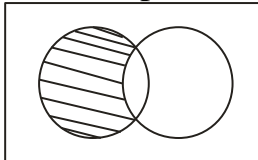


**ITL PUBLIC SCHOOL**  
**Summer Engagement Program**  
**SUBJECT - MATHEMATICS**  
**CLASS - XI**

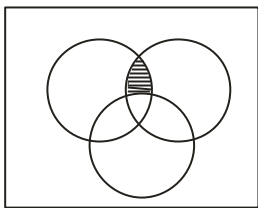
**(I) Complete the given 10 activities in the Maths Activity File**

**(II) Complete the assignment given below:**

1) Which portion is represented by the following Venn diagram.



2) Which portion is represent by the following Venn diagram.



3) Write the following sets in roster form:

(i)  $A = \{a_n : n \in N, a_{n+1} = 3a_n \text{ and } a_1 = 2\}$

(ii)  $B = \{a_n : n \in N, a_{n+2} = a_{n+1} + a_n, a_1 = a_2 = 1\}$

4) Find the pairs of equal sets, from the following sets, if any, giving reasons.

$$A = \{0\}, B = \{x : x > 15 \text{ and } x < 5\}, C = \{x : x - 5 = 0\}, D = \{x : x^2 = 25\}$$

$$E = \{x : x \text{ is an integral positive root of equation } x^2 - 2x - 15 = 0\}$$

5) Let  $A = \{a, b, \{c, d\}, e\}$ . which of the following statements are false and why?

(i)  $\{c, d\} \subset A$       (ii)  $\{c, d\} \in A$       (iii)  $\{\{c, d\}\} \subset A$

(iv)  $a \in A$       (v)  $a \subset A$       (vi)  $\{a, b, e\} \subset A$

(vii)  $\{a, b, e\} \in A$       (viii)  $\phi \in A$       (ix)  $\phi \in A$

(x)  $\{\phi\} \subset A$

6) Show that  $(A \cap B)' = A' \cup B'$ ..

7) Write the domain of the function  $f(x) = \sqrt{x-2}$ .

8) Write the domain and range of the function  $f(x) = |x|$ .

9) Write the domain and range of the function  $f(x) = [x]$ .

10) If  $A = \{1, 2, 3\}$  and  $B = \{4, 5\}$ ,  $C = \{5, 6\}$ , find  $A \times (B \cup C)$ ,  $A \times (B \cap C)$ ,  $(A \times B) \cup (A \times C)$ .

11) Let  $R$  be a relation on  $N$  defined by  $R = \{(a, b) : a, b \in N \text{ and } a = b^2\}$  Are the following true:

$$(a, a) \in R \text{ for all } a \in N \quad (\text{ii}) \quad (a, a) \in R \text{ for } \Rightarrow (b, a) \in R \quad (\text{iii}) \quad (a, a) \in R, (b, c) \in R \Rightarrow (a, c) \in R$$

12) Let  $f = \{(1,1), (2,3), (0,-1), (-1,-3)\}$  be a function described by the formula  $f(x) = ax + b$  for some integers  $a, b$ . Determine  $a, b$ .

13) Let  $X = \{1, 2, 3, 4\}$  and  $Y = \{1, 5, 9, 11, 15, 16\}$  Determine which of the following sets are functions from  $X$  to  $Y$

(a)  $f_1 = \{(1,1), (2,11), (3,1), (4,15)\}$

(b)  $f_2 = \{(1,1), (2,7), (3,5)\}$

(c)  $f_3 = \{(1,5), (2,9), (3,1), (4,5), (2,11)\}$

14) If  $f(x) = x + \frac{1}{x}$ , prove that  $[f(x)]^3 = f(x^3) + 3f\left(\frac{1}{x}\right)$ .

15) If  $f(x) = \frac{1}{2x+1}, x \neq -\frac{1}{2}$ , then show that  $f(f(x)) = \frac{2x+1}{2x+3}$ , provided that  $x \neq -\frac{3}{2}$ .

16) Find the range of each of the following functions :

$$(i) \ f(x) = \frac{1}{\sqrt{x-5}} \quad (ii) \ f(x) = \sqrt{16-x^2} \quad (iii) \ f(x) = \frac{x}{1+x^2} \quad (iv) \ f(x) = \frac{3}{2-x^2}$$

17) Find the equation of the set of points which are equidistant from the points  $(1,2,3)$  and  $(3,2,-1)$ .

18) Find the equation of the set of points  $P$  the sum of whose distances from  $A(4,0,0)$  and  $B(-4,0,0)$  is equal to 10.

19) Find the equation of set of points  $P$  such that  $PA^2 + PB^2 = 2k^2$ , where  $A$  and  $B$  are the points  $(3,4,5)$  and  $(-1,3,-7)$ , respectively

20) The centroid of a triangle  $ABC$  is at the point  $(1,1,1)$ . If the coordinates of  $A$  and  $B$  are  $(3,-5,7)$  and  $(-1,7,-6)$ , respectively, find the coordinates of the point  $C$ .

21) Three vertices of a parallelogram  $ABCD$  are  $A(3,-1,2)$ ,  $B(1,2,-4)$  and  $C(-1,1,2)$ . Find The coordinates of the fourth vertex.

22) Find the length of the medians of the triangle with vertices  $P(2a,2,6)$ ,  $Q(-4,3b,-10)$  and  $R(8,14,2c)$ , then find the value of  $a, b$ , and  $c$ .

23) If  $A$  and  $B$  be the points  $(3,4,5)$  and  $(-1,3,-7)$ , respectively, find the equation of the set of points  $P$  such that  $PA^2 + PB^2 = k^2$ , where  $k$  is constant.