

Assessment Report, 2012/2013 Academic Year Mathematics General Education Program

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Introduction

This math department serves two important roles in the general education of Oregon Tech students: (1) Students receive basic mathematical training expected of any college graduate. (2) Students receive major-specific mathematical training in support of courses taken in their majors. During the fall departmental meeting on assessment the department agreed that the following mission, objectives and outcomes needed no changes:

Mission

All Oregon Tech students will receive a basic mathematics education expected of a college graduate. Those needing it will receive further instruction in support of their major courses of study.

Educational Objectives

Individuals having completed their required math courses at Oregon Tech will have an understanding of the fundamental skills of mathematics, and will understand and be able to apply mathematical concepts as needed in their major courses and daily lives.

Expected Student Learning Outcomes

Upon completion of their required math courses, students will be able to

1. apply mathematical concepts and principles to perform symbolic computations
2. create, use and analyze graphical representations of mathematical relationships
3. use mathematical concepts and techniques to solve applied problems

Data Collection/Assessment Schedule

Program Student Learning Outcomes	Academic Year Assessed		
	'11-12	'12-13	'13-14
1. Apply mathematical concepts and principles to perform symbolic computations.	X		X
2. Create, use and analyze graphical representations of mathematical relationships.	X	X	
3. Use mathematical concepts and techniques to solve applied problems.	X		

Table 1: Assessment schedule.

2012/13 Assessment Activities

For the 2011/12 academic year, we assessed all three outcomes, for the purposes of providing data for a portion of the assessment of the ISLO on mathematical knowledge and skill. Results were considered acceptable for Outcome 2 above, which is the ISLO we were scheduled to assess this year. We have decided not to assess that outcome this year, for several reasons:

- We have seen improvement in that area over the past several years, as a result of extensive piloting and focus on that ISLO. It is felt that it is redundant to turn right around this year and assess it again.
- The Executive Committee is considering the possibility of using a three-year period of results for the next ISLO assessment, rather than assessing all three outcomes in one year. That way one outcome can be assessed each year, every three years, and doing all three at one time can be avoided.

Rather than conduct an assessment activity this year, we decided instead to take a careful look at Outcome 3. The mathematics faculty members were asked to submit examples of Math 111 exam questions they had used in the past that they considered to be assessments of the use of mathematical concepts and techniques to solve applied problems. The faculty then looked at the contributed exercises as group, and discussed them at length.

In the end, it was decided that the one topic in which we all agreed upon was the use of exponential models in applications. However, we identified a number of choices that could affect difficulty and student performance:

- The “real world” context in which the application is framed.
- Whether the relevant equation is given or not.
- Whether or not values of parameters and variables are integers.

- Whether the application is “forward” (substitute values and compute) or “backward” (solve an equation).
- Whether the question tests understanding or simply computational skill. Suggestions offered of testing understanding were questions about half-life and/or doubling time.
- Whether the parameters have numerical values or are simply represented by letters.
- Whether the question is framed continuously or discretely (again, half-life and doubling time).

It was also determined that an effort would be made in the 2013/14 academic year to develop some assessment activities that are meaningful to the math department, rather than to simply conduct assessments that lead to providing data for the assessment of the mathematics ISLO.

Planned Activities for 2013/14

The Mathematics Department has identified several areas of activity for the 2013/14 academic year:

- For each of the possibilities outlined in the previous section, either something will be decided upon or the various possibilities will be compared through piloting questions. Piloting will be done throughout the fall term.
- The three learning outcomes will be examined for the possibility of developing more specific criteria for assessing at a finer level. The mission and educational objectives will likely be revisited as well for validation or change as felt necessary.
- Faculty members will bring forward areas of concern for the possibility of targeted assessment activities in perceived areas of weakness.
- The possibility of setting benchmarks based on performance of successful (based on course grade) students will be explored.

Detailed assessment results are kept by Gregg Waterman, Assessment Coordinator for the Mathematics General Education Program.

Appendix A: Student Learning Outcomes/Course Curriculum

The courses listed in the following table are the core of the Mathematics Department's service courses, and are offered every term. The table indicates the extent to which each of the three student learning outcomes is addressed in each course. *Emphasized* indicates that there are at least three *core* performance criteria addressing that outcome, and *addressed* indicates that there are some performance criteria (core or non-core) addressing the outcome.

Course	Student Learning Outcome		
	Computation	Graphing	Application
Math 111	Emphasized	Emphasized	Addressed
Math 112	Emphasized	Emphasized	Emphasized
Math 243			
Math 251	Emphasized	Addressed	Emphasized
Math 252	Emphasized	Addressed	Emphasized
Math 254N	Emphasized	Addressed	Addressed
Math 321	Emphasized	Addressed	Emphasized
Math 361	Emphasized	Emphasized	Emphasized