Answer on Question #48816 – Math – Complex Analysis

if Ln z = Ln (z*) ,prove z is real number

Solution

Let complex number be $z = a + bi$. Then $z^* = a - bi$.

Ln z = ln |z| + i * phi, where phi is angle in complex interpretation of z.

For z*, Ln z* = ln |z*| - i * phi.

As we know, |z| = |z*| and according to statement of question, Ln z = Ln z*.

So, we obtain next equation:

ln |z| + i * phi = ln |z*| - i * phi.

It transforms to

I * phi = 0, which means that z is real number.