# Modulus

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

**1.** Find $|5 - 12i|$. [2 marks]

$|5 - 12i| = \sqrt{25 + 144} = \sqrt{169}$.

**Answer:** 13.

**2.** Find $|-3 + 2i|^2$. [2 marks]

Squared modulus is $9 + 4 = 13$.

**Answer:** 13.

**3.** Find the distance between $2 - i$ and $-1 + 3i$. [3 marks]

The difference is $3 - 4i$.

Its modulus is $\sqrt{9 + 16} = 5$.

**Answer:** 5.

**4.** Given $|z| = 6$ and $|w| = 2$, find $|zw|$ and $|z/w|$. [3 marks]

Use the product and quotient modulus identities.

**Answer:** 12 and 3.

**5.** Find all $z$ such that $\text{Im}(z) = 5$ and $|z| = 13$. [3 marks]

Write $z = a + 5i$.

$a^2 + 25 = 169$, so $a^2 = 144$ and $a = \pm 12$.

**Answer:** $z = 12 + 5i$ or $z = -12 + 5i$.

**6.** Use $z = 1$ and $w = -1$ to show that $|z + w| = |z| + |w|$ is not always true. [3 marks]

$z + w = 0$, whereas each of 1 and $-1$ is one unit from the origin.

Oppositely directed vectors cancel.

**Answer:** Left side 0; right side 2.