# 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.  $(5+i\sqrt{2})-(7-i)+(\sqrt{3}+4i)$

#### **Q**2

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

### **Q**4

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.

$$\begin{array}{rl} \text{4.1.} & \frac{(6+4i)(3-i)}{2i} \\ \text{4.2.} & 3i(5-4i)+(6+2i) \\ \text{4.3.} & (2+3i)(1-i)-(5-4i) \\ \text{4.4.} & \frac{(5+2i)+(4-i)}{1+i} \end{array}$$

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

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

After attempting the questions above, please click this link to find the answers.

## Version history and licensing

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

This work is licensed under CC BY-NC-SA 4.0.