**St. Xavier’s College (Autonomous), Kolkata**

**Department of Statistics**

**Problem Set 5**

**MDSC 4113/SEM I/CORE3 DATE:**

1. Plot the following system of linear equations and comment on solvability:
2. 5

1. x - 2y = 1

3x - 6y = 3

1. x - 2y = 1

3x - 6 Y = 11

2

3

1. 13-4+2=1

-4+11-2=2

2-2+8=6

1. + 2+ 3 = 6

2+ 5+ 2 = 4

6 - 3+ 1 = 2

1. A beverage company has two production sites A and B and they want to transport their beverage to two distributors C and D. The demand from distributor C is 542 bottles per week, and the demand from distributor D is 422 bottles per week. The supply from production site A is 475 bottles per week, and the supply from production site B is 489 bottles per week. We want to know if these sites produce enough beverage to satisfy the demands from the distributors. Formulate this problem as a system of linear equations.
2. An investor will invest a total of $15,000 in two accounts, one paying 4% annual simple interest and the other 3%. If he wants to earn $550 annual interest, how much should he invest at each rate?
3. Solve the following system of equation using Gaussian elimination, LU factorization, QR and Cholesky factorization:

i) + 3- 2 = - 4

3

-2= 7

ii) Also apply Jacobi and Gauss Seidel methods to solve i).

1. Set the seed at 4865299. Create a 4x3 matrix M by generating values from uniform (0, 1). Solve the system of equations Mx = b, where b = (1, 2, 3, 4) using Gaussian elimination, LU decomposition and QR factorization.
2. Set the seed at 4865299. Create a 6x6 symmetric matrix M by generating values from uniform (0, 1). Factorise it using Cholesky decomposition. Hence solve the system of equations Mx = b, where b = (1, 2, 3, 4, 5, 6).