### Problem 1.

**The product mix problem** occurs when we manufacture 3 products. Each unit produced of a given product uses a given amount of resources.( Table 25). Each unit produced of product earns profit. Formulate LINDO model that could be used to maximize profit in this situation.

# TABLE 24

	Cars	Trucks	Trains
Steel used (tons)	2	3	5
Rubber used (tons)	.3	.7	.2
Labor used (hrs)	10	12	20
Unit profit (\$)	800	1,500	2,500

## TABLE 25

Resource	Quantity Available
Steel	50 tons
Rubber	10 tons
Labor	150 hours

### Problem 2.

**The media mix problem** occurs when company has 3 media in which the company can place an ad. There are 3 groups of people the company wishes to reach, and the company wishes its ads to be seen at least  $e_i$  times by member group i. An ad on media cost  $c_j$  dollars and reaches  $a_{ij}$  members of group i. The goal minimize the cost of ensuring that the desired number of people in each group see the ads. Set up LINDO model that can be used to solve any media mix problem.(Table 26-27)

## TABLE **26**

Group	Needed Exposures (in Millions)
Children	15
Men	40
Women	50

## TABLE 27

No. Watching (million)		Program			
	Sponge Bob	Friends	Dawson's Creek		
Children	3	1	0		
Men	1	15	4		
Women	2	20	9		
Unit cost (\$)	30,000	360,000	80,000		

#### Problem -3.

Consider the following **school redistricing problem**. There are 10 districts in a city and 3 high school in the city. The distance between district i and high school j is d<sub>ij</sub> miles. District i has w<sub>i</sub> white and b<sub>i</sub> black residents. Each high school must have between L and U students. In the interests of racial harmony the percentages of blacks at each high school must have between 80% and 120% of the percentage of black students entire city. Set up LINDO model that can be used to minimize the total distance that students will have to travel in order to meet the racial balance requirements.(Table 28)

		District								
	1	2	3	4	5	6	7	8	9	10
Whites	400	200	150	300	400	100	200	300	250	150
Blacks	200	150	100	120	80	90	140	160	100	60
		Distance (Miles)								
	1	2	3	4	5	6	7	8	9	10
High School 1	1	2	3	2	3	4	2	3	1	2
High School 2	2	1	3	3	4	2	1	2	2	3
High School 3	3	3	2	1	2	3	2	2	3	1

#### **TABLE** 28