Introduction

(B) why need using Cauchy's integral Theorem

---

(1) $\int \frac{z}{z-1}\,dz = ?$ (Then find Answer)

$\int \frac{z}{z-1}\,dz \Rightarrow$ if Put the $z=2$

Now find integral

$\Downarrow$

$$\int \frac{z}{z-1}\,dz = \int \frac{2}{2-1}\,dz$$

$$= \int 2\,dz = 2z.$$

if Put the $z=0$

$$\int \frac{z}{z-1}\,dz = \int \frac{0}{0-1}\,dz = 0$$

But $z=1$ Put

$$\int \frac{z}{1-1}\,dz = \int \frac{z}{0}\,dz = \infty$$

[illegible]

formula

$$|z - z_0| = r$$

max circle

z_0 = Center

r = Radius.

Ex. $|z| = \frac{1}{2}$

$|z - z_0| = r$

$|z - 0| = \frac{1}{2}$

Center $= 0$, radius $= \frac{1}{2}$

$|z| = \frac{1}{2}$

$|(x + iy) - (0 + 0i)| = \frac{1}{2}$

$|x + iy| = \frac{1}{2}$

$\sqrt{x^2 + y^2} = \frac{1}{2}$

$x^2 + y^2 = \left(\frac{1}{2}\right)^2$

Now Center $= (0, 0)$

Radius $= \frac{1}{2}$

I - 2

Introduction Pole

If given integral is fraction Part

Ex $\int \frac{z}{(z-1)(z-2)} dz$. meaning $\int \frac{N}{D} dz$

Ex $\int \frac{\text{Numerator}}{\text{Denominator}} dz$.

~~Now Pole is~~

Find the Pole using only Denominator Part equal to zero.

Ex $\int \frac{z}{(z-1)(z-2)} dz$

$(z-1)(z-2) = 0$

$z = 1, 2$

Now Pole = So there are two Pole $z=1$, and $z=2$

Ex $\int \frac{z}{(z-1)} dz$

$z-1=0$ $z=1$

So there ~~exist~~ is one Pole $z=1$

Ex $\displaystyle\int \frac{z^2}{z(z-1)(z-2)}\,dz$

$z(z-1)(z-2)=0$

$z=0,1,2$

So there are Three Pole $z=0$, $z=1$ and $z=2$

Ex $\displaystyle\int \frac{z^3}{(z+1)^3}\,dz = ?$

$(z+1)^3=0$

$z=-1,-1,-1$