

		SRM Institute of Science and Technology Kattankulathur	
		DEPARTMENT OF MEATHEMATICS	
		18MAB102T ADVANCED CALCULUS & COMPLEX ANALYSIS	
		UNIT - V : Residue and Cauchy’s residue theorem Tutorial Sheet 15	
Sl.No.	Questions	Answer	
Part – A			
1	Find the residues of $f(z) = \frac{z}{(z-1)^2}$ at the poles	1	
2	Find the residues of $f(z) = \frac{e^z}{z^2+a^2}$ at $z = ai$	$2aie^{ai}$	
3	Find the residue of $f(z) = \frac{1-e^z}{z^2}$.	-1	
4	Find the residues of $f(z) = \frac{1}{(z^2+1)^2}$.	$-\frac{i}{4}, -\frac{i}{4}$	
5	Find the residue of $f(z) = \frac{1}{(z^2+a^2)^2}$ at $z = ai$	$-\frac{i}{4a^3}$	
Part – B			
6	Evaluate $\oint_C \frac{z-3}{z^2+2z+5} dz$ where C is the circle $ z+1-i =2$	$\pi(i-2)$	
7	Using Cauchy’s residue theorem evaluate $\oint_C \frac{z \sec z}{1-z^2} dz$ where C is the ellipse $4x^2+9y^2=9$	$-2\pi i \sec 1$	
8	Show that $\int_0^{2\pi} \frac{d\theta}{1+a \cos \theta} = \frac{2\pi}{\sqrt{1-a^2}}, (a^2 < 1)$.		
9	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5 \sin \theta}$	$\frac{\pi}{6}$	
10	Evaluate $\int_0^{2\pi} \frac{d\theta}{1-2a \cos \theta + a^2}, a^2 < 1$	$\frac{2\pi}{1-a^2}$	