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Relations and Functions 1 & 6 marks test 5

12th Standard CBSE

Date : 14-Jun-19

Maths

Reg.No. : | | | | | | |

FOR ANSWERS WHATSAPP - 8056206308

Time : 01:30:00 Hrs

1) If f(X)=X+7 and g(X)=X-7, $X \in R,$ find fog(7). ? 1

2) If the binary operation * on the set of integers Z is defined by a*b=a+3b^2 then find the value of 2*4. 1

3) Let * be a binary operation on N given by a*b=HCF(a,b), $a, b \in N$. Write the value of 22*4. 1

4) If the binary operation * defined on Q is defined as a*b=2a+b-ab, for all $a, b \in Q,$ find the value of 3*4. 1

5) If f:$R \rightarrow R$ be defined by $f(X) = (3 - X^3)^{\frac{1}{3}}$ then find fof(X). 1

6) If f is an invertible function defined as f(X)=$\frac{3X-4}{5}$, write f^{-1}(X). 1

7) If f:$R \rightarrow R$ and g:$R \rightarrow R$are given by f(X)=sin x and g(x)=5x^2 find gof(x). 1

8) If f(x)=27x^3 and g(x)=x$^{1/3}$ find gof(x). 1

9) State the reason for the relation R in the set {1,2,3} given by R={(1,2),(2,1),} not to be transitive. 1

10) Let A={1,2,3} B={4,5,6,7} and let f={(1,4),(2,5),(3,6)} be a function from A to B. State whether f is one-one or not. 1

11) Write fog, if f : $R \rightarrow R$ and g : $R \rightarrow R$ are given by: f(x)=|x| and g(x)=|5x-2| 1

12) Write fog, if f:$R \rightarrow R$ and g:$R \rightarrow R$ are given by f(x)=8x^2 and g(x)=x$^{1/3}$ 1

13) The binary operation *:R X $R \rightarrow R$ is defined as a*b=2a+b. Find (2*3)*4. 1

14) If the binary operation * on the set Z of integers is defined by a*b=a+b-5, then write the identiy element for the operation * in Z. 1

15) Let f and g be two real functions defined as f(x)=2x-3; g(x)=$\frac{3+x}{2}$. Find fog and gof. Can you say one is inverse of the other? 1

16) Prove that f:$R \rightarrow R$ given by f(x)=x^3+1 is one-one function. 1

17) Let f:$R \rightarrow R$ is defined by f(x)=x^2. Is f one-one? 1

18) Let f:$R \rightarrow R$ is defined by f(x)=|x|. Is function f onto? Give reasons. 1

19) Let R be a relation in the set of natural numbers N defined by R={(a,b) ∈ NXN;a 1

20) Let A be any non-empty set and P(A) be the power set of A. A relation R defined on P(A) by $X \quad R \quad Y \Leftrightarrow X \quad \cap \quad Y = X, X, Y \in P(A)$. Examine whether R is symmetric. 1

21) Let $f: N \rightarrow N$ be defined by f(x)=3x. Show that f is not onto function. 1

22) Let * be a binary operation on N given by a*b=lcm(a,b), a,b ∈ N. Find (2*3)*6. 1

23) * is a binary operation defined on the set of natural numbers N, defined by a*b=a^b Find (i)2*3 (ii)3*2 1

24) * is a binary operation defined on Q given by a*b=a+ab,a,b ∈ Q. Is * commutative? 1

25) An operation * on Z$^+$ is defined as a*b=a-b. Is the operation * a binary operation? Justify your answer. 1

26) Find if the binary operation * given by a*b=$\frac{a+b}{2}$ in the set of real numbers, associative. 1

27) Show that the relation R:{1,2,3} $\rightarrow$ {1,2,3} given by R={(1,1),(2,2),(3,3),(1,2),(2,3)} is reflexive but neither symmetric nor transitive. 1

28) Prove that the greatest integer function f:R $\rightarrow$ R, given by f(x)=[x] is neither one-one nor onto. 1

29) Show that the absolute value function :R $\rightarrow$ R given by f(x)=|x| is neither one-one nor onto. 1

30) Let A={1,2,3} B={4,5,6,7} and let f={(1,4),(2,5),(3,6)} be a function from A to B. Show that f is one-one. 1

31) Let f:{1,3,4} $\rightarrow$ {1,2,5} and g:{1,2,5} $\rightarrow$ {1,3} be given by f={(1,2),(3,5),(4,1)} and g={(1,3),(2,3),(5,1)}. Write down gof. 1

