# RD Sharma Solutions Class 12 Maths Chapter 30 Ex 30.1

## Linear Programming Ex 30.1 Q1

The given data may be put in the following tabular form:-

| Gadget | Foundry | Machine-shop | Profit |
|---|---|---|---|
| *A* | **10** | **5** | **Rs 30** |
| *B* | **6** | **4** | **Rs 20** |
| Firm's capacity per week | 1000 | 600 | |

Let required weekly production of gadgets $A$ and $B$ be $x$ and $y$ respectively.

Given that, profit on each gadget $A$ is Rs 30
So, profit on $x$ gadget of type $A = 30x$
Profit on each gadget of type $B$ = Rs 20
So, profit on $y$ gadget of type $B = 20y$

Let $Z$ denote the total profit, so
$$Z = 30x + 20y$$

Given, production of one gadget $A$ requires 10 hours per week for foundry and gadget $B$ requires 6 hours per week for foundry.

So, $x$ units of gadget $A$ requires $10x$ hours per week and $y$ units of gadget $B$ requires by hours per week, But the maximum capacity of foundry per week is 1000 hours, so
$$10x + 6y \leq 1000$$

This is first constraint.

Given, production of one unit gadget $A$ requires 5 hours per week of machine shop and production of one unit of gadget $B$ requires 4 hours per week of machine shop.

So, $x$ units of gadget $A$ requires $5x$ hours per week and $y$ units of gadget $B$ requires $4y$ hours per week, but the maximum capacity of machine shop is 600 hours per week
So, $5x + 4y \leq 600$

This is second constraint.
Hence, mathematical formulation of LPP is:
Find $x$ and $y$ which
Maximize $Z = 30x + 2y$

Subject to constraints,
$$10x + 6y \leq 1000$$
$$5x + 4y \leq 600$$

And, $x, y \geq 0$ [Since production cannot be less than zero]

## Linear Programming Ex 30.1 Q2

The given information can be written in tabular form as below:

| Product | Machine hours | Labour hours | Profit |
|---|---|---|---|
| $A$ | **1** | **1** | **Rs 60** |
| $B$ | **–** | **1** | **Rs 80** |
| Total capacity | 400 for $A$ | 500 | |
| Minimum supply of product $B$ is 200 units. | | | |

Let production of product $A$ be $x$ units and production of product $B$ be $y$ units.

Given, profit on one unit of product $A$ = Rs 60
So, profit on $x$ unit of product $A$ = Rs $60x$
Given, profit on one unit of product $B$ = Rs 80
So, profit on $y$ units of product $B$ = Rs $80y$

Let $Z$ denote the total profit, so

$$Z = 60x + 80y$$

Given, minimum supply of product $B$ is 200
So, $y \geq 200$ (First constraint)

Given that, production of one unit of product $A$ requires 1 hour of machince hours, so $x$ units of product $A$ requires $x$ hours but given total machine hours available for product $A$ is 400 hours, so

$x \leq 400$ (Second constraint)

Given, each unit of product $A$ and $B$ requires one hour of labour hour, so $x$ units of product $A$ require $x$ hours and $y$ units of product $B$ require $y$ hours of labour hours but total labour hours available are 500, so

$x + y \leq 500$ (Third constraint)

Hence, mathematical formulation of LPP is,
Find $x$ and $y$ which

Minimize $Z = 60x + 80y$

Subject to constraints,

$y \geq 200$
$x \leq 400$
$x + y \leq 500$
$x, y \geq 0$ [Since production of product cannot be less than zero]

## Linear Programming Ex 30.1 Q3

| Product | Machine ($M_1$) | Machine ($M_2$) | Profit |
|---|---|---|---|
| $A$ | **4** | **2** | **3** |
| $B$ | **3** | **2** | **2** |
| $C$ | **5** | **4** | **4** |
| Capacity maximum | 2000 | 2500 | |

Let required production of product $A$, $B$ and $C$ be $x, y$ and $z$ units respectively.

Given, profit on one unit of product $A, B$ and $C$ are Rs 3, Rs 2, Rs 4, so
Profit on $x$ unit of A, $y$ unit of $B$ and $z$ unit of $C$ are given by Rs. $3x$, Rs $2y$,Rs $4z$.

