3. The quadratic equation

$$3x^2 - 2x + 5 = 0$$

has roots α and β

Without solving the equation,

(a) write down the value of $(\alpha + \beta)$ and the value of $\alpha\beta$

(1)

(b) determine the value of $\alpha^2 + \beta^2$

(2)

(c) determine a quadratic equation that has roots

$$\left(\alpha + \frac{1}{\alpha}\right) \text{ and } \left(\beta + \frac{1}{\beta}\right)$$

giving your answer in the form $px^2 + qx + r = 0$ where p, q and r are integers.

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 3 continued

(Total for Question 3 is 7 marks)