32) Show that division is not a binary operation on N. 1

33) Let the function f:R $\rightarrow$ R to be defined by f(x)=cos x ∀x ∈ R. Show that is neither one-one nor onto. 1

34) For the set A={1,2,3} define a relation R in the set A is follows: R={(1,1).(2,2),(3,3),(1,3)}. Write the ordered pairs to be added to R to make it the smallest equivalence relation. 1

35) If R=[(x,y) : X+2y=8] is a relation on N, write the range of R **1**

36) Let R=[(a,a^2) : a is a prime number less than 5) be a relation Find the range of R **1**

37) Let R be the equivalence relation in the set A =[0,1,2,3,4,5] given by R=[(a,b) : 2 divides (a-b) Write the equivalence class [0] **1**

38) State the reason why the Relation R=[(a,b) : $a \le b^2$ on the set R of the real numbers is not reflexive **1**

39) If $f: R \to R$ defined as $f(x) = \frac{2x-7}{4}$ is an invertible function write $f^{-1}(x)$ **1**

40) Let $f: R \to R$ be defined by $f(x) = 3x^2 - 5$ and g : $R \to R$ be defined by $g(x) = \frac{x}{x^2+1}$ find gof **1**

41) Letf: {I, 3, 4} ~ {1,2, 5} and g : {1,2, 5} ~ {1,3} given byf = {(I, 2) (3,5) (4, I)} and g = {(I, 3), (2, 3), (5,1)} Write down gof **1**

42) Let*: $R \times R \to R$ given by (a,b) $\to$ $a + 4b^2$ is a binary operation .Computer (-5)(2 * 0) **1**

43) Let * be a binary operation , on the set of all non-zero real numbers given by a*b=$\frac{ab}{5}$ for all a,b $\in R - \{0\}$ Find the value of x, given that 2*(x*5)=10 **1**

44) State the reason for the following Binary operation * defined on the set Z of integers to be not commutative a*b=ab^2 **1**

45) If the binary operation * on the set of integers Z is defined by a*b=a+3b^2 then find the value of 8*3 **1**

46) If * is a binary operation on the set R of real numbers defined by a*b=a+b - 2 then find the identity element for the binary operation *. **1**

47) Let * be a binary operation on N given by a * b = LCM(a,b) for all a,b $\in$ N. Find 5*7 **1**

48) Let * be a binary operation. On the set of all non-zero real numbers, given by a*b = $\frac{ab}{5}$. For all a, b $\in R - [0]$. Find the value of x, given that (i) 2*(x*5) =6, (ii) 3(x*3) = 9. **1**

49) Show that the relation R in the Set A = {I, 2, 3, 4, 5} given by R = {(a, b) : Ia - b I is divisible by 2} is an equivalence relation. Write all the equivalence classes of R. **6**

50) Show that the function \(f:R[x\in R:1 defined by $f(x) = \frac{x}{1+|x|}, x \in R$ is one-one and onto function Hence find $f^{-1}(x)$ **6**

51) Consider $f: R_+ \to [-5, \infty)$ given by f(x)=9x^2+6x-5 Show that f is invertible find $f^{-1}(x)$ where R_+ is the set of all non-negative real numbers. **6**

52) Let f: $N \to N$ be a function defined as $f(x) = x^2 + 4x + 7$ show that f:$N \to S$ Where S is the range of f, and f is invertible Find the inverse of f .Has interest any relation with knowledge? **6**

53) Let A= $R \times R$ and * be a binary operation on A defined by (a,b)*(c,d)=(a+c,b+c) Show that * is commutative and associative. Find the identity element for * on A. Also find • the inverse of every element (a, b) $\in A$ *. **6**

54) Show that the binary operation * on A=R-{-1} defined as a*b=a+b for all a,b,c A is commutative and associative on A.Also find the identity element of * in A and prove that every element of A is invertible **6**

55) Determine whether the operation * define below on Q is binary operation or not. a*b=ab+1 If yes, check the commutative and the associative properties. Also check the existence of identity element and the inverse of all elements is Q. **6**

56) Let * be a binary operation defined on Q x Q by (a, b) * (c, d) = (ac, b + ad). where Q is the set of rational numbers. Determine, whether * is commutative and associative. Find the identity element for * and the invertible elements of Q x Q. **6**

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