

Project Work-2

1. What is the simplex method?
2. Define pivot element, slack, surplus, departing and entering variables.
3. What are the conditions required to solve any LP problem using the simplex method?
4. A manufacturer produces two products, A and B. Each product requires machine time and labor time. Product A requires 2 hours of machine time and 1 hour of labor time, whereas product B requires 1 hour of machine time and 3 hours of labor time. He earns Rs. 40 from product A and Rs. 50 from product B. If the available hours for the machine are 100 hours and for labor are 120 hours, formulate the LP problem for this information to maximize the profit.
5. Solve the above problem using the simplex method.
6. What is a system of linear equations?
7. Recall all the methods of solving simultaneous equations that you have learned till today.
8. Solve the equations: $x - 2y = 1$, and $x + y = 4$ using at least three methods.
9. What is meant by the consistency of a system of linear equations? Write one example of a system of linear equations that is consistent.
10. What is the Gauss elimination method for solving a system of linear equations?
11. What are the two basic steps of this method?
12. What is partial pivoting? Explain with an example.
13. Explain the steps of how the given system of equations can be solved by the Gauss elimination method:

$$a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = c_1 \quad (a_{11} \neq 0) \dots\dots\dots (i)$$

$$a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = c_2 \quad \dots\dots\dots (ii)$$

$$a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = c_3 \quad \dots\dots\dots (iii)$$

14. Use the above steps you mentioned to solve the system of equations:

$$2x + 3y - 2z = 1, \quad x - 2y + 3z = 10, \quad \text{and} \quad -x - 2y + 4z = 13$$