

Cambridge International AS & A Level

Mathematics

9709/32

Paper 3 Pure Mathematics 3

May/June 2025

Question No (3)

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On an Argand diagram shade the region whose points represent complex numbers z which satisfy both the inequalities $|z - 3i| \leq 2$ and $\frac{\pi}{4} \leq \arg(z - 1 - 2i) \leq \frac{3\pi}{4}$.

Solution:

$$|z - 3i| \leq 2$$

$$|x + iy - 3i| \leq 2$$

$$|(x-0) + i(y-3)| \leq 2$$

$$(x-0)^2 + (y-3)^2 \leq 2$$

And

$$\frac{\pi}{4} \leq \arg(z - 1 - 2i) \leq \frac{3\pi}{4}$$

$$z - 1 - 2i = x + iy - 1 - 2i$$

$$= (x-1) + i(y-2)$$

