

Answer on Question #42964, Math, Complex Analysis

Calculate by complex number the magnitude of conjugate $\frac{z+1}{z-1}$.

Solution.

If $z = x + iy$, then $\frac{z+1}{z-1} = \frac{(x+1)+iy}{(x-1)+iy}$. The conjugate to $\frac{z+1}{z-1}$ equals $\frac{\bar{z}+1}{\bar{z}-1} = \frac{(x+1)-iy}{(x-1)-iy}$. The magnitude of fraction is equal to the fraction of magnitudes of nominator and denominator.

$$\left| \frac{\bar{z}+1}{\bar{z}-1} \right| = \left| \frac{(x+1)-iy}{(x-1)-iy} \right| = \sqrt{\frac{(x+1)^2 + y^2}{(x-1)^2 + y^2}}.$$

Answer: $\left| \frac{\bar{z}+1}{\bar{z}-1} \right| = \left| \frac{(x+1)-iy}{(x-1)-iy} \right| = \sqrt{\frac{(x+1)^2 + y^2}{(x-1)^2 + y^2}}.$