

**Chapter**

❖ MATHEMATICAL INDUCTION  
❖ COMPLEX NUMBER  
❖ LINEAR INEQUALITIES  
❖ THREE DIMENSIONAL GEOMETRY

❖ CONIC SECTION,  
❖ STATISTICS,  
❖ MATHEMATICAL REASONING  
❖ PERMUTATION AND COMBINATION

1.  $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$

1. i. Consider The Following Ellipse

a. find the equation of the ellipse

b. find the coordinates of the foci

ii. Find the coordinates of the focus, axis, the equation of the directrix  $y^2 = -8x$

2. Solve the system of inequalities graphically :

$x - 2y \leq 3, 3x + 4y \geq 12, x \geq 0, y \geq 1$

3. a. Which of the following points lies in the sixth octant

(i)  $(-4, 2, -5)$  (ii)  $(-4, -2, -5)$  (iii)  $(4, -2, -5)$  (iv)  $(4, 2, 5)$

b. Show that the points  $P(-2, 3, 5)$ ,  $Q(1, 2, 3)$  and  $R(7, 0, -1)$  are collinear.

4. a. express  $(1 + 2i)^3$  in the form of  $a + ib$

b. if  $x + iy = \frac{a+ib}{a-ib}$ , prove that  $x^2 + y^2 = 1$

5. Find the variance and standard deviation of

$x_i$	2	4	6	8	10	12	14	16
$f_i$	4	4	5	15	8	5	4	5

6. i. Write the negation of the following statements

a. Both diagonals of a rectangle have same length

b. Chennai is the capital of Tamil Nadu

ii. Write the converse and contrapositive of the following statements

a. If  $x$  is prime number, then  $x$  is odd

b. If the two lines are parallel, then they do not intersect in the same plane

c.  $x$  is an even number implies that  $x$  is divisible by 4

7. i. A group consists of 4 girls and 7 boys. In how many ways can 5 members be selected if the team has team

a. no girl?

b. at least one boy and one girl?

c. at least 3 girls?

ii. find  $n$  if  $2n_{C_3} : n_{C_3} = 12:1$

