

Section 1: Introduction to complex numbers**Exercise level 1**

- Find the roots of the following equations:
 - $z^2 + 25 = 0$
 - $4z^2 + 9 = 0$
 - $z^2 - 2z + 2 = 0$
 - $4z^2 + 4z + 5 = 0$
- Two complex numbers $4 - 3i$ and $2 + i$ are denoted by z and w respectively. Find, giving your answers in the form $x + yi$.
 - $2z - 3w$
 - zw
 - $(iz)^2$
 - z^*w
- In each of the following cases find
 - $z_1 + z_2$
 - $z_1 - z_2$
 - z_1z_2
 - z_1^*
 - z_2^*
 - $z_1^* + z_2^*$
 - $z_1^* - z_2^*$
 - $z_1^*z_2^*$
 - $z_1 = 2 + 3i; z_2 = 1 - 2i$
 - $z_1 = -2i; z_2 = 3 + i$What do you notice about the results?
- Find the quadratic equation which has roots $2 + 3i$ and $2 - 3i$.
- Express these complex numbers in the form $x + yi$.
 - $\frac{2}{3+i}$
 - $\frac{2-i}{1+2i}$
- Solve the equation $(2+i)z = 3 + 4i$.
- One root of the quadratic equation $z^2 + az + b = 0$ where a and b are real, is the complex number $1 + 2i$.
 - Write down the other root.
 - Find the values of a and b .