

Important Question

1. If the complex number $\sin x + i\cos 2x$ and $\cos x - i\sin 2x$ are complex conjugate to each other, then find the value of x .
2. If z_1 and z_2 are two non-zero complex number s.t $|z_1 + z_2| = |z_1| + |z_2|$. Find $\arg(z_1) - \arg(z_2)$.
3. To prove that $|z_1 - z_2| \geq |z_1| - |z_2|$
4. Define Neighbourhood and deleted Neighbourhood.
5. $F(z) = e^z$ is an analytic function or not.
6. Verify whether the real and imaginary part of $w = \sin z$ satisfy Cauchy- Riemann equations.

Long question

1. Find the regular function $f(z) = u + iv$
Where $u = e^{-x}[(x^2 - y^2) \cos y + 2xy \sin y]$
2. Find Cauchy Riemann equation in polar co-ordinates.
3. Show that the inverse of a point a with respect to the circle $|Z - C| = R$ is the point $c + \frac{R^2}{\bar{a} - c}$
4. Show that the function $u = \frac{1}{2} \log(x^2 + y^2)$ are harmonic find their harmonic conjugates.