THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"
AIM HIGH, TOGETHER WE FLY

DEPARTMENT OF MATHEMATICS

CLASS12 CHAPTER1- RELATIONS &FUNCTIONS

1) 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
2) 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 = $\{(\Delta_1, \Delta_2) : \Delta_1$ is similar to $\Delta_2\}$. 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) 3. 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
4) 4. 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)}
5) . A relation S in the set of real numbers is defined as xSy ⇒ $x - y + \sqrt{3}$ is an irrational number, then relation S is
(a) reflexive
(b) reflexive and symmetric
(c) transitive
(d) symmetric and transitive
6) 6. Set A has 3 elements and the set B has 4 elements. Then the number of injective functions that can be defined from set A to set B is
(a) 144

(b) 12
(c) 24
(d) 64

7) Let Z be the set of integers and R be a relation defined in Z such that aRb if (a – b) is divisible by 5. Then R partitions the set Z into ______ pairwise disjoint subsets.
8) Consider set A = {1, 2, 3 } and the relation R= {(1, 2)}, then? is a transitive relation. State true or false.
9) Every relation which is symmetric and transitive is reflexive also. State true or false.
10) Let R be a relation defined as R = {(x, x), (y, y), (z, z), (x, z)} in set A = {x, y, z} then R is (reflexive/symmetric) relation.
11) Let R be a relation in the set of natural numbers N defined by R = {(a, b) ∈ N × N: a < b}. Is relation R reflexive? Give a reason.
12) 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 R Y ⇔ X ∩ Y = X, X, Y ∈ P(A). Examine whether ? is symmetric.
13) State the reason for the relation R in the set {1, 2, 3} given by R = {(1, 2), (2, 1)} not to be transitive.
14) State the reason for the relation R in the set {1, 2, 3} given by R = {(1, 2), (2, 1)} not to be transitive.
15) Show that the relation R in the set {1,2,3} given by R = {(1,1), (2, 2), (3, 3), (1, 2), (2, 3)} is reflexive but neither symmetric nor transitive.
16) Let A = {3, 4, 5} and relation R on set A is defined as R = {(a, b) e A x A : a – b – 10). Is relation an empty relation?
17) Given set A = {a, b} and relation R on A is defined as R = {(a, a), (b, b)}. Is relation an identity relation?
18) 19. Let set A represents the set of all the girls of a particular class. Relation R on A is defined as R = {(a, b) ∈ A × A : difference between weights of a and b is less than 30 kg}. Show that relation R is a universal relation.
19) If A = {1, 2, 3} and relation R = {(2, 3)} in A. Check whether relation R is reflexive, symmetric and transitive.
20) State the reason for the relation R in the set {1, 2, 3} given by R = {(1, 2), (2, 1)} not to be transitive.
21) Consider the set A containing n elements, then the total number of injective functions from set A onto itself is _____ .
22) The domain of the function f : R → R defined by f(x) = $\sqrt{4 - x^2}$is ___
23) Let A = {a, b }. Then number of one-one functions from A to A possible are

(a) 2
(b) 4
(c) 1
(d) 3

24) Let A = {1, 2, 3, 4} and B = {a, b, c}. Then number of one-one functions from A to B are _______.

25) If n(A) = p, then number of bijective functions from set A to A are _______ ..

26) The function $f : R \rightarrow R$ defined as $f(x) = [x]$, where [x] is greatest integer $\leq x$, is onto function. State true or false.

27) 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

28) Let $f : R \rightarrow R$ is defined by $f(x) = |x|$. Is function f onto? Give a reason.

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

30) Show that the Signum Function $f : R \rightarrow R$,

given by $f(x) = \begin{cases} 1, \text{ if } x > 0 \\ 0, \text{ if } x = 0 \\ -1, \text{ if } x < 0 \end{cases}$ is neither

one-one nor onto.

31) Given $f(x) = \sin x$ check if function f is one-one for (i) $(0, \pi)$ (ii) $(-\pi/2, \pi/2)$.

ANSWERS

https://www.ncertbooks.guru/maths-mcqs-for-class-12-with-answers-chapter-1/

4 MARK QUESTIONS

1) Consider f: **R +** → R given by f(x)=$9x^2 + 6x - 5$. Show that f is one to one but not onto.
2) Let f: **N**→ ***R*** be a function defined as f(x) = $4x^2$ +12x +15 . show that f is one to one but not onto.
3) Let A = {1,2,3, ...,10} and R be the relation in A x A defined by (a, b) R (c, d) iff a + d = b + c for (a, b), (c, d) in A x A. Prove that R is an equivalence relation. Also obtain the equivalence class [(3,4)].
4) Let A = {1,2,3, ...,9) and R be the relation in A x A defined by (a, b) R (c, d) if a + d = b + c for (a, b), (c, d) in A x A. Prove that R is an equivalence relation. Also obtain the equivalence class [(2, 5)].

5)

Let N denote the set of all natural numbers and R be the relation on N x N defined by (a, b) R (c, d) iff
ad (b + c) = bc (a + d). Show that R is an equivalence relation.

6) Show that the relation R in the set N of Natural numbers given by
R = $\{(a, b): 3 \; divides \; |a - b|\}$ is not an equivalence relation.
7) Check whether the relation R in **R** defined by R = $\{(a, b): a \leq b^3\}$ is reflexive, symmetric, transitive.
8) Prove the relation R on the set N x N defined by (a,b) R (c,d) ⇔ ad=bc for all
(a,b) ,(c,d) ϵ N x N is an equivalence relation.