Assessment Data is from what semester? Spring 2014

Faculty Name(s): Rob Smedfjeld

1. Course Name and Number:
Math 167, Calculus for Business and Social Science

2. List all Course SLOs from the Course Outline of Record:

The student will:
1. Manipulate and evaluate mathematical expressions involving limits and derivatives at the beginning level.
2. Manipulate and evaluate mathematical expressions involving integration at the beginning level.
3. Manipulate and evaluate mathematical expressions involving partial derivatives and multiple integration at the beginning level.
4. Apply differential and integral calculus concepts to business, finance and social science problems.
5. Use technology to analyze functions found in differential and integral calculus at the beginning level.

3. Specific Course SLO(s) assessed as part of this project:

2. Manipulate and evaluate mathematical expressions involving integration at the beginning level.

4. Is this course on GE Plan A? X Yes ___ No  (See Catalog pages 49-51 & page 55)
If Yes, identify what area. (All GE course assessments count as GE assessments.)

___ Area I Natural Sciences
___ Area II Social and Behavioral Sciences
___ Area III Fine Arts/Humanities
X Area IV Language and Rationality
___ Area V Physical Education/Wellness
___ Area VI Intercultural/International Studies
___ Area VII Information Competency

5. How did you assess the SLO(s)? (Attach any related documents at end of form.)
The fourth in-class exam in the course covered the topic of integration. For seven of the questions on the exam, the students were given an integral and needed to solve it (as opposed to other application questions where the student had to first determine what integral would be used to solve a given problem). Some of these integrals required the students to manipulate the expressions before evaluating them. For each student in the class, their solutions to each of the seven questions were assessed using the rubric shown at the end of this form.
6. Results and analysis of the data. (Attach any related documents at end of form.)

Analyzing the data for this SLO is complicated by the fact that the students as a whole were under-prepared for the algebraic rigor of a Calculus class. In many cases, a weakness in algebra will cause a student to incorrectly manipulate an expression right from the start, making the rest of their solution incorrect. This sometimes prevents a student from demonstrating an understanding of a Calculus concept being evaluated. In the analysis that follows, I've tried to take this factor into account.

The seven exam questions used did not include any directions on what method to use - for each question, the students needed to determine for themselves what was the appropriate method and then execute it. The average rubric score for all seven questions combined was 3.4 with individual question averages ranging from 2.0 to 4.4 and individual student averages ranging from 2.3 to 4.6. The exam question that had the lowest average rubric score involved using a table of integrals, which is theoretically the easiest of the methods, but one that students often miss the finer details on.

Given the weak algebra skills of some of the students that remained in the class, I will also consider the average rubric scores of only those students that earned a C or higher in the course. This yields a combined average of 3.6 with individual question averages ranging from 2.2 to 4.7 and individual student averages ranging from 3.0 to 4.6.

Lastly, eliminating the one question with the lowest score and the students with course grades below C yields a combined average of 3.9 with individual question averages ranging from 3.3 to 4.7 and individual student averages ranging from 3.2 to 4.8.

The other way to consider the rubric scores is to consider how many 4's or 5's were achieved, as this could be considered a "success" in achieving the SLO. Using all seven questions and all of the students yields 47% having 4 or 5. Excluding the lowest question and the students whose grade was below C yields 63% having 4 or 5.

Given the preparedness of the students in the class, the results are reasonable, but there's certainly room for improvement.

7. What are you going to do based on the results of the data? (Any planned revisions?)

I would say the results lead to two probable actions:

1. Consider ways to better explore the specific integration technique of using a table of integrals. It may be something that looks deceptively easy to the students, and it's possible that they're not putting enough practice in, because of that. This same topic can be a challenge for Math 101B students too, and I've always tried to emphasize how the students need to take that section seriously. I will experiment with other ways to drive home that point and see if there are other points of confusion the students have with that integration technique.

2. The lack of algebra preparedness in this course is a problem (and was also a problem this semester in Math 101A). I've already initiated discussions about this in the department, and it will be a topic of discussion in the Fall.

Please save your finished document in the following format. (Date should be for the semester in which data was collected; same date should be listed at top of this form.)

yyyysemester-sloa-courseid.doc
Example: 2014spring-sloa-engl101c.doc
<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>answer and notation are completely correct</td>
</tr>
<tr>
<td>4</td>
<td>answer and notation are basically correct, but student has minor notational issues or careless numerical errors</td>
</tr>
<tr>
<td>3</td>
<td>answer and notation are only partially correct, but student demonstrates some understanding</td>
</tr>
<tr>
<td>2</td>
<td>answer is mostly incorrect, but at least one aspect of the solution was reasonable</td>
</tr>
<tr>
<td>1</td>
<td>answer is completely incorrect or not given</td>
</tr>
</tbody>
</table>