Exercise 3

Paper 2 style · Graphic display calculator

3 6 marks AHL 1.13 ●●○ Typical

Let $z = 5e^{0.9i}$ and $w = 2e^{-1.2i}$. The points Z and W represent z and w in the complex plane, and O is the origin.

(a) Find $z + w$ in the form $a + bi$. **[2]**

(b) Hence write $z + w$ in the form $re^{i\theta}$. **[2]**

(c) Find the area of triangle OZW. **[2]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
© 2026 Hence

Exercise 3 — markscheme

Paper 2 style · Graphic display calculator

3 6 marks AHL 1.13 ●●○ Typical

Let $z = 5e^{0.9i}$ and $w = 2e^{-1.2i}$. The points Z and W represent z and w in the complex plane, and O is the origin.

(a) Find $z + w$ in the form $a + bi$. **[2]**

(b) Hence write $z + w$ in the form $re^{i\theta}$. **[2]**

(c) Find the area of triangle OZW. **[2]**

MARKSCHEME (a)

$5\cos 0.9 + 2\cos(-1.2) + i(5\sin 0.9 + 2\sin(-1.2))$ **(M1)**

$= 3.83 + 2.05i$ **A1**

Total 2 marks

MARKSCHEME (b)

$r = 4.35$ **A1**

$\theta = 0.492$ **A1**

Total 2 marks

MARKSCHEME (c)

angle $ZOW = 0.9 - (-1.2) = 2.1$ **(M1)**

$\frac{1}{2} \times 5 \times 2\sin 2.1 = 4.32$ **A1**

Total 2 marks