College Algebra Project Paper

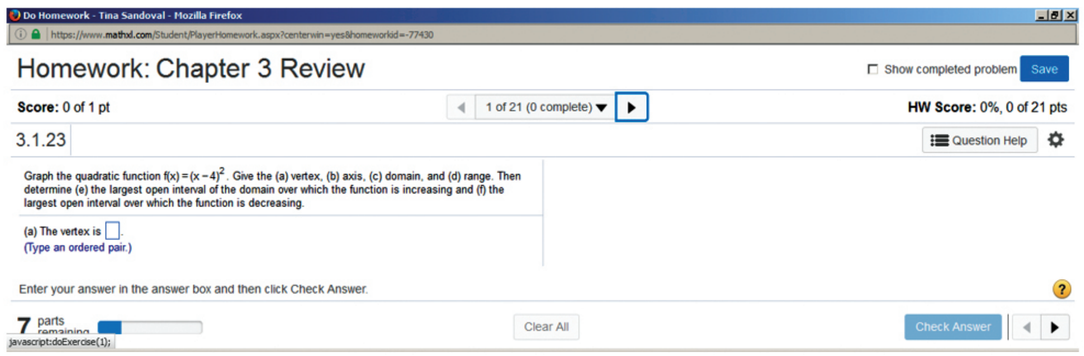
Department/Program: Arts and Sciences - Math · Project Dates: Spring/Fall 2016
Project Member: Tina Sandoval

Problem

It was determined that past MAT 121 students were deficient in their ability to analyze and evaluate data, and then synthesize the information to solve a signature problem, so the Math Department planned an assessment activity for Spring 2016 in order to directly evaluate students' mastery of this learning outcome. Our goal was for at least 60% of our future students to demonstrate proficiency in this area.

Plan

In Fall 2016, we developed several strategies to improve students' abilities to analyze, evaluate, and synthesize data. Instructors in five sections of MAT 121 used traditional lecture, group activities, discovery learning, and online materials, including MyLabsPlus, to strengthen students' abilities to graph a quadratic function and determine and evaluate its maximum point.



Assessment Activity

We conducted a summative assessment in the form of a signature application problem on the comprehensive final exam at the end of the semester, which involved graphing a quadratic function and determining and evaluating its maximum point:

The Problem

A university is trying to determine the price to charge for football game tickets. At a price of $16 per ticket, 40,000 people attend the game, while at $12 per ticket, 50,000 people attend the game. On average, everyone spends $4 for concessions. The capacity of the stadium is 60,000 people. With the information given, we wish to construct the price function ***p(x)***, where x is the number of people in attendance at the stadium. From this, we wish to construct the revenue function ***R(x)***, the **total** amount of money taken in at the stadium. We then wish to find the number of people that we wish to attend that will maximize the revenue, the maximum revenue, and finally the price to be charged per ticket to guarantee the maximum revenue. The capacity of the stadium is to be determined from the price function.

The Task

You are to write a 2-3 page paper describing **how** you solve this problem, as well as the detailed solution with appropriate calculations. All pertinent computations should be included on a separate attached sheet **(an appendix).** In addition, the graphs of the functions ***p(x)*** and ***R(x)*** are to be included, with descriptions of each graph, the relationships between the graphs, and the relationship of the graphs to your results. All graphs should have appropriate scaling. You are to use material from College Algebra in order to complete this task. You should also relate your results to the stadium's capacity. Cite your text.

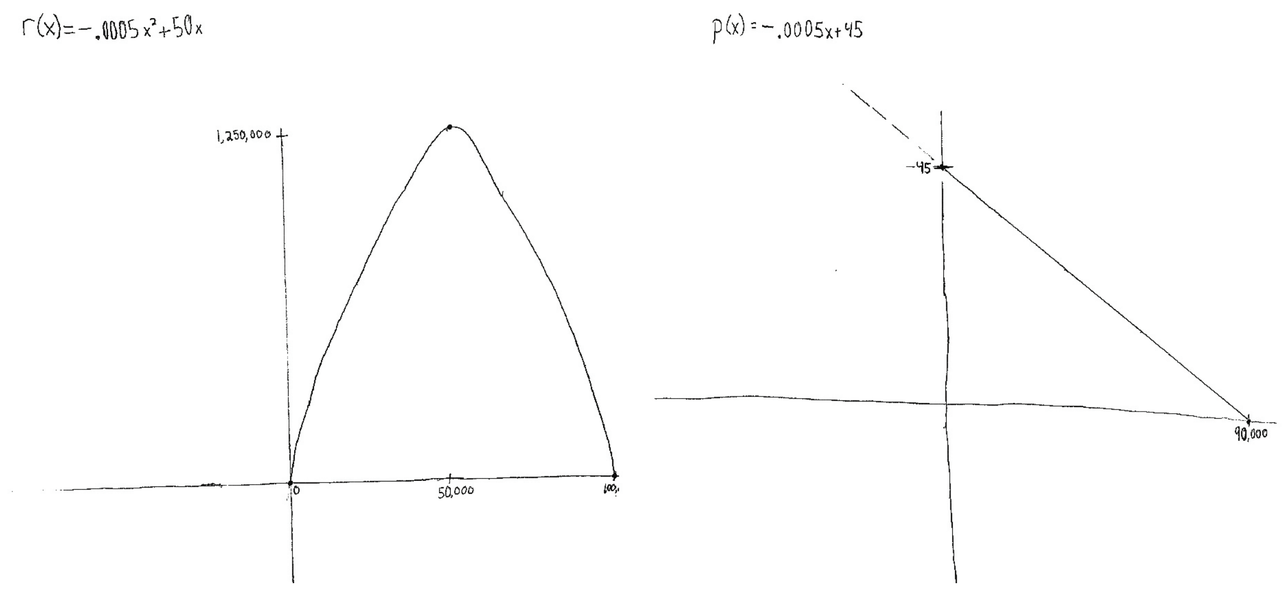
The Rubric

Students were assessed according to the following five criteria:

Introduction and Conclusion	Full description of the problem. This includes the setting, questions posed, and any background information that is relevant to solving the problem. Well written conclusion citing computed results and any conclusions.
Addressing Assumptions Involving the Problem and Mathematical Representation of Problem Information	Full description of the Mathematical elements needed to solve the problem and a detailed description of procedures used. Competent conversion of relevant information using the assumptions into appropriate and desired mathematical expressions (equations, graphs, etc.) as it pertains to the problem.
Performing Calculations to Determine the Solution to Problems Posed	Calculation of the numerical solutions to the problems.
Apply/Analyze Information Related to Problem Solutions	Analyzing the Numerical Results.
Interpreting Information Related to Problem Solutions	Description of the Numerical Results.

Results and Data

At the end of Fall 2016, there were 109 students assessed in five sections of MAT 121 on their answers to an application problem on the comprehensive final exam. The results showed that 58% of the students correctly graphed the function, while 70% of the students correctly determined and evaluated the function's maximum point. Thus, it appeared that the instructional activities used proved to benefit our students' ability to analyze, evaluate, and synthesize the data; however, there was room for improvement in terms of application on the graphing portion of the problem.



Closing the Loop & Next Steps

Since students seemed to have some difficulty with the graphing portion of the problem, more emphasis will be placed on determining scale, labeling axes, and ensuring neatness when creating graphs during the Fall 2017 semester, and the problem, or one similar to it, will be reassessed during the next cycle.