

# **Assessment Report, 2013/2014 Academic Year Mathematics General Education Program**

*Prepared by Gregg Waterman, Mathematics General Education Assessment Coordinator*

## **Introduction**

This math department serves two important roles in the general education of OIT 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. There was some discussion of adding another objective pertaining to communicating mathematical reasoning, but it was decided not to do so.

## **Mission**

All OIT students will receive a basic mathematics education expected of a college graduates. 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 OIT 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		
	'12-13	'13-14	'14-15
1. Apply mathematical concepts and principles to perform symbolic computations.		X	
2. Create, use and analyze graphical representations of mathematical relationships.	X		
3. Use mathematical concepts and techniques to solve applied problems.			X

**Table 1:** Assessment schedule.

### 2013/14 Assessment Activities

It appeared that one of our course performance criteria was not adequately addressed in the currently adopted textbook, but that was found not to be the case – the criterion is addressed by the text.

Several issues arose in the attempt to assess Outcome 3 in Math 111 during the 2011/12 academic year. The following activities are planned for 2013/14:

- We will pilot various versions (as described in the 2012/13 report) of exponential model problems during fall and winter terms.
- We will use performance of competent students (as measured by overall course grades) to set a performance benchmark for such exponential model problems.

### *Assessment Results*

It was decided to administer exams to students containing three exercises for which they needed to solve an exponential equation for an unknown in the exponent:

- Exercise 1: Numerical values given for all parameters:  $120 = 50e^{0.25t}$
- Exercise 2: Parameters given as letters:  $A = A_0e^{kt}$
- Exercise 3: The amount  $A$  of Carbon-14 in a fossil can be modeled using  $A = A_0e^{kt}$ , where  $k = -0.00012$  and  $t$  is measured in years. If a dead tree trunk initially has 12 grams of Carbon-14, how long will it take until the tree trunk contains 10 grams of Carbon-14.

Three department members administered all three exercises on a single exam (that also had other exercises on it) during Fall term 2013. Results are as follows:

- 81% of the students got the correct answer for Exercise 1.
- 80% of the students got the correct answer for Exercise 2.
- 86% of the students got the correct answer for Exercise 3.

## **Evidence of Student Learning**

All three exercises were essentially the same task in different forms, and here seems to be little difference in student performance from one for to another. These results indicate that perhaps 80-85% is a good benchmark for such exercises.

## **Changes Resulting From Assessment**

There were no activities in this area this year.

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.

<b>Course</b>	<b>Student Learning Outcome</b>		
	<b>Computation</b>	<b>Graphing</b>	<b>Application</b>
Math 111	Emphasized	Emphasized	Addressed
Math 112	Emphasized	Emphasized	Emphasized
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