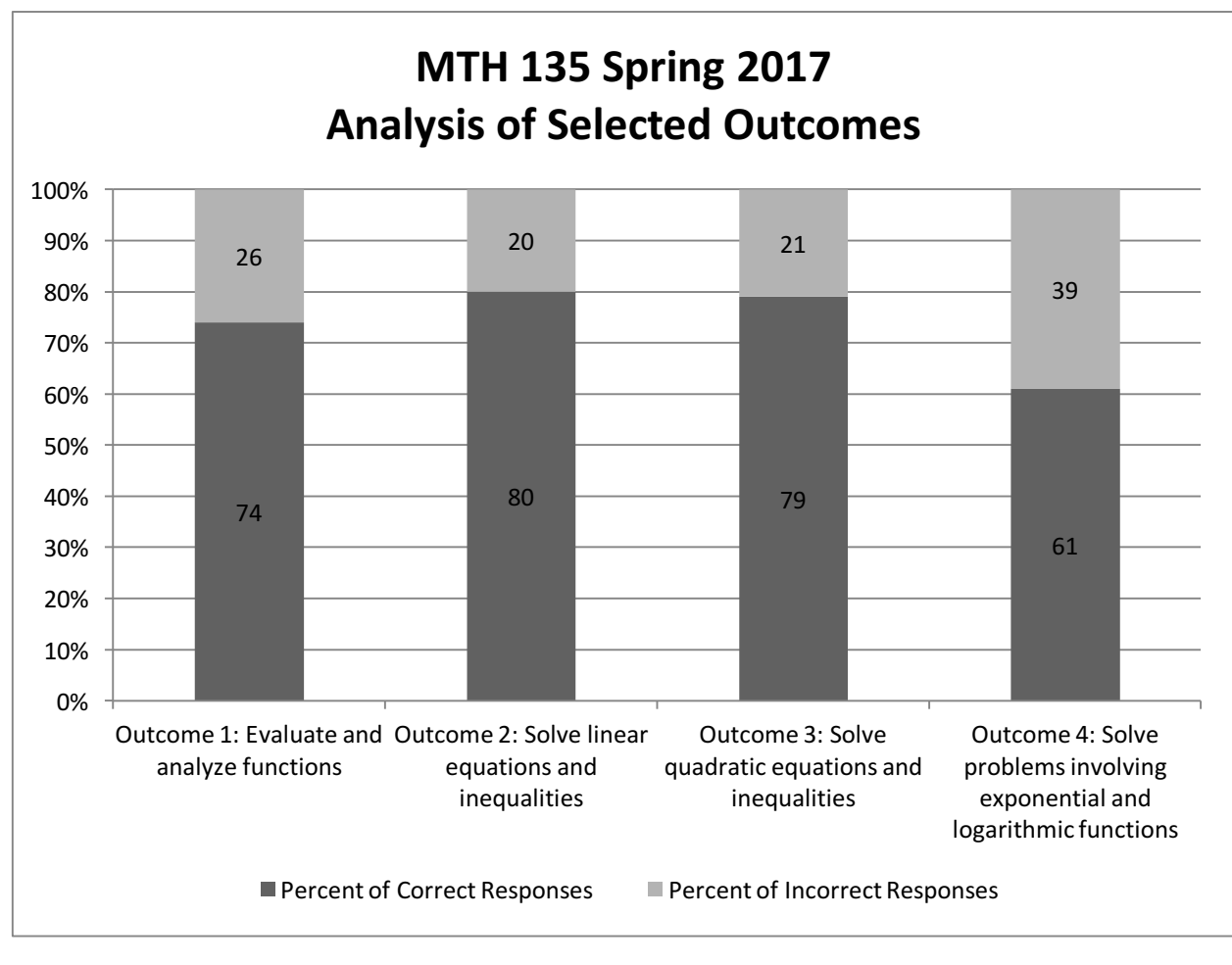
Course Title and Number: MTH 135 College Algebra	**Academic Term and Year of Assessment Activity (Ex: Fall, 2014)** Spring 2017
Report Submitted By: Andrea Williams	**Number of Students Assessed:** 33
Date Report Submitted: 5/24/2017	**Number of Sections Included:** 2
Course Delivery Format (list all modalities used in sections assessed. Ex: web based, VDL, traditional section, hybrid course, etc.): Both traditional sections, one of adults at Eastern's main campus and one of early entrance students at Petersburg High School	

