SCHOLUP

Class XII – Mathematics (Relation and Function)

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

2. Let $f(x) = \sqrt{1-x}$ and $g(x) = \log x$, describe the function fog. Also give their domains.

3. Let f be the greatest integer function and g be the modulus function. Find the values of the following:

   (gof) $\left(\frac{5}{3}\right)$ – (fog) $\left(\frac{5}{3}\right)$

4. If $f(x) = e^x$ and g(x) = log x. Find fog and gof. Is gof = fog?

5. Let f(x) = $\frac{x}{\sqrt{(1+x^2)}}$, then show that (fofof) (x) = $\frac{x}{\sqrt{(1+3x^2)}}$.

6. Show that the function f: R → R defined by $f(x) = 3x^3 + 5$ for all $x \in R$ is a bijective.

7. If f : (1,2,3) → (a, b, √c) given by f(1) = a, f(1) = b and f(3) = c. Find the inverse (f^{-1}) of f^{-1}. Show that $(f^{-1})^{-1}$ = f.

8. If the operation * is defined on the set of all rational number by the rule a*b = $\frac{ab}{3}$ for all a, b ϵ Q. Show that * is association on Q.

9. If '*' is defined on the set R of real numbers by $\frac{3ab}{7}$, then determine the identity element in R for the binary operation?

10. Show 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. Show that all the elements of {1, 3, 5} are related to each other and all the elements of {2, 4} are related to each other. But no element of {1, 3, 5} is related to any element of {2, 4}.