

It is given that $z_1 = 2 + 3i$ and $z_2 = 4 + ai$

Find a if $Im(z_1 z_2^*) = 0$

$$z_2^* = 4 - ai$$

z_2^* is the complex conjugate of z_2

$$z_1 z_2^* = (2 + 3i)(4 - ai)$$

$$z_1 z_2^* = 8 - 2ai + 12i - 3ai^2$$

$$z_1 z_2^* = 8 + 3a + (12 - 2a)i$$

$$Im(z_1 z_2^*) = 0$$

$$12 - 2a = 0$$

$$a = 6$$