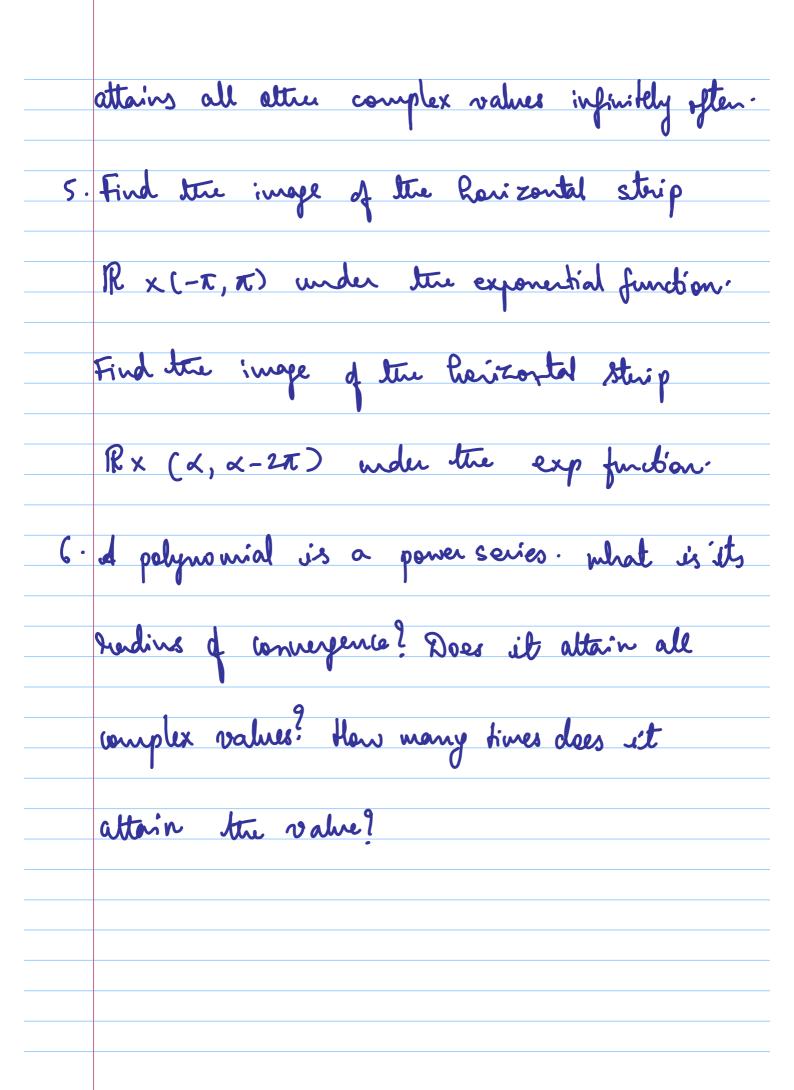
Tutorial-3 1. Show that if f(x,y) = u(x,y) + iv(x,y) is analytic, the real & : maginary parts of f(\(\overline{\pi}\)) are harmonic. Do tury satisfy the Cauchy-Riemann equations ? 2. Show that the harmonic function $U = \frac{1}{2} \log \frac{2(x+1)^2 + y^2}{(x+1)^2 + y^2}$ has a harmonic conjugate in the sing 2<x2+y2<3. 3. Prove that $|e^{z}| = e^{kez}$ 4. Prove that the exponential function exp never attains the value o although it



7. Prone the following identities:

Sint = sinx costy + i Cosx sinhy

cost = cosx coshy - isinn sinhy,

and we there to show that the

function sinz maps Louizontal lines to

ellipses & vertical lines to hyperbolae.

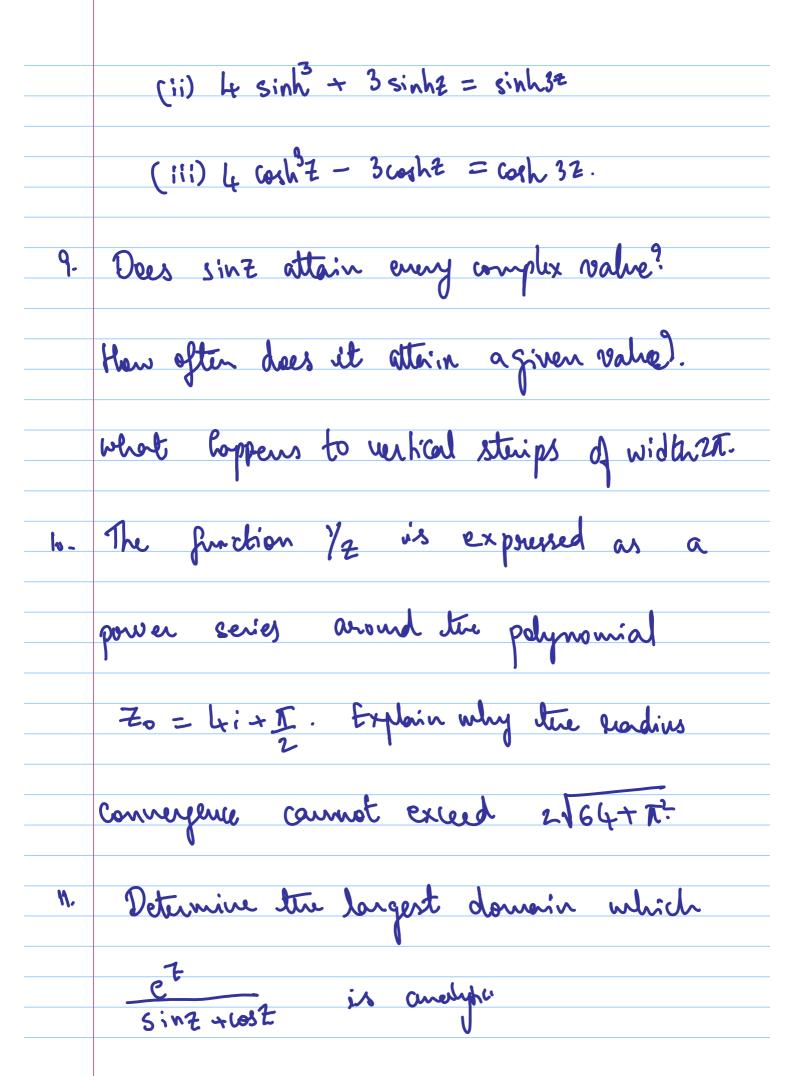
Show that:

| Sinz| = Sin2x+istnhy

| cosz | = cos2x + sinhy.

8 Prove the identifies:

(i) -4 sin = +3 sin = = Sin 3a



12. Disurs tre convergence & find the

sum of the following series. Let OER.

(i)
$$1 + \cos \theta + \frac{1}{2} \cos 2\theta + \cdots$$

map circles & straight lines to circles or lines. Write $f(z) = \frac{az+b}{cz+d}$ as a comparite of the above functions & f(2)=1. Show that f takes circles to lives to circles or lives-11) Show that tan(2) fails to taken on tre values i & -i.