EdExcel Further Pure 1

Complex Numbers

Section 2: The Argand diagram and the modulus-argument form

Exercise

1. Given that $z_1 = 3 + 2i$ and $z_2 = 4 - i$ represent z_1, z_2, $z_1 + z_2$ and $z_1 - z_2$ on an Argand diagram.

2. Given that $z = 2 + i$ show on an Argand diagram z, z^*, iz, and iz^*. Write down the transformation that describes the relationship between
   (i) z and z^*
   (ii) z and iz

3. Find the modulus and argument of each of the following complex numbers:
   (i) $-2\sqrt{3} - 2i$
   (ii) $1 - 3i$
   (iii) $-3 + 3i$

4. Write each complex number in the form $x + yi$.
   (i) $3\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$
   (ii) $6\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$
   (iii) $2\left(\cos\left(-\frac{\pi}{6}\right) + i\sin\left(-\frac{\pi}{6}\right)\right)$

5. Given that $z = 1 + 2i$, find the modulus and argument of
   (i) z (ii) z^* (iii) $\frac{1}{z}$ (iv) $\frac{1}{z^*}$
   What do you notice?

6. Given that $w = 10i$ and $z = 1 + \sqrt{3}i$
   (i) write each of w and z in modulus-argument form
   (ii) find $|wz|$ and $\left|\frac{w}{z}\right|$.