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 135 is a general education course taken primarily by students seeking an Associate of Science degree or by those who will transfer to a four-year program of study requiring College Algebra. At Eastern, MTH 123 Intermediate Algebra or satisfactory placement scores are prerequisites to MTH 135.
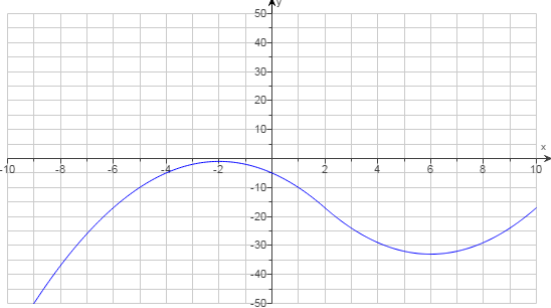
Assessment Methods
Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.

Final exam questions are used as a basis for this assessment. The two sections were given different exams via different modalities, but the instructors collaborated prior to the exam about what questions would be included for purposes of this assessment. For the adult section, 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, but for purposes of this analysis, only questions receiving full credit 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.

For the high school section, the exam was given through the online homework and assessment product Pearson's MyMathLab (as were all of the unit tests during the semester) but was proctored in class.

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 two out of the four met the 75% correct criterion, comparable to the Spring 2015 course assessment. More details about the outcomes and the assessed questions are included in the action plan.

MTH 135 Spring 2017
Analysis of Selected Outcomes

Course Level Assessment Summary of Outcomes, Indicators and Results					
Course Title and Number: MTH 135 – College Algebra – Spring 2017					
Number of students in assessment sample = 33					
Number of Sections in Assessment = 2					
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: Evaluate	**1.1.** Of which of the following sets is 7.2 a member? Circle all that apply.	74%	26%	No	

and analyze functions	a. natural numbers b. whole numbers c. integers d. rational numbers e. irrational numbers f. real numbers **1.5.** Determine whether the relation is a function: $\{(12,1),(17,-3),(33,1),(12,9),(57,9)\}$. **1.6.** Find $f(-1)$ if $f(x) = \frac{4x-16}{x+5}$. **1.7.** Find the domain of $f(x) = \frac{x}{x-6}$. Write your answer in set-builder notation. **1.8.** Use the graph of f to determine intervals (a) where f is decreasing and (b) where f is increasing. Write your answers in interval notation. **1.14.** Find $f(1)$ if $f(x) =$ $\begin{cases} 4x, \text{ if } 0 \le x \le 2 \\ x-1, \text{ if } 2 \le x \le 6 \end{cases}$. **2.15.** If $f(x) = 4x+3$ and $g(x) = \frac{2}{x}$, find $(fg)(5)$. **2.16.** If $f(x) = 9-8x$ and $g(x) = x^3$, find $(g \circ f)(x)$. **2.17.** Find the inverse of the one-to-one function $f(x) = 3x+1$. **2.12.** For $g(x) = |4x-3| + 6$, evaluate each of the following. a) $g(-3)$ b) $g(b)$ c) $g(x^3)$ d) $g(3x-4)$			

