

# Questions: Arithmetic on complex numbers

Charlotte McCarthy

## 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.  $(3 + 2i)^3$

$$2.6. \quad (7 - 4i)^2(i - 2)$$

$$2.7. \quad (1 - i\sqrt{3})^3$$

$$2.8. \quad (5 - 2i)(5 + 2i)$$

$$2.9. \quad (\sqrt{2} + i\sqrt{3})(\sqrt{8} - i\sqrt{3})$$

### 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.

$$3.1. \quad \frac{7 - 6i}{1 + 2i}$$

$$3.2. \quad \frac{4 - i}{1 + 4i}$$

$$3.3. \quad \frac{3}{5i}$$

$$3.4. \quad \frac{4 + 2i}{3 - i}$$

$$3.5. \quad \frac{9 + i}{i}$$

$$3.6. \quad \frac{-2 - 2i}{-2 + 2i}$$

$$3.7. \quad \frac{1 + 5i}{-3i}$$

$$3.8. \quad \frac{-4}{1 - i}$$

$$3.9. \quad \frac{1 - 3i}{1 + 2i}$$

### 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.

$$4.1. \quad \frac{(6 + 4i)(3 - i)}{2i}$$

$$4.2. \quad 3i(5 - 4i) + (6 + 2i)$$

$$4.3. \quad (2 + 3i)(1 - i) - (5 - 4i)$$

$$4.4. \quad \frac{(5 + 2i) + (4 - i)}{1 + i}$$

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

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

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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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