

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 131 Major Exam 1

Name:.....ID:.....

Exercise 1 (12 pts) The demand function for a manufacturer's product is $p = 100 - 3q$, where p is the price (in SR) per unit when q units are demanded (per day). Find the maximum revenue that the manufacturer can receive.

Exercise 2 (12 pts) A manufacturer will break even at a total revenue of 100,000 SR. Fixed costs are 30,000 SR and each unit of output sells for 10 SR. Determine the variable cost per unit.

Exercise 3 (12 pts) Solve the linear system

$$\begin{cases} 3x + 2y - z = 11 \\ 2x - 3y + 2z = 31 \\ x + y + z = 53 \end{cases}$$

Exercise 4 (12 pts) Solve the system of inequalities

$$\begin{cases} 3x + 2y \leq 12 \\ 2x - 3y \leq 6 \\ x, y \geq 0 \end{cases}$$

Exercise 5 (12 pts) A real-estate firm owns 100 apartments. At 600 SR per month, every apartment can be rented. For each 30 SR per month increase, there will be two vacancies with no possibility of filling them,. The firm wants to receive 60,000 SR per month from rents. What rent should be charged for each apartment?

Exercise 6 (13 pts) A total of \$15,000 was invested in two businesses A and B. At the end of the first year, A and B returns 8% and 4.5% respectively, on the original investment. How was the original amount allocated if the total amount earned was \$800.

Exercise 7 (13 pts) The cost C (in dollars) for a company to produce and sell x thousands gadgets is given by $C = \frac{1}{30}x^2 - 2x + 4300$.

- a) what was the company start-up cost?
- b) what is the minimum cost?
- c) How many gadgets must the company produce and sell in order to incur the least cost?

Exercise 8 (14pts) *The cost of publication of each copy of a magazine is \$1 per copy. It is sold to dealers for \$1.2 per copy. The amount received for advertising is \$20 of the amount received for all magazines sold beyond 43000. Find the least number of magazines that can be published profitably, if*

- a) *100% of the issues published are sold.*
- b) *95% of the issues published are sold.*