

Answer on Question #51656 – Math – Complex Analysis

Let

$$z_1 = 3 + 2j$$

$$z_2 = 4 + 5j$$

Calculate $z_1 * z_2$ and state $Re(z_1 * z_2)$ & $Im(z_1 * z_2)$.

Solution:

The product of complex numbers z_1 and z_2 is defined to be the number

$$(a + bj)(c + dj) = (ac - bd) + (bc + ad)j,$$

$$\begin{aligned} z_1 * z_2 &= (3 + 2j)(4 + 5j) = (3 \cdot 4 - 2 \cdot 5) + (3 \cdot 5 + 2 \cdot 4)j = (12 - 10) + (8 + 15)j \\ &= 2 + 23j \end{aligned}$$

The real part of complex number $z = a + bi$ is $Re(z) = a$,

$$Re(z_1 * z_2) = Re(2 + 23j) = 2.$$

The imaginary part of complex number $z = a + bi$ is $Im(z) = b$,

$$Im(z_1 * z_2) = Im(2 + 23j) = 23$$

Answer:

$$z_1 * z_2 = 2 + 23j$$

$$Re(z_1 * z_2) = 2$$

$$Im(z_1 * z_2) = 23$$