Complex-number arithmetic

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Calculate $(5+i)-(2-4i)$. [2 marks]

$5+i-2+4i=3+5i$.

Answer: $3+5i$.

2. Calculate $(2-3i)(-1+2i)$. [3 marks]

Expand to $-2+4i+3i-6i^2$.

Replace i^2 by -1 and collect.

Answer: $4+7i$.

3. Expand $(3+2i)^2$. [2 marks]

$9+12i+4i^2=9+12i-4$.

Answer: $5+12i$.

4. Find i^{2026}. [2 marks]

$2026=4(506)+2$, so $i^{2026}=i^2=-1$.

Answer: -1.

5. Solve $2z+3i=8-i$. [2 marks]

$2z=8-4i$.

Divide both components by 2.

Answer: $z=4-2i$.

6. Evaluate $(1+i)^4$ without using a calculator. [3 marks]

$(1+i)^2=1+2i+i^2=2i$.

Square again: $(2i)^2=4i^2=-4$.

Answer: -4.