

8. (i) The point  $P$  is one vertex of a regular pentagon in an Argand diagram.  
The centre of the pentagon is at the origin.

Given that  $P$  represents the complex number  $6 + 6i$ , determine the complex numbers that represent the other vertices of the pentagon, giving your answers in the form  $re^{i\theta}$

(5)

- (ii) (a) On a single Argand diagram, shade the region,  $R$ , that satisfies both

$$|z - 2i| \leq 2 \quad \text{and} \quad \frac{1}{4}\pi \leq \arg z \leq \frac{1}{3}\pi$$

(2)

- (b) Determine the exact area of  $R$ , giving your answer in simplest form.

(4)