Assessment Report, 2011/2012 Academic Year
Mathematics General Education Program

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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:

Mission

All OIT 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 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		
	'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.

2011-12 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. Here are the results:

Overall results for math courses combined

There were 232 students who participated in the assessment in math courses. The Math Department has set the acceptable level of performance at 60% of students achieving proficiency. Results for students demonstrating proficiency or high proficiency for all math courses combined are shown in Table 2.

Proficiency Level	Math Computation	Graphical Comprehension	Application	Overall*
Percent proficient (two correct)	39.7	33.2	27.2	
Percent highly proficient (three correct)	25.4	37.9	17.2	
Total proficient or highly proficient	**65.1**	**71.1**	**44.4**	**31.0%***

Table 2. Overall proficiency levels

*Percentage of students performing at proficiency or high proficiency for all three criteria.

Analysis by course

To determine strengths and weaknesses in student performance in each course, an analysis of student proficiency by course was completed, as shown in Table 3.

Proficiency Level	Math Computation	Graphical Comprehension	Application	Overall*
Math 111 (*n* = 98)				
Percent proficient (two correct)	40.8	34.7	30.6	
Percent highly proficient (three correct)	28.6	36.7	12.2	
Total proficient or highly proficient	**69.4**	**71.4**	**42.8**	**31.6***
Math 251 (*n* = 94)				
Percent proficient (two correct)	36.2	26.6	23.4	
Percent highly proficient (three correct)	25.5	44.7	16.0	
Total proficient or highly proficient	**61.7**	**71.3**	**39.4**	**26.6***
Math 361 (*n* = 40)				
Percent proficient (two correct)	45.0	45.0	27.5	
Percent highly proficient (three correct)	17.5	25.0	32.5	
Total proficient or highly proficient	**62.5**	**70.0**	**60.0**	**40.0***

Table 3. Proficiency levels by course

*Percentage of students performing at proficiency or high proficiency for all three criteria.

Evidence of Student Learning

The Mathematics Department reviewed the overall results and found math computation and graphical comprehension to be acceptable. Application is a newly defined performance criterion in this year's assessment; results showing proficiency at 44.4% is a concern, although some in the department feel that this might be in line with what could be expected nationally.

The Math Department reviewed the data by course and revisited the exam questions discussing the relationship between results and each question. They found that:

- Some concepts that were tested in the prescribed questions for Math 111 are not covered in much depth in College algebra textbooks.
- Not all members of the department agree on the level of Math 100 type simplification that should occur when performing computations in Math 111, 112 and 251. Poor performance in some of the computations (including those used in the applications questions) could be due to variation in expectations from instructor to instructor.

Math Faculty Recommendations
The Math Department made the following recommendations to improve the ISLO assessment in the future:

- Some of the exercises used for assessment may have been poorly designed. The department should pilot changes to those exercises on midterm and/or final exams to see if they can be improved.
- The expectation in the area of applications needs be more clearly defined and agreed upon within the department.
- The level of expectation for application of Math 100 computations in trailer courses (Math 111, 112 and 251) needs to be clarified and agreed upon as well.

The Math Department made the following recommendations to improve student learning in the areas noted above:

- Supplemental materials should be designed and used to provide opportunity for student practice on those criteria that are not adequately addressed in the textbooks used.
- A discussion of the expectation in the area of applications will take place over the course of the 2012/13 academic year, with the results being implemented and assessed in the fall of 2013.
- A discussion of the level of expectation for application of Math 100 computations in trailer courses will take place during the 2012/13 and 2013/14 academic years, with the results being implemented and assessed in the fall term of 2014.

For the next three academic years one of the areas of (1) graphing, (2) application and (3) computation will be assessed each year, in that order. The cycle will then repeat again in that order during the following three years.

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.

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