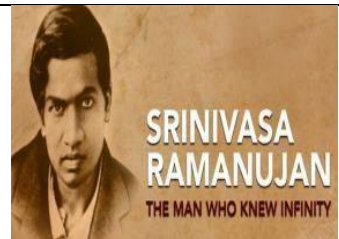|	**SRM Institute of Science and Technology**	
	Kattankulathur	
	DEPARTMENT OF MEATHEMATICS	
	18MAB302T DISCRETE MATHEMATICS	
	UNIT–1 SET THEORY	
	Tutorial Sheet - 3	

Sl.No.	Questions PART-A (3 Marks)
1	For the function F: $\{1, 2, 3, 4, 5\} \rightarrow \{a, b, c, d, e\}$ defined as F(1)=a, F(2)=b, F(3)=b, F(4)=d, F(5)=c, identify domain(F), codomain(F), range(F), $F^{-1}(a)$, $F^{-1}(\{a, b, c\})$ and $F^{-1}(e)$.
2	If f and g are both defined on the set of real numbers and c is a constant $f(x) = cx - 3$, $g(x) = cx + 5$. If $(f \circ g)(x) = (g \circ f)(x)$ for all values of x, what is the value of c?
3	Find $(f \circ g \circ h)(x)$ if $f(x) = 2x$, $g(x) = x^2 + 2x$ and $h(x) = 2x$.
4	Consider the function $g : Z \rightarrow Z$ defined by $g(n)= n^2 + 1$. Find $g^{-1}(1)$, $g^{-1}(2)$, $g^{-1}(3)$ and $g^{-1}(10)$.
5	Find $(g \circ f \circ q)(t)$ if $q(t) = \sqrt{x}$, $f(t) = x^2$ and $g(t) = 5x^9$.
	PART – B (6 Marks)
6	Let $f : X \rightarrow Y$ and $g : Y \rightarrow Z$ be two bijective functions. Show that $(g \circ f)^{-1}$ exists and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.
7	For the functions $f(x) = x^2 - 4$ and $g(x) = \sqrt{(x + 1)}$, find f(g(x)), g(f(x)), $(f \circ f)(x)$, and $(g \circ g)(x)$.
8	If f, g : $R \rightarrow R$ where f(x) = ax+b, $g(x)= 1 - x+x^2$ and $(g \circ f)(x) = 9x^2 - 9x+3$. Find the values of a and b.
9	If f, g, h : $R \rightarrow R$ where f(x) = x+2, $g(x)= 1 / (x^2+1)$ and h(x) = 3. Find $g \circ f^{-1} \circ f(x)$ and $f^{-1} \circ g \circ f(x)$.
10	Verify $f \circ (g \circ h) = (f \circ g) \circ h$, when f, g, h : $Z \rightarrow Z$ defined by $f(n) = n^2$, $g(n) = n+1$ and h(x) = n – 1.