Let $U$ be the total profit, so

$$U = 3x + 2y + 4z$$

Given, one unit of product $A, B$ and $C$ requires 4,3 and 5 minutes on machine $M_1$. So, $x$ units of product $A$, $y$ units of $B$ and $z$ units of product $C$ need $4x$, $3y$ and $5z$ minutes on machine $M_1$ is 2000 minutes, so

$$4x + 3y + 5z \le 200 \quad \text{(First constraint)}$$

Given, one unit of product $A, B$ and $C$ requires 2,2 and 4 minutes on machine $M_2$. So, $x$ units of $A$, $y$ units of $B$ and $z$ units of $C$ require $2x$, $2y$ and $4z$ minutes on machine $M_2$ is 2500 minutes, so

$$2x + 2y + 4z \le 2500 \quad \text{(Second constraint)}$$

Also, given that firm must manufacture 100 $A$'s, 200 $B$'s and 50 $C$'s but not more than 150 $A$'s.

$$100 \le x \le 150$$
$$y \ge 200 \qquad \text{(Other constraints)}$$
$$z \ge 50$$

Hence, mathematical formulation of LPP is :-
Find $x, y$ and $z$ which

$$\text{maximize } U = 3x + 2y + 4z$$

Subject to constraints,

$$4x + 3y + 5z \le 2000$$
$$2x + 2y + 4z \le 2500$$
$$100 \le x \le 150$$
$$y \ge 200$$
$$z \ge 50$$

And, $x, y, z \ge 0$ [Since, $x, y, z$ are non-negative]

## Linear Programming Ex 30.1 Q4

Given information can be written in tabular form as below:

| Product | $M_1$ | $M_2$ | Profit |
|---|---|---|---|
| $A$ | **1** | **2** | **2** |
| $B$ | **1** | **1** | **3** |
| Capacity | 6 hours 40 min = 400 min. | 10 hours = 600 min. | |

Let required production of product $A$ be $x$ units and product $B$ be $y$ units.

Given, profit on one unit of product $A$ and $B$ are Rs 2 and Rs 3 respectively, so profits on $x$ units of product $A$ and $y$ units of product $B$ will be Rs $2x$ and Rs $3y$ respectively.

Let total profit be $Z$, so

$$Z = 2x + 3y$$

Given, production of one unit of product $A$ and $B$ require 1 and 1 minute on machine $M_1$ respectively, so production of $x$ units of product $A$ and $y$ units of product $B$ require $x$ minutes and $y$ minutes on machine $M_1$ but total time available on machine $M_1$ is 600 minutes, so

$$x + y \le 400 \quad \text{(First constraint)}$$

Given, production of one unit of product $A$ and $B$ require 2 minutes and 1 minutes on machine $M_2$ respectively. So production of $x$ units of product $A$ and $y$ units of product $B$ require $2x$ minutes and $y$ minutes respectively on machine $M_2$ but machine $M_2$ is available for 600 minutes, so

$$2x + y \le 600 \quad \text{(Second constraint)}$$

Hence, mathematical formulation of LPP is:-
Find $x$ and $y$ which

maximize $Z = 2x + 3y$

Subject to constraints,

$x + y \le 400$

$2x + y \le 600$

and, $x, y \ge 0$ [Since production of product can not be less than zero]

## Linear Programming Ex 30.1 Q5

| Plant | A | B | C | Cost |
|---|---|---|---|---|
| I | 50 | 100 | 100 | 2500 |
| II | 60 | 60 | 200 | 3500 |
| Monthly demand | 2500 | 3000 | 7000 | |

Let plant I requires $x$ days and plant II requires $y$ days per month to minimize cost.

Given, plant I and II costs Rs 2500 perday and Rs 3500 perday respectively, so cost to run plant I and II is Rs $2500x$ and Rs $3500y$ per month.

