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

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

(4)

(b) Find the maximum value of V.

(5)

Question 7 continued

(Total for Question 7 is 9 marks)

8 $f(x) = x^2 + px + 7 \qquad p \in \mathbb{R}$

The roots of the equation $f(x) = 0$ are α and β

(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)

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 11 marks)