DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : MATHS
DPP No. :1

Topic :-SETS

1 **(b)**

For any $a \in R$, we have $a \geq a$

Therefore, the relation R is reflexive.

R is not symmetric as $(2,1) \in R$ but $(1,2) \notin R$. The relation R is transitive also, because $(a,b) \in R, (b,c) \in R$ imply that $a \geq b$ and $b \geq c$ which in turn imply that $a \geq c$

2 **(d)**

Clearly, R is an equivalence relation

3 **(c)**

Let M and E denote the sets of students who have taken Mathematics and Economics respectively.

Then, we have

$n(M \cup E) = 35, n(M) = 17$ and $n(M \cap E') = 10$

Now,

$n(M \cap E') = n(M) - n(M \cap E)$

$\Rightarrow 10 = 17 - n(M \cap E) \Rightarrow n(M \cap E) = 7$

Now,

$n(M \cup E) = n(M) + n(E) - n(M \cap E)$

$\Rightarrow 35 = 17 + n(E) - 7 \Rightarrow n(E) = 25$

$\therefore n(E \cap M') = n(E) - n(E \cap M) = 25 - 7 = 18$

4 **(a)**

Let $A = \{n(n+1)(2n+1) : n \in Z\}$

Putting $n = \pm 1, \pm 2, \ldots.,$ we get $A = \{\ldots -30, -6, 0, 6, 30, \ldots\}$

$\Rightarrow \quad \{n(n+1)(2n+1) : n \in Z\} \subset \{6k : k \in Z\}$

5 **(a)**

$\because \quad A \cup B = \{1, 2, 3, 4, 5, 6\}$

$\therefore \quad (A \cup B) \cap C = \{1, 2, 3, 4, 5, 6\} \cap \{3, 4, 6\}$

$= \{3, 4, 6\}$

6 **(d)**

We have,

$n(A \cap \overline{B}) = 9, n(\overline{A} \cap B) = 10$ and $n(A \cup B) = 24$

$\Rightarrow n(A) - n(A \cap B) = 9, n(B) - n(A \cap B) = 10$ and, $n(A) + n(B) - n(A \cap B) = 24$

$\Rightarrow n(A) + n(B) - 2n(A \cap B) = 19$ and $n(A) + n(B) - n(A \cap B) = 24$

$\Rightarrow n(A \cap B) = 5$

$\therefore n(A) = 14$ and $n(B) = 15$

Hence, $n(A \times B) = 14 \times 15 = 210$

7 **(a)**

Clearly, $P \subset T$

$\therefore P \cap T = P$

8 **(a)**

It is given that A is a proper subset of B

$\therefore A - B = \phi \Rightarrow n(A - B) = 0$

We have, $n(A) = 5$. So, minimum number of elements in B is 6

Hence, the minimum possible value of $n(A \,\Delta\, B)$ is $n(B) - n(A) = 6 - 5 = 1$

9 **(d)**

$\because \quad n(A \times B \times C) = n(A) \times n(B) \times n(C)$

$$\therefore \quad n(C) = \frac{24}{4 \times 3} = 2$$

10 **(b)**

Use $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

11 **(d)**

$\because A = \{(a, b): a^2 + 3b^2 = 28, a, b \in Z\}$

$= \{(5, 1), (-5, -1), (5, -1), (-5, 1), (1, 3), (-1, -3), (-1, 3),$

$(1, -3), (4, 2), (-4, -2), (4, -2), (-4, 2)\}$

And $B = \{(a, b): a > b, a, b \in Z\}$

$\therefore \quad A \cap B = \{(-1, -5), (1, -5), (-1, -3), (1, -3), (4, 2), (4, -2)\}$

$\therefore$ Number of elements in $A \cap B$ is 6.

13 **(d)**

We have

$R = \{(1,39),(2,37),(3,35),(4,33),(5,31),(6,29),$

$(7,27),(8,25),(9,23),(10,21),(11,19),(12,17),$

$(13,15),(14,13),(15,11),(16,9),(17,7),(18,5),$

$(19,3),(20,1)\}$

Since $(1,39) \in R$, but $(39,1) \notin R$

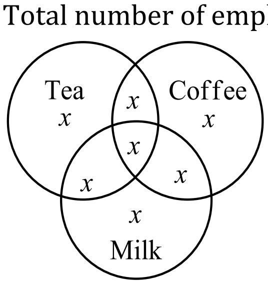
Therefore, R is not symmetric

Clearly, R is not reflexive. Now, $(15,11) \in R$ and $(11,19) \in R$ but $(15,19) \notin R$

So, R is not transitive

14 **(c)**

Total number of employees $= 7x$ i.e. a multiple of 7. Hence, option (c) is correct



15 **(a)**

The power set of a set containing n elements has 2^n elements.
Clearly, 2^n cannot be equal to 26

16 **(b)**

The relation is not symmetric, because $A \subset B$ does not imply that $B \subset A$. But, it is anti-symmetric because

$A \subset B$ and $B \subset A \Rightarrow A = B$

18 **(c)**

We have, $A \supset B \supset C$

$\therefore A \cup B \cup C = A$ and $A \cap B \cap C = C$

$\Rightarrow (A \cup B \cup C) - (A \cap B \cap C) = A - C$

19 **(c)**

Given, $n(C) = 63, n(A) = 76$ and $n(C \cap A) = x$

We know that,

$n(C \cup A) = n(C) + n(A) - n(C \cap A)$

$\Rightarrow \quad 100 = 63 + 76 - x \Rightarrow x = 139 - 100 = 39$

And $n(C \cap A) \leq n(C)$

$\Rightarrow \quad x \leq 63 \qquad \therefore 39 \leq x \leq 63$

20 **(b)**

We have,

$X =$ Set of some multiple of 9

and, $Y =$ Set of all multiple of 9

$\therefore X \subset Y \Rightarrow X \cup Y = Y$

ANSWER-KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	B	D	C	A	A	D	A	A	D	B
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	D	D	C	A	B	D	C	C	B