

Assignment # 03

Q1:- For what contours C with it follows from Cauchy's Integral theorem that

$$(i) \oint_C \frac{1}{z} dz = 0$$

$$(ii) \oint_C \frac{\cos z}{z^6 - z^2} dz = 0$$

$$(iii) \oint_C \frac{e^{1/z}}{z^2 + 9} dz = 0$$

Q2:- Integrate

$\int_C \operatorname{Re} z \, dz$ C the parabola $y = x^2$ from 0 to $1+i$.

Q3:- Find the upper bound of the absolute value of the integral in problem 2.

Q4:- Are the following sequences bounded? find their limit points.

$$(a) z_n = \ln((z_n + i)^n)$$

$$(b) z_n = (0.9 + 0.1i)^{2n}$$

$$(c) z_n = (5 + 5i)^{-n}$$

Q5 Find the radius and convergence from the series of simpler term

$$(a) \sum_{n=2}^{\infty} \frac{n(n-1)}{3^n} (2-7i)^n$$

$$(b) \sum_{n=1}^{\infty} \frac{n}{2} (2-2i)^{2n}$$

$$(c) \sum_{n=2}^{\infty} \frac{3^n (n)(n+1)}{5^n} (2-1)^{2n}$$

Q6 Find the Taylor of the given ftn with given points as center and determine the radius of convergence

$$(a) \sin z, \frac{\pi}{2}$$

$$(b) \frac{1}{1-z}, i$$

$$(c) \ln(1-z), i$$

Q7 Determine the location and kind of the singularity the following in case of pole also state the order

$$(a) z^3 \frac{1}{e^{2-1}}$$

(b)

$$\cos z - \sin z$$

End.

Review Exercise of
CHAP 19.5
from Section A or B.