Let $Z$ be the total cost per month, so

$$Z = 2500x + 3500y$$

Given, production of tyre $A$ from plant I and II is 50 and 60 respectively, so production of tyre $A$ from plant I and II will be $50x$ and $60y$ respectively per month but the maximum demand of tyre $A$ is 2500 per month so,

$$50x + 60y \geq 2500 \qquad \text{[First constraint]}$$

Given, production of tyre $B$ from plant I and II is 100 and 60 respectively, so production of tyre $B$ from plant I and II will be $100x$ and $60y$ per month respectively but the maximum demand of tyre $B$ is 3000 per month, so

$$100x + 60y \geq 3000 \qquad \text{[Second constraint]}$$

Given, production of tyre $C$ from plant I and II is 100 and 200 respectively. So production of tyre $B$ from plant I and II will be $100x$ and $200y$ per month respectively but the maximum demand of tyre $C$ is 7000 per day, so

$$100x + 200y \geq 7000 \qquad \text{[Third constraint]}$$

Hence, mathematical formulation of LPP is..
Find $x$ and $y$ which

Minimize $Z = 2500x + 3500y$

Subject to constraint,

$$50x + 60y \geq 2500$$
$$100x + 60y \geq 3000$$
$$100x + 200y \geq 7000$$

And, $x, y \geq 0$ [Since number of days can not be less than zero]

## Linear Programming Ex 30.1 Q6

| Product | Man hours | Maximum demand | Profit |
|---|---|---|---|
| $A$ | **5** | **7000** | **60** |
| $B$ | **3** | **10000** | **40** |
| Total capacity | 45000 | | |

Let required production of product $A$ be $x$ units and production of product $B$ be $y$ units.

Given, profits on one unit of product $A$ and $B$ are Rs 60 and Rs 40 respectively, so profits on $x$ units of product $A$ and $y$ units of product $B$ are Rs $60x$ and Rs $40y$.

Let $Z$ be the total profit, so

$$Z = 60x + 40y$$

Given, production of one unit of product $A$ and $B$ require 5 hours and 3 hours respectively man hours, so $x$ unit of product $A$ and $y$ units of product $B$ require $5x$ hours and $3y$ hours of man hours respectively but total man hours available are 45000 hours, so

$$5x + 3y \le 45000 \qquad \text{(First constraint)}$$

Given, demand for product $A$ is maximum 7000, so

$$x \le 7000 \qquad \text{(Second constraint)}$$

Hence, mathematical formulation of LPP is,
Find $x$ and $y$ which

$$\text{maximize } Z = 60x + 40y$$

Subject to constraints,

$$5x + 3y \le 45000$$
$$x \le 7000$$
$$y \le 10000$$

$$x, y \ge 0 \qquad \text{[Since production can not be less than zero]}$$

## Linear Programming Ex 30.1 Q7

Let x and y be the packets of 25 gm of Food I and Food II purchased. Let Z be the price paid. Obviously price has to be minimized.
Take a mass balance on the nutrients from Food I and II,

Calcium $10x + 4y \geq 20$

$5x + 2y \geq 10$ ........(i)

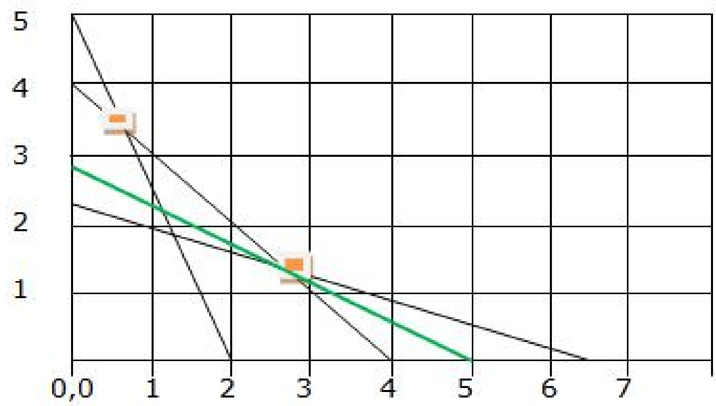
Protein $5x + 5y \geq 20$

$x + y \geq 4$ ........(ii)

Calories $2x + 6y \geq 13$ ......(iii)

These become the constraints for the cost function, Z to be minimized ie., $0.6x + y = Z$, given cost of Food I is Rs 0.6/- and Rs 1/- per lb

From (i), (ii) & (iii) we get points on the X & Y-axis as [0, 5] & [2, 0] ; [0, 4] & [ 4, 0] ; [0, 13/6] & [6.5, 0]
Plotting these




The smallest value of Z is 2.9 at the point (2.75, 1.25). We cannot say that the minimum value of Z is 2.9 as the feasible region is unbounded.

