

Class - XI (Maths)

1. Prove that  $\frac{1}{3 \times 5} + \frac{1}{5 \times 7} + \frac{1}{7 \times 9} + \dots + \frac{1}{(2n+1)(2n+3)} = \frac{n}{3(2n+3)}$

2. The sum of two numbers is 6 times their geometric mean, show that the numbers are in the ratio  $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$

3. Find  $(x+1)^6 + (x-1)^6$ . Hence or otherwise evaluate  $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6$ .

4. In how many ways can the letters of the word 'INDEPENDENCE' be arranged such that

- (i) words starts with I and end with D
- (ii) all the vowels occur together

5. Solve the following system of linear ~~quat~~ inequalities graphically:-

$3x - 2y \leq 4$ ,  $x + 3y \geq 3$  and  $x + y \geq 5$ ,  $y \leq 4$

6. Prove that:  
 $\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1$

7. Solve:
- (i)  $\cos 2\theta - \cos \theta = 0$
  - (ii)  $\sin \theta - \cos \theta = \sqrt{2}$

8. In a group of 35 students, 15 study algebra, 22 study geometry, 14 study trigonometry, 11 study both algebra

and geometry, 8 study geometry, and trigonometry, 5 study algebra and trigonometry and 3 study all three subjects. Find how many students are:

- (i) taking at least one of these subjects
- (ii) not taking any of these subjects.
- (iii) taking algebra only
- (iv) geometry and trigonometry but not algebra.

9. Find the term independent of  $x$  in the expansion of  $(3x^2 - \frac{1}{3x})^9$ . Also find its value.

10. Solve the inequality:-

$$\frac{2x-1}{3} \geq \frac{3x-2}{4} + \frac{2-x}{5}$$

11. A committee of 7 has to be formed from 9 boys & 4 girls. In how many ways can this be done when the committee consists of

- i) exactly three girls
- ii) at least three girls

12. In how many ways can final eleven be selected from 15 cricket players if

- i) One of them must be included
- ii) One of them must be excluded.

13. If  $(x+iy)^3 = u+iv$ , then show that  $\frac{u}{x} + \frac{v}{y} = 7(x^2-y^2)$

14. Find the square root of  $-7-24i$

15. Convert the complex number  $z = i-1$  in the polar form.

