Mathematics Department Course SLO Assessment Report

**Team leader:** Danny Vo

**Course:** MATH 85 - Mathematical Analysis for Business

**Participating Instructors:** Danny Vo, Lily Lum, Guy De Primo, Sean Nguyen, Bin Shao, Wesley Jeh, Adam Fahey, Nathaniel Hellerstein.

**Semester and year of assessment:** Fall 2014

**Course SLOs being assessed:** Math 75 SLO
   - D. Calculate derivative and interpret their values as instantaneous rates of change or as slopes of tangent lines.
   - E. Calculate and interpret marginal functions.

**Description of the assessment process as determined by the team.**

To assess part D of the Major Learning Outcome for math 75, the assessment team voted to develop one problem with two parts, focusing on finding the derivative of a square root function and finding the equation of a tangent line to the graph of the given function.

To assess part E of the Major Learning Outcome, the assessment team developed two problems. The first problem focused on total cost, the approximate changes in the total cost and the estimation for the total cost of producing n+1 productions without giving an equation for function of the total cost. The second problem focused on a given revenue function, finding the marginal revenue function, the estimation results from finding the marginal revenue when certain number of productions are sold.

The assessment team voted to include these three questions as a part of final exam. The grading rubric for each question was as follows:

- 2 points: Student understood and executed the concept perfectly.
- 1 point: Student partially understood the concept and executed with minor errors.
- 0 points: Student showed no understanding of the concept.

**Summary of assessment results.**

1. Results from eight sections with total 151 students, and 83% passed math 75.
2. For each assessment question, the student’s score is mapped to the following categories:
   - i. Proficient: Score is 2 points.
   - ii. Developing: Score is 1 point.
iii. No evidence: Score is 0 points.
The table below summarizes the results for each question from passing and failing students.

<table>
<thead>
<tr>
<th>Question</th>
<th>Passed</th>
<th>Developing</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>Passed</td>
<td>6</td>
<td>59</td>
</tr>
<tr>
<td>Failed</td>
<td>14</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>67</td>
<td>64</td>
</tr>
<tr>
<td>Question 2</td>
<td>Passed</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Failed</td>
<td>15</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>36</td>
<td>83</td>
</tr>
<tr>
<td>Question 3</td>
<td>Passed</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Failed</td>
<td>13</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>30</td>
<td>98</td>
</tr>
</tbody>
</table>

A bar graph for each question is given below, along with the percentage distribution.
Analysis of assessment results.

1. The first assessment question is focusing on finding the derivative of a square root function and finding the equation of a tangent line to the graph of the given function. Only 48.4% of the students who passed the class are proficient. This question requests many mathematical skills and solid basic foundations from elementary algebra and intermediate algebra. Even the majority of the students know how to convert the square root function to a power function to take the derivative using the power rule, 46.8% of passing students and 32% of failing students are still struggle with finding the equation of the tangent line.

2. The second problem focused on total cost, the approximate changes in the total cost and the estimation for the total cost of producing $n+1$ productions without giving an equation for function of the total cost. While the majority of the passing students are proficient of interpreting the idea of rate of change, only 8% of the failing students shows their understanding of the question.

3. The third problem focused on a given revenue function, finding the marginal revenue function, the estimation results from finding the marginal revenue when certain number of productions are sold. The assessment shows that majority of passing students (72.2%) and a relatively large number of failing students (28%) are proficient in finding the marginal function and interpret its result.

Overall, our students are proficient at performing computations, but not as good with their conceptual understanding. Some students are struggled with connecting the past materials to apply to the current materials. Instructors can spend more time to review the old material from the previous classes but also make sure the new material is taught appropriately within the time limit.

Recommendations for future assessments.
As mentioned above, we should design questions that concentrate more on the current materials and their applications instead of asking questions that require the comprehensive understanding of all of the previous classes. Other than that,
the process was effective in assessing the students’ outcomes. The students who passed the course were more likely to be proficient.