Therefore, we have to draw the graph of the inequality $0.6x + y < 2.9$

Plotting this to see if the resulting line (in green) has any point common with the feasible region. Since there are no common points this is the minimum value of the function Z and the mix is

Food I = 2.75 lb; Food II = 1.25 lb; Price = Rs 2.9

When Z has an optimal value (maximum or minimum), where the variables *x* and *y* are subject to constraints described by linear inequalities, this optimal value must occur at a corner point (vertex) of the feasible region.

Here the feasible region is the unbounded region A-B-C-D
Computing the value of Z at the corner points of the feasible region ABHG

| Point | Corner point | Value of Z = 0.6x + y |
|---|---|---|
| A | 2, 5 | 6.2 |
| B | 0.67, 3.33 | 3.73 |
| C | 2.75, 1.25 | 2.9 |
| D | 6.5, 2.16 | 6.06 |

## Linear Programming Ex 30.1 Q8

Given information can be tabulated as:-

| Product | Grinding | Turning | Assembling | Testing | Profit |
|---|---|---|---|---|---|
| $A$<br>$B$ | 1<br>2 | 3<br>1 | 6<br>3 | 5<br>4 | 2<br>3 |
| Maximum capacity | 30 hours | 60 hours | 200 hours | 200 hours | |

Let required production of product $A$ and $B$ be $x$ and $y$ respectively

Given, profits on one unit of product $A$ and $B$ are Rs 2 and Rs 3 respectively, so profits on $x$ units of product $A$ and $y$ units of product $B$ are given by $2x$ and $3y$ respectively. Let $Z$ be total profit, so

$$Z = 2x + 3y$$

Given, production of 1 unit of product $A$ and $B$ require 1 hour and 2 hours of grinding respectively, so, production of $x$ units of product $A$ and $y$ units of of product $B$ require $x$ hours and $2y$ hours of grinding respectively but maximum time available for grinding is 3 hours, so

$$x + 2y \le 30 \quad \text{(First constraint)}$$

Given, production of 1 unit of product $A$ and $B$ require 3 hours and 1 hours of turning respectively, so $x$ units of product $A$ and $y$ units of of product $B$ require $3x$ hours and $y$ hours of turning respectively but total time available for turning is 60 hours, so

$$3x + y \le 60 \quad \text{(Second constraint)}$$

Given, production of 1 unit of product $A$ and $B$ require 6 hour and 3 hours of assembling respectively, so productinon of $x$ units of product $A$ and $y$ units of product $B$ require $6x$ hours and $3y$ hours of assembling respectively but total time available for assembling is 200 hours, so

$$6x + 3y \le 200 \quad \text{(Third constraint)}$$

Given, production of 1 unit of product $A$ and $B$ require 5 hours and 4 hours of testing respectively, so productinon of $x$ units of product $A$ and $y$ units of product $B$ require $5x$ hours and $4y$ hours of testing respectively but total time available for testing is 200 hours, so

$$5x + 4y \le 200 \quad \text{(Fourth constraint)}$$

Hence, mathematical formulation of LPP is,
Find $x$ and $y$ which

maximize $Z = 2x + 3y$

Subject to constraints,

$$x + 2y \le 30$$
$$3x + y \le 60$$
$$6x + 3y \le 200$$
$$5x + 4y \le 200$$

and, $x, y \ge 0$ [Since production can not be negative]

## Linear Programming Ex 30.1 Q9

Given information can be tabulated as below:

| Foods | Vitamin $A$ | Vitamin $B$ | Cost |
|---|---|---|---|
| $F_1$ | **2** | **3** | **5** |
| $F_2$ | **4** | **2** | **2.5** |
| Minimum daily requirement | 40 | 50 | |

Let required quantity of food $F_1$ be $x$ units and quantity of food $F_2$ be $y$ units.

Given, costs of one unit of food $F_1$ and $F_2$ are Rs 5 and Rs 2.5 respectively, so costs of $x$ units of food $F_1$ and $y$ units of food $F_2$ are Rs $5x$ and Rs $2.5y$ respectively.
Let $Z$ be the total cost, so

$$Z = 5x + 2.5y$$

Given, one unit of food $F_1$ and food $F_2$ contain 2 and 4 units of vitamin $A$ respectively, so $x$ unit of Food $F_1$ and $y$ units of food $F_2$ contain $2x$ and $4y$ units of vitamin $A$ respectively, but minimum requirement of vitamin $A$ is 40 unit, so

