Complex numbers – AS Further Mathematics P1

1. June/2022/Paper_7366/01/No.5

Show that $(2+i)^3$ is $2+11i$

[3 marks]

2. June/2022/Paper_7366/01/No.4

The complex numbers w and z are defined as

$$w = 2(\cos\alpha + \mathrm{i}\sin\alpha)$$

$$z = 3(\cos\beta + \mathrm{i}\sin\beta)$$

Find the product wz

Tick (✓) **one** box.

[1 mark]

$5(\cos(\alpha\beta) + \mathrm{i}\sin(\alpha\beta))$ ☐

$6(\cos(\alpha\beta) + \mathrm{i}\sin(\alpha\beta))$ ☐

$5(\cos(\alpha + \beta) + \mathrm{i}\sin(\alpha + \beta))$ ☐

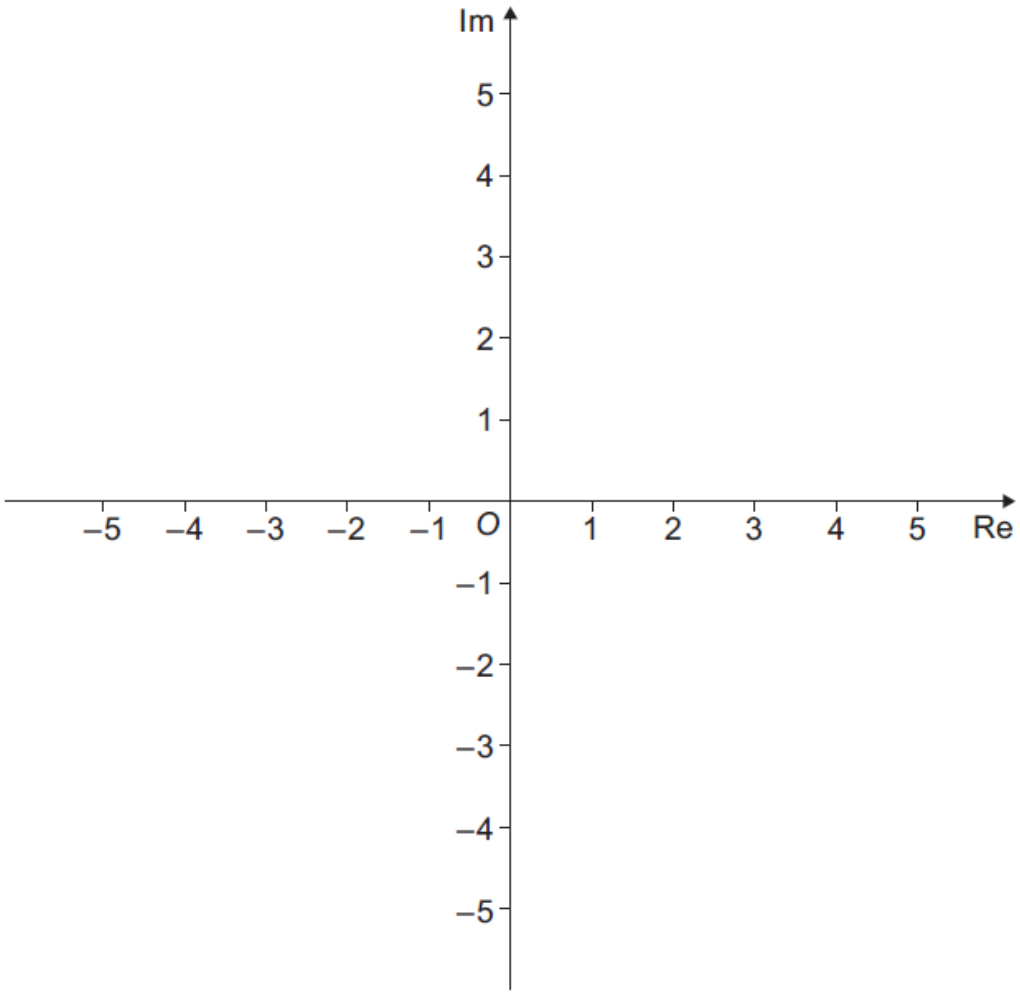
$6(\cos(\alpha + \beta) + \mathrm{i}\sin(\alpha + \beta))$ ☐

3. June/2022/Paper_7366/01/No.12

(a) Sketch, on the Argand diagram below, the locus of points satisfying the equation

$$|z - 2i| = 2$$

[2 marks]



(b) Sketch, also on the Argand diagram above, the locus of points satisfying the equation

$$\arg z = \frac{\pi}{3}$$

[1 mark]

(c) For the complex number w find the maximum value of $|w|$ such that

$$|w - 2i| \leq 2 \qquad \text{and} \qquad 0 \leq \arg w \leq \frac{\pi}{3}$$

[3 marks]