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جامعة جيلالي بونعامة– خميس مليانة
كلية العلوم والتكنولوجيا
قسم الرياضيات و الاعلام الالي

Module : Operations Research 1

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Exercise sheet 1

This exercise sheet will be covered in the in-class meetings. There are two different types of exercises:

Home: This exercise should be solved by you alone before the in-class meeting. The exercise and possible solutions will be discussed in the in-class meeting.

In-class: This exercise will be solved during the in-class meeting. I will give you some time where you can discuss and solve the exercise in a small group. Afterwards, we will discuss possible solutions.

Exercise 1: (In-class)

The Primo Insurance company is introducing two new product lines: special risk insurances and mortgages. The expected profit is $5 per unit on special risk insurance and $2 per unit on mortgage. Management wishes to establish sales quotas for the new product lines to maximize total expected profit. The work requirements are as follows:

	Work-Hours per Unit		Work-Hours
Department	Special Risk	Mortgage	Available
Underwriting	3	2	2400
Administration	0	1	800
Claims	2	0	1200

Task:

1. Identify the sets, parameters, variables, objective and constraints of the problem.
2. Create a linear model that represents the problem.

Exercise 2: (In class)

A company owns two flour mills viz. A and B, which have different production capacities for high, medium and low quality flour. The company has entered a contract to supply flour to a firm every month with at least 8, 12 and 24 quintals of high, medium and low quality respectively. It costs the company Rs.2000 and Rs.1500 per day to run mill A and B respectively. On a day, Mill A produces 6, 2 and 4 quintals of high, medium and low quality flour, Mill B produces 2, 4 and 12 quintals of high, medium and low quality flour respectively. How many days per month should each mill be operated in order to meet the contract order most economically.

Task:

1. Identify the sets, parameters, variables, objective and constraints of the problem.
2. Create a linear model that represents the problem.

Exercise 3: (Home)

Suppose an industry is manufacturing two types of products P1 and P2. The profits per Kg of the two products are Rs.30 and Rs.40 respectively. These two products require processing in three types of machines. The following table shows the available machine hours per day and the time required on each machine to produce one Kg of P1 and P2. Formulate the problem in the form of linear programming model.

Profit/Kg	P1 Rs.30	P2 Rs.40	Total available Machine hours/day
Machine 1	3	2	600
Machine 2	3	5	800
Machine 3	5	6	1100

Task:

1. Identify the sets, parameters, variables, objective and constraints of the problem.
2. Create a linear model that represents the problem.