$$2x + 4y \geq 40 \qquad \text{(First constraint)}$$

Given, one unit of food $F_1$ and food $F_2$ contain 3 and 2 units of vitamin $B$ respectively, so $x$ unit of Food $F_1$ and $y$ units of food $F_2$ contain $3x$ and $2y$ units of vitamin $B$ respectively, but minimum daily requirement of vitamin $B$ is 40 unit, so

$$3x + 2y \geq 50 \qquad \text{(Second constraint)}$$

Hence, mathematical formulation of LPP is,
Find $x$ and $y$ which

$$\text{Minimize } Z = 5x + 2.5y$$

Subject to constraint,

$$2x + 4y \geq 40$$
$$3x + 2y \geq 50$$

$$x, y \geq 0 \qquad \text{[Since requirement of food } F_1 \text{ and } F_2 \text{ can not be less than zero.]}$$

## Linear Programming Ex 30.1 Q10

Let the number of automobiles produced be x and let the number of trucks produced be y.

Let Z be the profit function to be maximized.
Z = 2,000x + 30,000y

The constraints are on the man hours worked

| | | | |
|---|---|---|---|
| Shop A | $2x + 5y \leq 180$ | (i) | assembly |
| Shop B | $3x + 3y \leq 135$ | (ii) | finishing |
| | $x \geq 0$ ; $y \geq 0$ | | |

Corner points can be obtained from
$2x + 5y = 180 \Rightarrow x=0; y=36$ and $x=90; y=0$
$3x + 3y \leq 135 \Rightarrow x=0; y=45$ and $x=45; y=0$
Solving (i) & (ii) gives x = 15 & y = 30

| Corner point | Value of Z =2,000x + 30,000y |
|---|---|
| 0,0 | 0 |
| 0, 36 | 10,80,000 |
| 15, 30 | 9,30,000 |
| 45, 0 | 90,000 |

0 automobiles and 36 trucks will give max profit of 10,80,000/-

## Linear Programming Ex 30.1 Q11

| | Taylor A | | Taylor B | Limit |
|---|---|---|---|---|
| Variable | x | | y | |
| Shirts | 6x | + | 10y | ≥ 60 |
| Pants | 4x | + | 4y | ≥ 32 |
| Earn Rs. | 150 | + | 200 | Z |

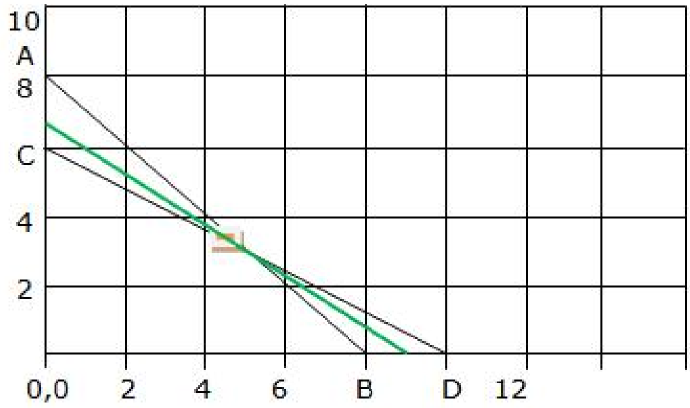
The above LPP can be presented in a table above.

To minimize labour cost means to assume minimize the earnings i.e, Min Z = 150x + 200y
s.t. the constraints

| | |
|---|---|
| $x \geq 0$; $y \geq 0$ | at least 1 shirt & pant is required |
| $6x + 10y \geq 60$ | require at least 60 shirts |
| $4x + 4y \geq 32$ | require at least 32 pants |

Solving the above inequalities as equations we get,
x = 5 and y = 3

other corner points obtained are [0, 6] & [10, 0]
[0, 8] & [8,0]




The feasible region is the open unbounded region A-E-D

Point E(5, 3) may not be the minimal value. So, plot 150x + 200y < 1350 to see if there is a common region with A-E-D

The green line has no common point , therefore

| Corner point | Value of Z = 150x + 200y |
|---|---|
| 0,8 | 0 |
| 10, 0 | 1500 |
| 5, 3 | 1350 |

Stitching 5 shirts and 3 pants minimizes labour cost to Rs.1350/-

## Linear Programming Ex 30.1 Q12

| | Model 314 | | Model 535 | Limit |
|---|---|---|---|---|
| Variable | x | | y | |
| F class | 20x | + | 20y | ≥ 160 |
| T class | 30x | + | 60y | ≥ 300 |
| Cost | 1.x lakh | + | 1.5y lakh | Z |

The above LPP can be presented in a table above.

