

# Questions: Arithmetic on complex numbers

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## Summary

A selection of questions for the study guide on arithmetic on complex numbers.

*Before attempting these questions, it is highly recommended that you read [Guide: Arithmetic on complex numbers](#).*

## Q1

Work out each of the following expressions, expressing your answer in the form  $a + bi$  where  $a$  is the real part and  $b$  is the imaginary part.

- 1.1.  $(5 + 7i) - (2 + 3i)$
- 1.2.  $(8 + 6i) + (2 - 4i)$
- 1.3.  $(4 - i\sqrt{2}) - (3 + i\sqrt{7})$
- 1.4.  $(\sqrt{8} + 4i) - (\sqrt{5} + 2i)$
- 1.5.  $(\sqrt{7} + 3i) + (2 - i)$
- 1.6.  $(5 + i\sqrt{2}) - (7 - i) + (\sqrt{3} + 4i)$

## Q2

Work out each of the following expressions, expressing your answer in the form  $a + bi$  where  $a$  is the real part and  $b$  is the imaginary part.

- 2.1.  $(2 + 3i)(4 + 5i)$
- 2.2.  $(3 + i)(2 - i)$
- 2.3.  $4(6 + 3i)$
- 2.4.  $(1 + i)^2$
- 2.5.  $(3 + 2i)^3$

- 2.6.  $(7 - 4i)^2(i - 2)$   
 2.7.  $(1 - i\sqrt{3})^3$   
 2.8.  $(5 - 2i)(5 + 2i)$   
 2.9.  $(\sqrt{2} + i\sqrt{3})(\sqrt{8} - i\sqrt{3})$

### Q3

Work out each of the following expressions, expressing your answer in the form  $a + bi$  where  $a$  is the real part and  $b$  is the imaginary part.

- 3.1.  $\frac{7 - 6i}{1 + 2i}$   
 3.2.  $\frac{4 - i}{1 + 4i}$   
 3.3.  $\frac{3}{5i}$   
 3.4.  $\frac{4 + 2i}{3 - i}$   
 3.5.  $\frac{9 + i}{i}$   
 3.6.  $\frac{-2 - 2i}{-2 + 2i}$   
 3.7.  $\frac{1 + 5i}{-3i}$   
 3.8.  $\frac{-4}{1 - i}$   
 3.9.  $\frac{1 - 3i}{1 + 2i}$

### Q4

Work out each of the following expressions, expressing your answer in the form  $a + bi$  where  $a$  is the real part and  $b$  is the imaginary part.

- 4.1.  $\frac{(6 + 4i)(3 - i)}{2i}$   
 4.2.  $3i(5 - 4i) + (6 + 2i)$   
 4.3.  $(2 + 3i)(1 - i) - (5 - 4i)$   
 4.4.  $\frac{(5 + 2i) + (4 - i)}{1 + i}$

$$4.5. \quad \frac{(2+i)^3}{(3+i)-(1+i)}$$

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$$4.6. \quad \left(\frac{6-3i}{2(1-i)}\right)^2$$

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[After attempting the questions above, please click this link to find the answers.](#)

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## Version history and licensing

v1.0: initial version created 11/24 by Charlotte McCarthy as part of a University of St Andrews VIP project.

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