King Fahd University of Petroleum & Minerals
Department of Math and Stat
Math 131 Semester 141 - Exam 1

Name_____ ID No._____

1) A company manufactures hair dryers. The manufacturing cost is \$9 per unit with a fixed cost of \$16,000. A hair dryer sells for \$15. If the company wants to earn a profit of \$50,000, how many dryers must be sold?

2) The demand equation for a certain product is $p = 400 - q^2$ and its supply equation is $p = 20q + 100$. Find the equilibrium price.

3) A woman must decide whether to buy or rent a garden machine. If she rents the machine, the rental fee is \$25 per day, and the daily cost to use it is \$5 for gas. If she were to buy the machine, the purchase price is \$650, and the daily cost is \$7 for gas, oil, and maintenance. On which day of use would the rental costs become greater than the ownership costs?

4) The demand function for an appliance company's line of washing machines is $p = 300 - 5q$, where p is the price (in dollars) per unit when q units are demanded (per week) by consumers. Find the maximum revenue.

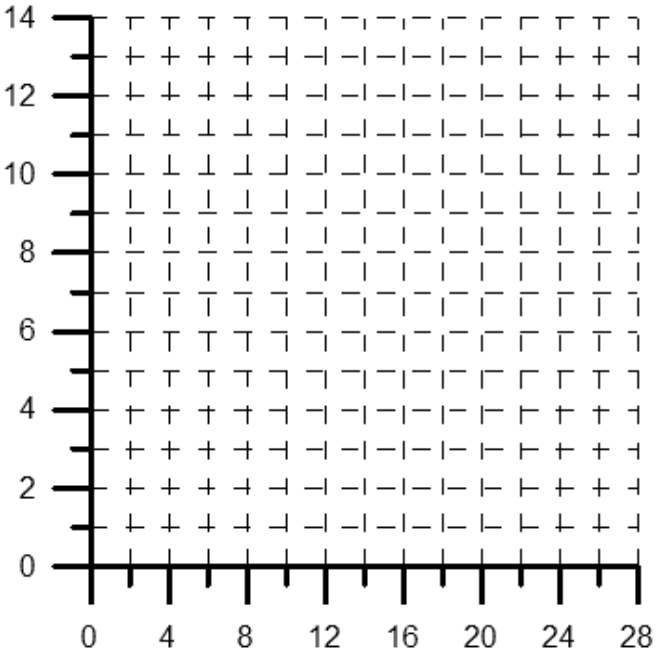
5) Conisder the problem

maximize $Z = x + 2y$

subject to

$$y \geq x + 3$$
$$x + 2y \leq 24$$
$$x, y \geq 0.$$

Determine all values of x and y at which the maximum Z occurs.



6) A manufacturer produces two products, product A and product B. Both products require processing on Machines I and II. The number of hours needed to produce one unit is given by the following chart:

	Machine I	Machine II
Product A	2 hrs	3 hrs
Product B	1 hrs	4 hrs

Machine I is available for at most 1000 hours and Machine II is available for at most 2500 hours. The profit made on product A is $20 / unit and the profit made on product B is $25 / unit.

a) Formulate the linear programming problem.Clearly define your variables.
b) Using the graphical corner-point technique, find and shade the feasible region.
c) Find the maximum profit.