

3. (a) Shade on an Argand diagram the set of points

$$\left\{z \in \mathbb{C} : |z - 1 - i| \leq 3\right\} \cap \left\{z \in \mathbb{C} : \frac{\pi}{4} \leq \arg(z - 2) \leq \frac{3\pi}{4}\right\}$$

(5)

The complex number  $w$  satisfies

$$|w - 1 - i| = 3 \quad \text{and} \quad \arg(w - 2) = \frac{\pi}{4}$$

(b) Find, in simplest form, the exact value of  $|w|^2$

(4)