

EXAM 1 - MATH 111

DATE: Friday, September 23

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. During the peak season, the Imperial Hotel has a monthly expenditure budget of \$70,000 and has 80 guests. During the off season, when there are only 35 guests in the hotel, the monthly expenditure falls to only \$40,000. Assuming a linear trend, find an equation of the monthly expenditures in terms of the number of guests. Then find the fixed costs of the hotel that are independent of the number of guests.
2. A friend of yours has a small business that is producing a gadget. The fixed costs of his company are \$3,000. Every gadget costs \$8.00 to produce. If your friend wants to have a monthly profit of \$5,000 and is expecting to sell 2,000 gadgets a month, can you help him determine the price that he should charge per gadget?
3. Use the substitution method to solve the following system of linear equations:

$$\left\{ \begin{array}{rcl} x & - & 2y = 14 \\ 7x & + & 3y = 13 \end{array} \right\}$$

4. A friend of yours has \$20,000 to invest in bonds, with an annual return of 3% and in stocks, with an annual return of 13%. If she wants her overall return rate to be 6%, how much should she invest in bonds and how much in stocks?
5. Graph the solution set of the following system of inequalities:

$$\left\{ \begin{array}{l} 3x + 5y \leq 30 \\ 3x + 4y > 12 \\ x \geq 0, y \geq 0 \end{array} \right.$$

6. Solve the following system of linear equations by using the Gauss-Jordan method:

$$\left\{ \begin{array}{rclcl} x & + & y & + & z = 3 \\ -x & + & 2y & - & z = -6 \\ 3x & - & y & + & 2z = 6 \end{array} \right\}$$