

1. Solve the following systems of equations by Gaussian elimination :-

$$\begin{array}{lll}
 2x + z = 2 & 2x + y + z = 4 & 3x - y - z = -11 \\
 \text{(a) } x + y + z = -1 & \text{(b) } 2x - y - 2z = 1 & \text{(c) } x - y + z = -9 \\
 y - 2z = 3 & x - z = 2 & x + 2y - 2z = 9
 \end{array}$$

2. A parabola passes through the points $(0, 3)$, $(2, 5)$ and $(-1, 8)$.

Form a system of equations and solve to find the equation of the parabola.

3. For the system of equations :-

$$\begin{array}{l}
 x + 2y + z = 60 \\
 2x + 3y + z = 85 \\
 3x + y + pz = 105
 \end{array}$$

find the value of p such that there is inconsistency and hence no solutions.

4. For what values of a and b will the system of equations

$$\begin{array}{l}
 2x + y - 3z = 5 \\
 x - 2y + 3z = 1 \\
 2x - y + az = b
 \end{array}$$

(a) be inconsistent (i.e. have no solutions)

(b) be redundant (i.e. have infinitely many solutions) ?

5. What is meant by a system of equations being *ill-conditioned* ?

Determine if these systems of equations are ill-conditioned.

$$\begin{array}{ll}
 \text{(a) } 7x + 5y = 19 & \text{(b) } 7x + 5y = 2 \\
 4x + 3y = 11 & 4x - 3y = 13
 \end{array}$$