

- 8** A hollow circular cylinder, open at one end, is constructed of thin sheet metal. The total external surface area of the cylinder is $192\pi \text{ cm}^2$. The cylinder has a radius of $r \text{ cm}$ and a height of $h \text{ cm}$.

(i) Express h in terms of r and show that the volume, $V \text{ cm}^3$, of the cylinder is given by

$$V = \frac{1}{2}\pi(192r - r^3). \quad [4]$$

Given that r can vary,

- (ii) find the value of r for which V has a stationary value, [3]
- (iii) find this stationary value and determine whether it is a maximum or a minimum. [3]