

Name _____

Date _____

Advanced Algebra

Unit 6 Advanced Systems of Equations

Big State U



The Admissions Office at Big State University needs to decide how many in-state students and how many out of state students to admit to the next class. Like many universities, Big State U has limited resources, and budget considerations have to play a part in admissions policy.

Here are the constraints on the Admissions Office decision.

- The college president wants this class to contribute a total of at least \$2,500,000 to the school after it graduates. In the past, Big State U has gotten an average of \$8,000 in contributions from each in-state student admitted and an average of \$2,000 from each out of state student admitted.
- The faculty at the college wants entering students with good grade point averages. Grades of in-state students average less than grades of out of state students. Therefore, the faculty is urging the school to admit at least as many out of state students as in state students.
- The housing office is not able to spend more than \$85,000 to cover costs such as meals and utilities for students in dormitories during vacation periods. Because out of state students are more likely to stay on campus during vacations, the housing needs to take these differences into account. In-State students will cost the office an average of \$100 each for vacation time expenses, while out of state students will cost an average of \$200 each.

The college treasure needs **to minimize educational costs**. Because students take different courses, it costs an average of \$7,200 a year to teach an in-state student and an average of \$6,000 a year to teach an out of state student.

Your job is to recommend how many students from each category should be admitted to Big State U. You need to minimize educational costs, as the treasure requires, within the constraints set by the college president, the faculty, and the housing office.

Your write up should include a proof that your solution is the best possible within the constraints. Your report should include:

- All the constraints
- The graph
- The feasible region
- Proof of how you minimize
- And a brief recommendation to the President. You can type this or write it. You should make your report as if you are giving a real recommendation to the president. Include a summary of the issue and your findings.