

- 5 (a) Show that  $(\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta) = \alpha^3 + \beta^3$  (2)

The roots of the equation  $2x^2 + 3x + 6 = 0$  are  $\alpha$  and  $\beta$

Without solving the equation,

- (b) find the value of  $\alpha^3 + \beta^3$  (2)
- (c) Show that  $(\alpha^2 + \beta^2)^2 - 2(\alpha\beta)^2 = \alpha^4 + \beta^4$  (2)
- (d) Form a quadratic equation with integer coefficients that has roots  $(\alpha^3 - \beta)$  and  $(\beta^3 - \alpha)$  (6)

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**(Total for Question 5 is 12 marks)**

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