

**GEarea****Delivery Mode:****Submitted by:****Participating Faculty and Staff:****Outcome Assessed:****Courses Used:****Assessment Reporting****Area D3 - Analytical Thinking**

(Choose one)

R-EUREKA\Dave-Bazard on 3/9/2020

Mathematics Faculty - including former staff Amber Buntin, Mike Butler, Mike Haley, Levi Gill, Steve Jackson, Tami Matsumoto, Tony Luehrs, Todd Olsen, Jon Pace, Erin Wall. Plus data from Dave Arnold and Kyle Falbo

2 - Apply analytical and/or computational concepts to analyze relationships.

Math-120 #3 (Course no longer being taught)

Math-15 #4

Math-194 #2 (Course no longer being taught)

Math-25 #3

Math-30 #2

Math-4 #1

Math-5 #2

Math-50A #2

**Course or degree outcomes to be added/changed/removed:**

The main change has been the "multiple measures placement" and the discontinuation of most pre-collegiate instruction. The college is no longer scheduling Math 120 or Math 194 as GE options. The options for GE now include Math 120, Math 5, 10, 15, 25, 30, 50A.

**Course Level Assessments:**

1 course was not successful at conveying this outcome.

4 courses were generally successful at conveying this outcome.

3 courses were definitely successful at conveying this outcome to most of the students.

0 courses were not included in this report.

**Findings/Results:**

Seven of the eight course-level assessments were deemed successful or generally successful. The success within each assessment ranged from 60-95%, which is consistent with the percent of students who pass mathematics courses. The one unsuccessful assessment (52% in Math-5) is discussed below. In this case the instructor comments about the environment of testing and how assessment of the outcome was mixed in with other content related to opinion and emotion. The instructor intends on assessing this outcome differently in the future to separate out achievement of the outcome from other factors.

Dialogue amount faculty led to an agreement that students who are active in the classes (attend most or all sessions, actively take notes, do homework, etc.) tend to meet the outcomes and expectations from the course. Lack of success in achieving the outcome has more to do with "student skills" than specific knowledge of math facts. A greater emphasis on students taking advantage of support services (Math Lab, Math Review courses, support courses) is advised. The faculty also discussed ways to help students better understand the hours required to learn the material (twice the amount of outside work as lecture hours) and to manage their time. Discussion of learning is important for students. The material will not be easy and it's okay to fail and learn from mistakes.

**Specific course comments:**

Many students have a weakness in interpreting results from graphing calculators. Instructors need to continually stress interpretation of results from calculators and graphing programs (from Math 120). Students struggle to assess the validity of their predictions was due to the small amount of time spent on the topic of regression. Plan to make regression a more prominent course topic, which I believe will familiarize students with regression concepts over time rather than all at once (Math-194). Instructors felt that the majority of students that are active in class (taking notes, doing homework, etc.) met expectations on this assessment. Some discussion led to instructors wanting to be more consistent in labeling schematics and diagrams properly when presenting the material in class. Instructors agreed to publish artifacts and rubrics on course outline pages so that future instructors teaching Math 25 will have access to what we did this semester (Math-25). For those who didn't meet expectations, most errors were small mistakes that made the student ultimately arrive at an incorrect answer. I was pleased that my successful students applied the quadratic formula successfully. But I know quantifying irrational numbers to check for extraneous is a bit of a stretch. Still a large number of students unsuccessful. I think that the way I broke the material up this semester by having them test on solving logs as the last section covered for that midterm as opposed to applications of logs as the last section could have had an effect. In the future I would wait to finish the chapter before the exam (Math-30). Some students this semester demonstrated inability/unwillingness to write about their findings, results, and products. These findings suggest a change to how written components to the course are assessed. Changes/Actions: Low stakes written assignments should be implemented earlier in the semester (Math-4). Nearly all students displayed the ability to handle this problem adequately if not well. Those who did not had largely stopped participating (3 had stopped attending class) and/or were just hanging on with the basics. This was a complicated multi-step problem and was beyond those students' abilities at that time. In future, this outcome might be better assessed with a more basic application of calculus in a less-complicated problem.

**Actions/Changes To Be Implemented:**

**Course Mapping:**

Four of the 8 courses assessed were done in the last 2-years. Five of the eight were assessments conducted during the 2016-2020 assessment cycle (4-year cycle)