From: Mark Whisler, Chair, Dept. of Mathematics

August 5, 2008

To: Kim Krull, Vice-President of Academic Services, Nancy Zenger-Beneda, Assessment Coordinator, College Algebra instructors

Subject: General Education Assessment for Mathematics, 2007-2008

The General Education goals for mathematics are:
Goal A: The student should apply mathematics by demonstration of proficiency in one or more of the following ways:
1. Extracting data from mathematical problems.
2. Representing data using one or more of the following methods: graphs, charts, tables, and equations.
3. Analyzing data using one or more of the following techniques: estimation, modeling, calculations, extrapolation, and interpretation.
4. Interpreting data.
5. Drawing correct conclusions from data.
6. Presenting data and making conclusions.

Goal B: The student should demonstrate applied mathematics in a career setting in at least one of the following areas:
1. financial
2. scientific
3. agricultural
4. other career settings

Goal C: The student should use appropriate technology to solve mathematical problems.

Our method of evaluation and rubric is as follows:
Goal A: Three questions from the final exam will be used. The student will score a 0 if none are correct, 1 if one is correct, 2 if 2 are correct, and 3 if all three questions are correct. Our target is that 75% of the students should score at least a 2.

Goal B: The final exam will contain one type of each problem. Our target is that 95% of the students should answer at least one question correctly.

Goal C: Three questions from the final exam will be used. The rubric is the same as for Goal 1, as is the target.

The students tested all took the College Algebra final exam for either Fall 2007 or Spring 2008. A total of 116 on-campus students at the two campuses were included, all of which
I analyzed. This includes evening sections. Last year, we had 113 students at the two campuses. With these sections, we have a gain of just over 2.5% from last year's enrollment on the two campuses. There were 363 students tested at other sites, which represents most of the population. This gives a total population of 479 students, which represents an increase from last year's population of 459 students of roughly 4.4%. Since at least one class of 7 was not reported, this increase is understated.

Results:
In the fall semester, we met only one of three goals, as summarized in the accompanying spreadsheet. We had 72.3% of our students meet Goal 1. We had 98.6% meet Goal 2, which is excellent, and 68.4% meet Goal 3, with targets of 75%, 95%, and 75% respectively.
In the spring, performance was a bit better, with two of our three goals being met. 78.9% of our students met Goal 1, 97.9% met Goal 2, and 68.6% met Goal 3.

Results also are broken down by comparing on-campus students (all students at Concordia and GCC) vs. off-campus students. These results are summarized in the following two tables, one for each semester.

<table>
<thead>
<tr>
<th>Fall 2007</th>
<th>Goal A</th>
<th>Goal B</th>
<th>Goal C</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-campus</td>
<td>63.8%</td>
<td>96.6%</td>
<td>50%</td>
</tr>
<tr>
<td>Off-campus</td>
<td>74.4%</td>
<td>99.1%</td>
<td>73.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring 2008</th>
<th>Goal A</th>
<th>Goal B</th>
<th>Goal C</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-campus</td>
<td>75.9%</td>
<td>96.6%</td>
<td>65.5%</td>
</tr>
<tr>
<td>Off-campus</td>
<td>80.1%</td>
<td>98.5%</td>
<td>69.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall (both semesters)</th>
<th>Goal A</th>
<th>Goal B</th>
<th>Goal C</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-campus</td>
<td>69.8%</td>
<td>96.6%</td>
<td>57.8%</td>
</tr>
<tr>
<td>Off-campus</td>
<td>76.6%</td>
<td>98.9%</td>
<td>71.9%</td>
</tr>
</tbody>
</table>

Analysis
This year, we had a drop in performance in the fall, with only one goal being met. We bounced back in the spring to reach two goals. As usual, goals A and C seem to need special attention with on-campus students. What were the differences in the questions that I was using? I took a look at this question, comparing the questions used in these two semesters with questions used in Fall 2006, in which we met all three goals. Those questions are identified by category below:

Fall 2006 (Goal A)
1. Approximating interval over which the value of a function was positive given its graph.
2. Finding balance in a compound interest situation
3. Describing effects of rigid transformations on graph of a function.
Fall 2007 (Goal A)
1. Estimating domain and range of a function from its graph.
2. Describing effects of a rigid transformation on graph of a function.
3. Finding the vertical asymptote of a rational function.

Fall 2006 (Goal C)
1. Finding a local maximum of a quadratic function
2. Finding the balance in an account earning compound interest
3. Finding the product of two matrices.

Fall 2007 (Goal C)
1. Finding distance between two points using the Distance Formula.
2. Finding balance in compound interest situation.
3. Solving an exponential equation.

Spring 2008 (Goal C)
1. Solving a quadratic equation using the Quadratic Formula and calculator.
2. Finding balance in compound interest situation.
3. Answering a question involving an exponential model.

For Goal C two of the three questions used this year involved exponential and logarithmic functions, which often give students difficulties. Since we use calculators extensively with these topics, they are prime candidates to be chosen to measure this goal. The questions in the fall of 2006 also require less thought and analysis; the first and third questions used in that semester are easy. For Goal A, the inclusion of a question about vertical asymptotes in the fall of 2007 jumps out at me. This is another topic that gives students difficulties.

Recommendations
We should give more attention to the skills in Goal C in our classes. Even though we missed Goal A in the fall, we didn’t miss it by that much, and so I am not overly concerned with it.

Comparing on-campus results with those from last year, we can see an improvement in performance on one goal, and a decline in another. On Goal A, performance stayed the same, at around 70%. Goal B showed a slight increase, from 95% to 96.6%. Goal C showed the decrease, dropping from 62% to 57.8%. This is the second year in a row that performance has dropped on this goal on the two campuses. This is my largest concern.

Sincerely,
Mark Whisler

Chair, Department of Mathematics