Marked example 3

Paper 2 style · Graphic display calculator

3 6 marks AHL 1.13 ●●○ Typical

Let $z = 4e^{1.2i}$ and $w = 3e^{-0.5i}$. 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)

$4\cos 1.2 + 3\cos(-0.5) + i(4\sin 1.2 + 3\sin(-0.5))$ **(M1)**

$= 4.08 + 2.29i$ **A1**

Total 2 marks

MARKSCHEME (b)

$r = \sqrt{4.08^2 + 2.29^2} = 4.68$ **A1**

$\theta = \arctan\frac{2.29}{4.08} = 0.511$ **A1**

Total 2 marks

MARKSCHEME (c)

angle $ZOW = 1.2 - (-0.5) = 1.7$ **(M1)**

$\frac{1}{2} \times 4 \times 3\sin 1.7 = 5.95$ **A1**

Total 2 marks

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