CLASS XII
GUESS PAPER
MATHS

RELATION AND FUNCTION

Q. 1. Show that the relation R in the set A ={1,2,3,4} given by R={ (a,b) :I a – b I is even }, is an equivalence relation.

Q. 2. Show that the relation R in R defined by R={ (a,b) : a ≤ b }, is reflexive and transitive but not symmetric.

Q. 3. Show that the relation R in the set A = { x : x€W, 0≤ x≤ 12} given by R = { (a,b): | a- b |is a multiple of 4 } is an equivalence relation. Also find the set of all elements related to 2.

Q. 4. If ƒ: R ® R be given by ƒ (x) = $\left(3 - x^3\right)^{\frac{1}{3}}$, find the value of ƒoƒ (x)

Q. 5. Consider ƒ : R ® R given by f(x) = 4x+3, show that ƒ is invertible . Find the inverse of ƒ.

Q.6 Let A = { a,b,c} and B = { p,q,r} and f: A →B is given by f = {(a,r),(b,q),(c,q)} Is f invertible? If so find f^{-1}. Also verify f^{-1} o f = I$_A$ and foƒ$^{-1}$ = I$_B$ where I$_A$ and I$_B$ are identity elements on set A and B respectively.

Q. 7. Show that binary operation a * b =(a+ b)/2 " a,b € N is commutative but not associative.

Q. 8. Show that ƒ: N →N defined by ƒ (x) = $\begin{cases} \dfrac{n+1}{2} & if\, n,\, odd \\ \dfrac{n}{2} & n,\, even \end{cases}$ many-one onto function.

Q. 9. Show that ƒ : R – {0} → R– {0} given by ƒ (x) = 3 / x is invertible and it is inverse of itself.

Q. 10. Show that the function ƒ: R → R defined by ƒ (x) = 3x^3 + 5 for x € R is a bijection.

Q. 11. Show that the relation R on the set R of all real numbers, defined as R = { (a, b): a ≤ b ^{2} } is neither reflexive nor symmetric nor transitive.

Q. 12. Show that the function ƒ:N ® Ngiven by ƒ (1) = ƒ (2) =1 and ƒ (x) = x - 1,for every x > 2 is   onto but not one-one.

Q.13   Let A = R – {3} and B = R – {1} If f :A →B: f(x) = $\dfrac{x-2}{x-3}$, prove that f is a bijective function.

Q.14   For real Numbers x and y we write x*y if x – y + √2 is an irrational number. Prove that the relation * is not an equivalence relation.

Q.15   Let * be the binary operation on N defined by a* b = H.C.F. of a and b. Is * commutative , Associative ? Does there exist identity for this operation?

Q.16   Show that if f : R – {7/5} →R – {3/5}is defined by f(x) = $\dfrac{3x+4}{5x-7}$ and g : R – {3/5}→R - {7/5} is defined by g(x) = $\dfrac{7x+4}{5x-3}$, then fog = I$_A$ and gof = I$_B$, where A = R – {3/5}, B= R - {7/5}.

Q.17 If L be the set of all lines in a plane and R be the relation in L defined as R = {(L1,L2): L1 is perpendicular to L2}then find whether the relation is equivalence or not.

Q18. If * be the binary operation on Z_0 such that $a*b = a^2 - b^2 + ab + 4$, then find (2*3) * 4

Q19. Let * be the binary operation on Q+ such That a*b = ab/100,for all a,b€Q+, Find the inverse of 0.1

Q.20 Consider a binary operation * on the set { 1,2,3,4,5}given by the following table . Find (i) (2*3)*4 and 2 *(3* 4)
(ii) (2*3)* (4*5)   (iii) Is * commutative (iv) Find identity and inverse , if exist

*	1	2	3	4	5
1	1	1	1	1	1
2	1	2	1	2	1
3	1	1	3	1	1
4	1	2	1	4	1
5	1	1	1	1	5