

- 7 A solid cuboid has width  $x$  cm, length  $5x$  cm and height  $h$  cm. The total surface area of the block is  $480\text{ cm}^2$ . The volume of the block is  $V\text{ cm}^3$ .

(a) Show that  $V = 200x - \frac{25}{6}x^3$  (4)

(b) Find the maximum value of  $V$ . (5)

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**Question 7 continued****(Total for Question 7 is 9 marks)**

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8

$$f(x) = x^2 + px + 7 \quad p \in \mathbb{R}$$

The roots of the equation  $f(x) = 0$  are  $\alpha$  and  $\beta$

(a) Find, in terms of  $p$  where necessary,

(i)  $\alpha^2 + \beta^2$       (ii)  $\alpha^2\beta^2$  (4)

Given that  $7(\alpha^2 + \beta^2) = 5\alpha^2\beta^2$

(b) find the possible values of  $p$  (2)

Using the positive value of  $p$  found in part (b) and without solving the equation  $f(x) = 0$

(c) form a quadratic equation with roots  $\frac{2p}{\alpha^2}$  and  $\frac{2p}{\beta^2}$  (5)

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**Question 8 continued**

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**Question 8 continued**

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**Question 8 continued**

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**(Total for Question 8 is 11 marks)**

