

Example 2.1-1 (The Reddy Mikks Company)

Reddy Mikks produces both interior and exterior paints from two raw materials, $M1$ and $M2$. The following table provides the basic data of the problem:

	Tons of raw material per ton of		Maximum daily availability (tons)
	Exterior paint	Interior paint	
Raw material, $M1$	6	4	24
Raw material, $M2$	1	2	6
Profit per ton (\$1000)	5	4	

A market survey indicates that the daily demand for interior paint cannot exceed that of exterior paint by more than 1 ton. Also, the maximum daily demand of interior paint is 2 tons.

Reddy Mikks wants to determine the optimum (best) product mix of interior and exterior paints that maximizes the total daily profit.

LP for RM problem. Let x_1 and x_2 be the amounts of exterior and interior paints produced respectively.

$$\begin{aligned}
 & \max \quad 5x_1 + 4x_2 \\
 & \text{subject to} \\
 & 6x_1 + 4x_2 \leq 24 \\
 & x_1 + 2x_2 \leq 6 \\
 & -x_1 + x_2 \leq 1 \\
 & x_2 \leq 2 \\
 & x_1, x_2 \geq 0
 \end{aligned}$$

Suppose RM uses quantity discounts for the sales of exterior paint. If more than 2 tons of exterior paint are sold then RM applies an “all units discount” and reduces the price of exterior paint by \$500, reducing the profit to \$4,5 K. Formulate this modified problem as a LP.