The flight cost is to be minimized i.e, Min Z = x + 1.5y
s.t. the constraints

| | |
|---|---|
| x ≥ 2 | at least 2 planes of model 314 must be used |
| y ≥ 0 | at least 1 plane of model 535 must be used |
| 20x + 20y ≥ 160 | require at least 160 F class seats |
| 30x + 60y ≥ 300 | require at least 300 T class seats |

Solving the above inequalities as equations we get,
When x=0, y=8 and when y=0, x=8
When x=0, y=5 and when y=0, x=10

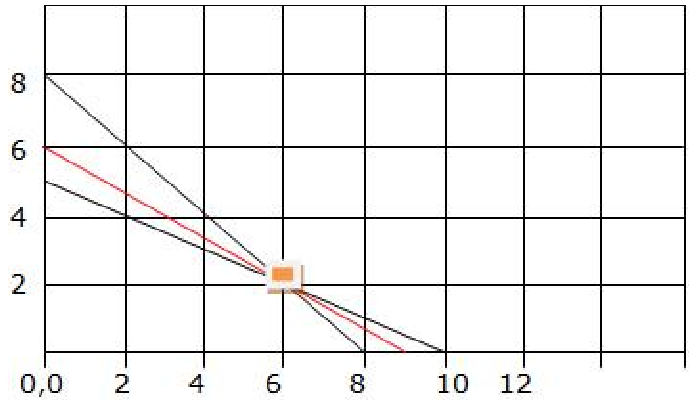
We get an unbounded region 8-E-10 as a feasible solution. Plotting the corner points and evaluating we have,

| Corner point | Value of Z = x + 1.5y |
|---|---|
| 10, 0 | 10 |
| 0, 8 | 12 |
| 6, 2 | 9 |

Since we obtained an unbounded region as the feasible solution a plot of Z ( x+1.5 < 9) is plotted.

Since there are no common points point E is the point that gives a minimum value.

Using 6 planes of model 314 & 2 of model 535 gives minimum cost of 9 lakh rupees.




## Linear Programming Ex 30.1 Q13

Given information can be tabulated as below

| Sets | Time requirement | Points |
|---|---|---|
| I | 3 | 5 |
| II | 2 | |
| III | 4 | 6 |

Time for all three sets $= 3\frac{1}{2}$ hours

Time for Set I and Set II $= 2\frac{1}{2}$ hours

Number of questions maximum 100

Let he should $x, y, z$ questions from set I, II and III respectively.

Given, each question from set I, II, III earn $5, 4, 6$ points respectively, so $x$ questions of set I, $y$ questions of set II and $z$ questions of set III earn $5x$, $4y$ and $6z$ points,
let total point credit be $U$
So, $U = 5x + 4y + 6z$

Given, each question of set I, II and III require 3,2 and 4 minutes respectively,
so $x$ questions of set I, $y$ questions of set II and $z$ questions of set III require $3x$, $2y$ and $4z$ mimutes respectively but given that total time to devote in all three sets is $3\frac{1}{2}$ hours $= 210$ minutes and first two sets is $2\frac{1}{2}$ hours $= 150$ minutes
So,

$$3x + 2y + 4z \le 210 \quad \text{(First constraint)}$$
$$3x + 2y \le 150 \quad \text{(Second constraint)}$$

Given, total number of questions cannot exceed 100
So, $x + y + z \le 100$ (Third constraint)

Hence, mathematical formulation of LPP is
Find $x$ and $y$ which
maximize $U = 5x + 4y + 6z$

Subject to constraint,

$$3x + 2y + 4z \le 210$$
$$3x + 2y \le 150$$
$$x + y + z \le 100$$

$$x, y, z \ge 0$$

[Since number of questions to solve from each set cannot be less than zero]

## Linear Programming Ex 30.1 Q14

Given information can be tabulated as below

| Product | Yield | Cultivation | Price | Fertilizers |
| --- | --- | --- | --- | --- |
| Tomatoes | 2000 kg | 5 days | 1 | 100 kg |
| Lettuce | 3000 kg | 6 days | 0.75 | 100 kg |
| Radishes | 1000 kg | 5 days | 2 | 50 kg |
| Average 2000 kg/per acre<br>Total land $= 100$ Acre<br>Cost g fertilizers $=$ Rs 0.50 per kg.<br>A total of 400 days of cultivation labour with Rs 20 per day | | | | |

Let required quantity of field for tomatoes, lettuce and radishes be $x, y$ and $z$ Acre respectively.