Outcome 2: Solve linear equations and inequalities	**1.13.** Solve for n: $r = 3n + 3z$. **1.15.** Let y vary directly with x. Find y when $x = 16$, if $y = 7$ when $x = 4$. **1.16.** Solve the inequality $4 > 2(x + 1) - 4 > -4$. Write your answer in interval notation.	80%	20%	Yes
Outcome 3: Solve quadratic equations and inequalities	**2.2.** Solve $5x^2 = 11x + 12$. Include any imaginary solutions. **2.3.** Solve $x(x + 4) = -8$. Include any imaginary solutions. **2.4.** Multiply $(2 + 2i)(5 - 3i)$. Write your answer in the form $a + bi$.	79%	21%	Yes
Outcome 4: Solve problems involving exponential and logarithmic functions	**2.18.** There are initially 2500 bacteria in a sample, and this sample doubles in size every hour. Find values for C and a so that $f(x) = Ca^x$ gives the number of bacteria after x hours. **2.19.** Use the formula $A = Pe^{rt}$ to determine the final value of \$8400 invested at 2.5% compounded continuously for 5 years. Round to the nearest cent. **2.20.** Find the domain of $f(x) = \ln(2x + 7)$. Write your answer in interval notation. **2.21.** Solve $\log_3(4x - 3) = -2$. **2.22.** Use the properties of logarithms to write $2 \ln x - \frac{1}{9}\ln y$ as a single logarithm. **2.23.** Find $\log_3 40$ rounded to four decimal places. **2.24.** Solve $3^{x+4} = 8^x$. Round your answer to the nearest thousandth. **2.25.** A city's population P in thousands during year x is modeled by $P(x) = 182(1.013)^{x-1992}$. Estimate the year when the city's population reached 220 thousand. Round down to the nearest year as needed.	61%	39%	No

* 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".
This course assessment shows continued improvement compared to the previous results. The two new outcomes that were assessed both met the 75% standard; the two outcomes that were reassessed were still not quite at the desired level, but both showed improvement from the last assessment, one only missing the criterion by one percentage point. Changes since the previous assessment will continue to be implemented along with further emphasis on weaker topics as discussed below in the action plan.

Previous Assessment Reports and Results
Date of Previous Assessment: Spring 2015 **List of Outcomes Not Met: Evaluate and analyze functions; solve problems involving exponential and logarithmic functions** **Summary of Actions Taken to Address Unmet Learning Outcomes: Append additional pages if necessary. If appending, include notation in box to "See attached".**
The two outcomes not met on the previous assessment both saw an improvement. Evaluate and analyze functions increased by 4% and was just one percentage point short of the 75% standard. Solve problems involving exponential and logarithmic functions also increased by 4%, from 57% to 61%. For the areas of concern, extra in-class examples, homework problems, and problems on the final exam review have been incorporated as discussed in the Spring 2015 assessment. All tests were given in class as closed-book, closed note tests. The final exam review has been made a required assignment, counting as a test grade. The completion rate of the assignment has drastically improved following this implementation.

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".
Outcome 1: Evaluate and analyze functions After seeing improvement since the last assessment, the extra in-class examples and homework problems that have been added will continue to be utilized. The two questions earning the lowest number of correct responses continue to be finding domain and finding the inverse of a function. Both of these topics will be addressed during final exam review in future classes. Outcome 2: Solve linear equations and inequalities Since this outcome was met at 80%, no adjustment to instruction is recommended at this time.

Outcome 3: Solve quadratic equations and inequalities
Both sections did well with all of the questions under this outcome. No adjustment to instruction is recommended at this time.

Outcome 4: Solve problems involving exponential and logarithmic functions
While this outcome has shown improvement over the previous assessment, more work still needs to be done. This seems to be the hardest chapter of the course for students, but it is also one of the most important chapters for students who will be going on to higher math courses. The last assessment mentioned covering the topic in MTH 123 so that students would be exposed to it more than once, but it has not been feasible to incorporate it into 123's schedule. An alternative could be to allow for an extra day in the 135 course schedule for this chapter to allow for review and extra practice on the problem areas. The lowest scoring questions included solving exponential and logarithmic equations, particularly in the context of a word problem, and finding domain of a logarithmic function. The questions on the final exam review for this chapter will also be revised to ensure better alignment with the questions on the final exam.

Per state requirements, the prerequisites for MTH 135 (MTH 103 and 123) will soon be replaced with a *co-requisite* supplement for students not meeting the placement criteria. At the same time, revisions to program requirements will likely result in a reduction of students needing to take MTH 135. Both of these factors could potentially have a significant impact on the results when the course is reassessed in Spring 2019.

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

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

Date: 09-08-17