# Marked example 3

Paper 2 style · Graphic display calculator

## 3 7 marks AHL 1.12 ●○○ Routine

Let $z_1 = 3 + 4\text{i}$ and $z_2 = 1 - 2\text{i}$.

**(a)** Find $\frac{z_1}{z_2}$, giving your answer in the form $a + b\text{i}$. **[2]**

**(b)** Find $|z_1 z_2|$ and $\arg(z_1 z_2)$. **[3]**

**(c)** Find the real number $k$ such that $z_1 + kz_2$ is purely imaginary. **[2]**

**MARKSCHEME (a)**

$\frac{(3+4\text{i})(1+2\text{i})}{5}$ **(M1)**

$= -1 + 2\text{i}$ **A1**

Total 2 marks

**MARKSCHEME (b)**

$z_1 z_2 = 11 - 2\text{i}$ **(A1)**

$|z_1 z_2| = \sqrt{125} = 11.2$ **A1**

$\arg(z_1 z_2) = -0.180$ **A1**

Total 3 marks

**Note** Or $|z_1||z_2| = 5\sqrt{5}$.

**MARKSCHEME (c)**

$\text{Re} = 3 + k = 0$ **(M1)**

$k = -3$ **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