Given, costs of cultivation and harveshing of tomatoes, lettuce and radishes are $5 \times 20 =$ Rs 100, $6 \times 20 =$ Rs 120, $5 \times 20 =$ Rs 100 respectively per acre. Cost of fertilizers for tomatoes, lettuce and radishes $100 \times 0.50 =$ Rs 50, $100 \times 0.50$ = Rs 50 and $50 \times 0.50 =$ Rs 25 respectively per acre.

So, total costs of production of tomatoes, lettuce and radishes are Rs $100 + 50$ = Rs $150x$, Rs $120 + 50 =$ Rs $170y$ and radishes are Rs $100 + 25 =$ Rs $125z$ respectively total selling price of tomatoes, lettuce and radishes, according to yield are $2000 \times 1 =$ Rs $2000x$, $3000 \times 0.75 =$ Rs $2250y$ and $100 \times 2 =$ Rs $2000z$ respectively.

Let $U$ be the total profit,
So,

$$U = (2000x - 150x) + (2250y - 170y) + (2000z - 125z)$$
$$U = 1850x + 2080y + 1875z$$

Given, farmer has 100 acre form
So, $x + y + z \le 100$ (First constraint)

Number of cultivation and harvesting days are 400
So, $5x + 6y + 5z \le 400$

Hence, mathematical formulation of LPP is
Find $x, y, z$ which
maximize $U = 1850x + 2080y + 1875z$

Subject to constraint,

$$x + y + z \le 100$$
$$5x + 6y + 5z \le 400$$

$$x, y, z \ge 0$$

[Since from used for cultivation cannot be less than zero.]

## Linear Programming Ex 30.1 Q15

Given information can be tabulated as below:

| Product | Department 1 | Department 2 | Selling price | Labour cost | Raw material cost |
|---|---|---|---|---|---|
| $A$ | **3** | **4** | **25** | **16** | **4** |
| $B$ | **2** | **6** | **30** | **20** | **4** |
| Capacity | 130 | 260 | | | |

Let the required product of product $A$ and $B$ be $x$ and $y$ units respectively.

Given, labour cost and raw material cost of one unit of product $A$ is Rs 16 and Rs 4, so total cost of product $A$ is Rs 16 + Rs 4 = Rs 20
And given selling price of 1 unit of product A is Rs 25,
So, profit on one unit of product
$A = 25 - 20 =$ Rs 5

Again, given labour cost and raw material cost of one unit of product $B$ is Rs 20 and Rs 4
So, that cost of product $B$ is Rs 20 + Rs 4 = Rs 24
And given selling price of 1 unit of product $B$ is Rs 30
So, profit on one unit of product $B = 30 - 24 =$ Rs 6

Hence, profits on $x$ unit of product $A$ and $y$ units of product $B$ are Rs $5x$ and Rs $6y$ respectively.
Let $Z$ be the total profit , so $Z = 5x + 6y$

Given, production of one unit of product $A$ and $B$ need to process for 3 and 4 hours respectively in department 1, so production of $x$ units of product $A$ and $y$ units of product $B$ need to process for $3x$ and $4y$ hours respectively in Department 1. But total capacity of Department 1 is 130 hour ,
So, $3x + 2y \leq 130$ (First constraint)

Given, production of one unit of product $A$ and $B$ need to process for 4 and 6 hours respectively in department 2, so production of $x$ units of product $A$ and $y$ units of product $B$ need to process for $4x$ and $6y$ hours respectively in Department 2 but total capacity of Department 2 is 260 hours
So, $4x + 6y \leq 260$ (Second constraint)

Hence, mathematical formulation of LPP is,
Find $x$ and $y$ which
Maximize $Z = 5x + 6y$

Subject to constraint,

$3x + 2y \leq 130$

$4x + 6y \leq 260$

$x, y \geq 0$ [Since production cannot be less than zero]