

Tutorial No. 1

Subject: Applied Mathematics - IV**Class: SE**

1. Evaluate $\int_0^{1+i} x - y + ix^2 dz$ along the line from 0 to $1+i$.

2. Evaluate $\int_0^{1+2i} \bar{z} dz$, i) along the line $2x = y$.

ii) along the line from A to B and then from B to C where $A = (0,0)$, $B = (2,1)$, $C = (1,2)$.

3. $\int_C |z|^2 dz$, C : Square with vertices $(-1,0), (0,-1), (1,0), (0,1)$.

4. Evaluate $\int_C \log z dz$ where C is the left half of the circle $|z| = 2$.

5. Evaluate $\int_C z^3 dz$ along the parabola $x^2 = y$ from $(-1,1)$ to $(1,1)$.

6. Verify Cauchy's Integral theorem for $\int_C z + z^2 dz$ along the circle $|z| = 1$.

7. Verify Cauchy's Integral theorem for $\int_C z^2 dz$ where C is the boundary of the

Triangle with vertices $0, 2, 2i$.

8. Evaluate $\int_C \frac{2z+3}{z} dz$

where i) C is upper half of the circle $|z| = 1$ ii) C is lower half of the circle $|z-1| = 1$

iii) C is the circle $|z| = 1$ iv) C is the circle $|z-1| = 1$

9. Evaluate $\int_C \frac{\sin z}{z^6} dz$ along the circle $|z| = 2$.

10. Evaluate $\int_C \frac{z^2}{(z-1)^2(z-2)} dz$, $C: |z| = 2.5$ 11. Evaluate $\int_{C: |z|=2} \frac{1}{z(z-1)^2(z+3)} dz$

12. Evaluate $\int_C \frac{e^{2z-i}}{(z-i)^2} dz$, $C: |z-1| + |z+1| = 4$

13. Evaluate $\int_C \frac{2z^3 + z^2 + 4}{z^4 + 4z^2} dz$, $C: |z-2-2i| = 3$

14. If $f(a) = \int_C \frac{z^2 + z + 1}{z-a} dz$, where C is $|z| = 2$, find the values of

$f(1), f(3i), f'(i), f''(2.5), f''(-1)$.

15. Evaluate $\int_C \frac{z-1}{z^2 + 3z + 2} dz$, $C: |z| = 3$

16. Evaluate $\int_C \frac{z^2}{z^4 - 1} dz$, where C is $|z-1| = 1$