



## JYOTI PUBLIC SCHOOL DHORKA

Holiday Homework  
ASSIGNMENT, (2018-19)

CLASS – 11<sup>th</sup>

Sub-Mathematics

- How many elements has  $P(A)$  if  $A = \emptyset$  ?
- If  $A$  and  $B$  are two sets such that  $A \subset B$ , then what is  $A \cup B$ ?
- If  $X$  and  $Y$  are two sets such that  
 $n(X) = 17, n(Y) = 23$  and  $n(X \cup Y) = 38$ , then find  $n(X \cap Y)$ .
- Prove that  $A \subseteq B, B \subseteq C$  and  $C \subseteq A \Rightarrow A = C$ .
- Prove that  $(A \cup B) \cap (A \cap B) = (A - B) \cup (B - A)$ .
- Prove that  $(A \cap B) \cap (A \cap C)$  need not imply  $B = C$ .
- In a committee 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least of these two languages?
- In survey of 60 people, it was found that 25 people read Newspaper H, 26 read Newspaper T, 26 read Newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find:
  - the number of people who read at least one of the newspapers.
  - the number of people who read exactly one newspaper.
- By the Principle of Mathematical Induction, prove the following for each  $n \in \mathbb{N}$  :
  - $4+8+12+\dots+4n = 2n(n+1)$ .
  - $1+4+7+\dots+(3n-2) = \frac{n(3n-1)}{2}$ .
- $1.2+2.3+3.4+\dots+n(n+1) = \frac{n(n+1)(n+2)}{3}$ .
- By using the Principle of Mathematical Induction, prove the following for all  $n \in \mathbb{N}$  :
  - $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$ .
  - $x + 4x + 7x + \dots + (3n-2)x = \frac{1}{2}n(3n-1)x$ .
- Prove, by Mathematical Induction, that for all  $n \in \mathbb{N}$ ,  
 $3^{2n} - 1$  is divisible by 8
- Find the multiplicative inverse of  $\frac{3+4i}{4-5i}$  and write it in the form  $a + ib$ .
- Express the following in polar form:
  - $3 + 4i$
  - $-4 + 4\sqrt{3}i$
- Express  $\sin 50^\circ + i \cos 50^\circ$  in the polar form. Also find  $r$  and  $\theta$ .
- Find the real part of  $\frac{1-i}{1+i}$ .
- Find  $x$  and  $y$  if  $(x - iy)(3 + 5i)$  is the conjugate of  $-6 - 24i$ .

18. Give an example to show that the subtraction of complex numbers is not commutative.
19. What is the additive inverse of  $-2 + 3i$ .
20. Find the multiplicative inverse of  $3 + 4i$ .
21. Find the square roots of  $-144$ .
22. Find the modulus of  $\frac{1+i}{1-i} - \frac{1-i}{1+i}$ .
23. Convert  $i$  in polar form.
24. Solve :  $x^2 + 3 = 0$
25. Solve :  $x + 10 > 4x - 5$ .
26. Solve:  $5x + 1 > -24$ ,  $5x - 1 < 24$ .
27. Draw the graph of  $x + y \leq 6$ ,  $x + y \geq 4$ .
28. Solve  $\frac{x}{4} < \frac{5x-2}{3} - \frac{7x-3}{5}$ .
29. Solve:  $3x + 8 > 2$ . when:  
 (i)  $x$  is an integer                      (ii)  $x$  is a real number .
30. Solve graphically:  $2x + y \geq 4$ ,  $x + y \leq 3$ ,  $2x - 3y \leq 6$
31. Find all pairs of consecutive odd positive integers, both of which are smaller than 10 such that their sum is more than 11.
32. In how many ways can six different rings be worn on the four fingers of one hand ?
33. How many natural number less than 1,000 can be formed with the digits 1, 2, 3, 4 and 5 if  
 (i) No digit is repeated                      (ii) repetition of digits is allowed?
34. There are 3 prizes to be distributed amongst 6 students. In how many ways can it be done when:  
 (i) no student gets more than one prize  
 (ii) there is no restriction as to the number of prizes any student gets  
 (iii) no student gets all prizes ?
35. How many 7- digit numbers can be formed, using the digits 1, 2, 0, 2, 4, 2, and 4?
36. How many numbers can be formed with the digits 1, 2, 3, 4, 3, 2, 1 so that odd digits always occupy the odd places ?
37. In how many ways can 4 red, 3 yellow and 2 green discs be arranged if the discs of the same colour are indistinguishable?
38. Evaluate  ${}^{10}C_4$ .
39. Verify that  $2 {}^7C_4 = {}^8C_4$ .
40. If  ${}^n C_7 = {}^n C_5$ , find  ${}^n C_4$ .  
 Prove that :  
 ${}^2C_1 + {}^3C_1 + {}^4C_1 = {}^3C_2 + {}^4C_2$ .
41. Find the locus of a point, which moves so that its distance from  $(1, 2, 3)$  is four times its distance from  $YZ$ -plane.