5. The quadratic equation

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

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 $\alpha^3 + \beta^3$

(2)

(c) determine a quadratic equation that has roots

$$(\alpha^4\beta - 2) \text{ and } (\alpha\beta^4 - 2)$$

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

(5)

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Question 5 continued

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Question 5 continued

(Total for Question 5 is 8 marks)