	ANSWER KEY CLASS XII MATHS	
1	A	
2	C	
3	Set A is the set of all books in the library of a college. R={(x,y):x and y have the same number of pages} Now, R is reflexive since (x,x)∈R as x and x has the same number of pages. Let (x,y)∈R⇒x and y have the same number of pages. ⇒y and x have the same number of pages. ⇒(y,x)∈R ∴R is symmetric. Now, let (x,y)∈R and (y,z)∈R ⇒x and y and have the same number of pages and y and z have the same number of pages. ⇒x and z have the same numbers of pages. ⇒(x,z)∈R ∴R is transitive. Hence, R is an equivalence relation.	
4	R is an equivalance relation if R is reflexive,symmetric and transitive. a)checking if it is reflexive; Given R in A×Aand(a,b)R(c,d)suchthata+d=b+c For reflexive,consider (a,b)R(a,b)(a,b)∈A and applying given condition⇒a+b=b+a;which is true for all A ∴Risreflexive. b)checking if it is symmetric; given(a,b)R(c,d)suchthata+d=b+c	

	consider (c,d)R(a,b)onA×A applying given condition⇒c+b=d+awhichsatisfiesgivencondition Hence R is symmetric. c)checking if it is transitive; Let(a,b)R(c,d)and(c,d)R(e,f) and(a,b),(c,d),(e,f)∈A×A applying given condition:⇒a+d=b+c→1andc+f=d+e→2 equation 1⇒a−c=b−d nowaddequation1and2; ⇒a−c+c+f=b−d+d+e ⇒a+f=b+e ∴(a,b)R(e,f) also satisfies the condition Hence R is transitive.	
5	**We have gof(x) = g((3x + 4)/(5x - 7)) = (7((3x + 4)/(5x - 7)) + 4)/(5((7x + 4)/(5x - 7)) - 3) = (21x + 28 + 20x - 28)/(15x + 20 - 15x + 21) = 41x/41 = x** **Similarly,** **fog(x) = f((7x + 4)/(5x - 3)) = (3(7x + 4)/(5x - 3)) + 4)/(5(7x + 4)/(5x - 3)) - 7) = (21x + 12 + 20x - 12)/(35x + 20 - 35x + 21) = 41x/41 = x** **Thus, gof (x) = x, ∀ x ∈ B and fog (x) = x, ∀ x ∈ A, which implies that gof = IB and fog = IA.**	

6	We have, the function $f : R \to R$ defined by $f(x) = \frac{x}{x^2+1} \forall\ x \in R$ For one-one: Let $x_1, x_2 \in R$ Now, $f(x_1) = f(x_2)$ $\Rightarrow \frac{x_1}{x_1^2+1} = \frac{x_2}{x_2^2+1}$ $\Rightarrow x_1x_2^2 + x_1 = x_2x_1^2 + x_2$ $\Rightarrow x_1x_2^2 - x_2x_1^2 + x_1 - x_2 = 0$ $\Rightarrow -x_1x_2[x_1 - x_2] + (x_1 - x_2) = 0$ $\Rightarrow (x_1 - x_2)(1 - x_1x_2) = 0$ $\Rightarrow x_1 = x_2$ or $x_1x_2 = 1$ $\Rightarrow x_1 = x_2$ or $x_1x_2 = 1$ But, there exists some values of x_1 and x_2 so that $x_1 \neq x_2$ but $f(x_1) = f(x_2)$ Like $x_1 = 2$ and $x_2 = \frac{1}{2}$ then, $f(x_1) = \frac{2}{5}$ and $f(x_2) = \frac{2}{5}$ but $x_1 \neq x_2$ Hence, f(x) is not one-one. For onto: Again, consider a value '1' as element in co-domain R. $\Rightarrow \frac{x}{x^2+1} = 1$ $\Rightarrow x^2 + 1 = x$	

	i.e., quadratic equation in x Here, discriminant $D < 0$. Hnece, there is no real value of $x \in R$ for which $f(x) = 1$. $\therefore$ f is not an onto function. Thus, f is neither one-one nor onto.		