

## 4B Roots of Cubics

1. If  $\alpha$ ,  $\beta$  and  $\gamma$  are the roots of the equation  $2x^3 + 3x^2 - 4x + 2 = 0$ , find the values of:

a)  $\alpha + \beta + \gamma$

b)  $\alpha\beta + \beta\gamma + \gamma\alpha$

c)  $\alpha\beta\gamma$

d)  $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$

2. The roots of a cubic equation  $ax^3 + bx^2 + cx + d = 0$  are

$$\alpha = 1 - 2i, \beta = 1 + 2i \text{ and } \gamma = 2.$$

Find integer values for  $a, b, c$  and  $d$ .