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. $(7 - 4i)^2(i - 2)$

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. $\dfrac{7-6i}{1+2i}$

3.2. $\dfrac{4-i}{1+4i}$

3.3. $\dfrac{3}{5i}$

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

3.5. $\dfrac{9+i}{i}$

3.6. $\dfrac{-2-2i}{-2+2i}$

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

3.8. $\dfrac{-4}{1-i}$

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

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. $\dfrac{(6+4i)(3-i)}{2i}$

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

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

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

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

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

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.