WORKSHEET CHAPWISE - 1

12th Standard CBSE

Maths

Relations and Functions

Total Mark : 39

1 Mark Questions **5 x 1 = 5**

1) Given set A = {a, b, c). An identity relation in set A is

(a) R = {(a, b), (a, c)} (b) R = {(a, a), (b, b), (c, c)} (c) R = {(a, a), (b, b), (c, c), (a, c)} (d) R= {(c, a), (b, a), (a, a)}

2) Given triangles with sides T_1 : 3, 4, 5; T_2 : 5, 12, 13; T_3 : 6, 8, 10; T_4 : 4, 7, 9 and a relation R in set of triangles defined as R = {(Δ_1, Δ_2) : Δ_1 is similar to Δ_2}. Which triangles belong to the same equivalence class?

(a) T_1 and T_2 (b) T_2 and T_3 (c) T_1 and T_3 (d) T_1 and T_4

3) A relation S in the set of real numbers is defined as xSy $\Rightarrow$ x – y+ $\sqrt{3}$ is an irrational number, then relation S is

(a) reflexive (b) reflexive and symmetric (c) transitive (d) symmetric and transitive

4) Let R be a relation on the set L of lines defined by l_1 R l_2 if l_1 is perpendicular to l_2, then relation R is

(a) reflexive and symmetric (b) symmetric and transitive (c) equivalence relation (d) symmetric

5) Given set A ={1, 2, 3} and a relation R = {(1, 2), (2, 1)}, the relation R will be

(a) reflexive if (1, 1) is added (b) symmetric if (2, 3) is added (c) transitive if (1, 1) is added

(d) symmetric if (3, 2) is added

2 Mark Questions **5 x 2 = 10**

6) Define symmetric Relation.Give one example

7) Define Transitive Relation. Give one example.

8) Given an example of a relation which is

(i) Reflexive, Symmetric and transitive

(ii) Reflexive, Symmetric and not transitive.

9) Define Reflexive.Give one example.

10) Let f:$X \rightarrow Y$ be a function Define a relation R on X given be R=[(a,b) ; (f(b)] Show that R is an equivalence relation ?

4 Mark Questions **5 x 4 = 20**

11) Show that the relation R defined by (a,b) R (c,d) $\Rightarrow$a+d=b+c on the set N x N is an equivalence relation.

12) Let f:N→N be defined by $f(n)=\begin{cases}\frac{n+1}{2}, \text{ if } n \text{ is odd.}\\ \frac{n}{2}, \text{ if } n \text{ is even}\end{cases}$ for all $n \in N$ State whether the functions f is onto, one-one or bijective.Justify your answer

13) Prove that the relation R in the set A={1,2,3,4,5} given by R={(a,b):|a-b| is even}, is an equivalence relation.

14) Let Z be the set of all integers and R be the relation on Z defined as R={(a,b):a,b ∈ Z, and (a-b) is divisible by 5}. Prove that R is an equivalence relation.

15) Let T be the set of all triangles in a plane with R a relation in T given by R={(T_1,T_2):T_1 is conguruent to T_2 and T_1 ,T_2 T}. Show that R is an equivalence relation.

4 Mark Questions **1 x 4 = 4**

16) A relation R on a set A is said to be an equivalence relation on A iff it is

(a) Reflexive i.e.., $(a, a) \in R \, \forall \, a \in A$

(b) Symmetric i.e., $(a, b) \in R \Rightarrow (b, a) \in R \, \forall \, a, b \in A$

(c) Transitive i.e., $(a, b) \in R$ and $(b, c) \in R \Rightarrow (a, c) \in R \, \forall \, a, b, c \in A$

Based on the above information, answer the following questions.

(i) If the relation R = {(1, 1), (1, 2), (1, 3), (2,2), (2, 3), (3,1), (3, 2), (3, 3)} defined on the set A = {1, 2, 3}, then R is

(a) reflexive **(b) symmetric** **(c) transitive** **(d) equivalence**

(ii) If the relation R = {(1, 2), (2,1), (1, 3), (3, I)} defined on the setA = {1, 2, 3}, then R is

(a) reflexive **(b) symmetric** **(c) transitive** **(d) equivalence**

(iii) If the relation R on the set N of all natural numbers defined as R = {(x, y) : y = x + 5 and x < 4}, then R is

(a) reflexive **(b) symmetric** **(c) transitive** **(d) equivalence**

(iv) If the relation R on the set A = {1, 2, 3, , 13, 14}defined as R = {(x, y) : 3x - y = 0}, then R is

(a) reflexive **(b) symmetric** **(c) transitive** **(d) equivalence**