**HOLIDAY HOMEWORK**

**CLASS XII**

***CHAPTER 1***

**1.Let** $f=\left\{\left(1, 3\right), \left(2, 1\right), \left(3, 2\right)\right\}$ **and** $g=\left\{\left(1, 2\right), \left(2, 3\right), \left(3, 1\right)\right\}$**, then find** $\left(gof\right) \left(1\right) and \left(fog\right) (2)$

**2. If** $f\left(x\right)=x^{2}+1 and g\left(x\right)=3x-1$ **then find**

 **i)** $gof$ **ii)** $fog$ **iii)** $fof$ **iv)** $gog$

**3. Let** $f :R \rightarrow R$ **be defined by** $f\left(x\right)=7x-3$**. Show that f is invertible. Find** $f^{-1}$

**4. Show that the relation** R **in the set R of real numbers, defined as R=** $\left\{\left(a, b\right) : a\leq b^{2}\right\}$**, is neither reflexive nor symmetric nor transitive.**

**5. Show that the relation** R **in R is defined as** R**=**$\left\{\left(a, b\right) :a\leq b\right\}$**, is reflexive and transitive but not symmetric.**

**6. Show that the relation R in the set A of all the books in a library of a college, given by R={(x, y) : x and y have same number of pages}, is an equivalence relation.**

**7. Show that the relation R in the set A={1, 2, 3, 4, 5}, given by R={**$\left(a, b\right)$ **:** $\left|a-b\right|$ **is even}, is an equivalence relation**

**8. Let L, be the set of all lines in XY-plane and R be the relation in L defined as**

**R=**$\left\{\left(L\_{1}, L\_{2}\right) : L\_{1} is parallel to L\_{2}\right\}$**. Show that R is an equivalence relation.**

**9. Check the injectivity and surjectivity of the following functions :**

 **i)** $f :Z\rightarrow Z given by f\left(x\right)=x^{3}$ **ii)** $f :N\rightarrow N given by f\left(x\right)=x^{3}$

 **iii)** $f :R\rightarrow R given by f\left(x\right)=x^{3}$

**10. In each of the following cases, state whether the function is one-one, onto or bijective. Justify your answer.**

 **i)** $f :R\rightarrow R defined by f\left(x\right)=3-4x$ **ii)** $f :R\rightarrow R defined by f\left(x\right)=1+x^{2}$

**11. If** $f\left(x\right)=\frac{\left(4x+3\right)}{\left(6x-4\right)} , x\ne \frac{2}{3} $ **show that** $\left(fof\right) \left(x\right)=x$**, for all** $x\ne \frac{2}{3}$

**12. Consider** $f :R\rightarrow R$ **given by** $f\left(x\right)=4x+3$**. Show that** $f$ **is invertible. Find the inverse of** $f$

**13. A relation** $R=\left\{\left(x,y\right) :x divides y; x,y \in N\right\}$ **defined on the set N of all natural numbers. Show that** $R$ **is reflexive but not symmetric.**

**14. Show that the relation : R={(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3), (3, 2)} is a reflexive and transitive but not symmetric.**

**15. Show that the relation R={(1, 1), (1, 2), (2, 2), (3, 3), (3, 2), (2, 3), (2, 1)} is reflexive and symmetric but not transitive.**

**16. Show that the relation R={(1, 2), (2, 3), (3, 2), (1, 3), (2, 1), (2, 2), (3, 3), (3, 1), (1, 1)} is reflexive, symmetric and transitive.**

**17. Show that the relation R={(1, 1), (1, 2), (2, 1), (2, 2)} is reflexive, symmetric and transitive.**

**18. Show that the relation R={(1, 1), (3, 3), (5, 5), (1, 3), (3, 1), (3, 5)} is reflexive and is neither symmetric nor transitive.**

**19. Show that the relation R defined in the set A of all triangles as :**

$R=\left\{\left(T\_{1}, T\_{2}\right) : T\_{1} is similar to T\_{2} and T\_{1}, T\_{2}\in T\right\}$ **is an equivalence relation.**

**20. Show that the relation R defined in the set A of all polygons as** $R=\left\{\left(P\_{1}, P\_{2}\right) : P\_{1} and P\_{2} have the same number of sides\right\}$ **is an equivalence relation.**