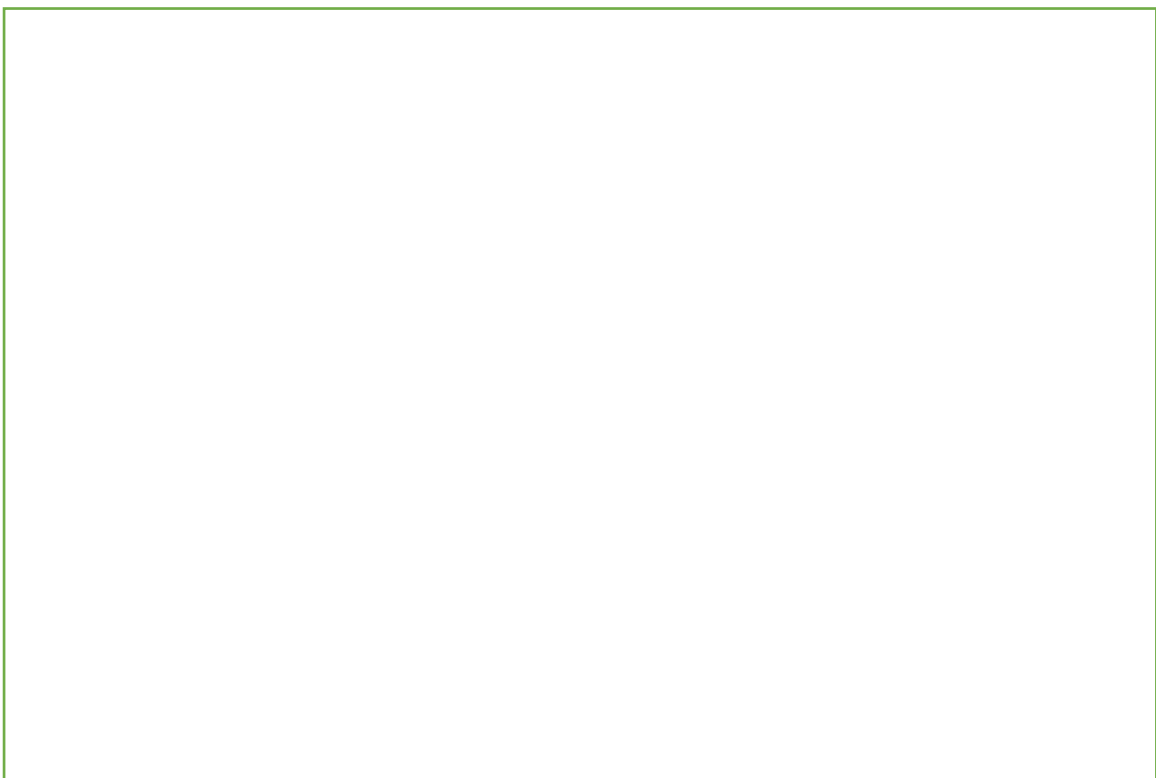# Roots of Cubic and Quartic Equations

Cubics

Quartics

1. [Textbook] Given that $3 + i$ is a root of the quartic equation

$2z^4 - 3z^3 - 39z^2 + 120z - 50 = 0$, solve the equation completely.

2. [Textbook] Show that $z^2 + 4$ is a factor of $z^4 - 2z^3 + 21z^2 - 8z + 68$.
Hence solve the equation $z^4 - 2z^3 + 21z^2 - 8z + 68 = 0$

Test Your Understanding:

Given that 2 and 5 + 2i are roots of the equation

$$x^3 - 12x^2 + cx + d = 0, \quad c, d \in \mathbb{R},$$

(a) write down the other complex root of the equation.

(1)

(b) Find the value of c and the value of d.

(5)