Complex Numbers 1

1.

    a. Find the modulus and argument of the complex numbers:
       (i) $5 - 5\sqrt{3}i$ (ii) $(3 - i)(2 + 3i)$

    b. Express $z = \dfrac{4 + 2i}{3 - i}$ in the form $x + iy$ and indicate z and its complex conjugate, $\bar{z}$
       on an Argand diagram.

2. Solve the equation $z^2 + 2z + 5 = 0$ and illustrate the solutions on the Argand diagram.

3. Find the modulus and argument of the complex number $1 - \sqrt{3}i$

4. Given that $z = 1 + i$ is a root of the equation $z^4 + 3z^2 - 6z + 10 = 0$ find the other roots.

5. A complex number z can be written as $z = (1 + ic)^6$.

   a) Expand z in powers of c.

   b) Find the 5 real values of c for which z is real.