Answer on Question #58293 – Math – Complex Analysis

Let $z_1, z_2 \in \mathbb{C}$. Then the reverse triangle inequality is given by .....

Solution:

The triangle inequality is given by

$$|z_1 + z_2| \leq |z_1| + |z_2|$$

Then

$$|z_1| = |z_1 + (z_2 - z_2)| = |(z_1 - z_2) + z_2|$$

Using the triangle inequality we obtain:

$$|z_1| \leq |(z_1 - z_2)| + |z_2|$$

So

$$|z_1| - |z_2| \leq |z_1 - z_2|$$

As $|z| = |-z|$ we obtain (permutation $z_1 \rightleftarrows z_2$) the reverse triangle inequality:

$$\big||z_1| - |z_2|\big| \leq |z_1 - z_2|$$

Answer: The reverse triangle inequality is given by $\big||z_1| - |z_2|\big| \leq |z_1 - z_2|$.