

AQA Further Pure 1

Complex Numbers

Section 1: Introduction to Complex Numbers

Study Plan (Oxford textbook)

Background

You have already encountered several number systems in your study of mathematics. Starting with learning to count with the natural numbers, you have progressed through fractions and decimals, negative numbers, and real numbers. Each extension to the number system allows us to solve more problems. For example, the equation $x + 4 = 0$ has no solution in the natural numbers, but it does in the integers.

The equation $x^2 - 2 = 0$ has no solution in the rational numbers, but it does have two real solutions, $x = \sqrt{2}$ and $x = -\sqrt{2}$. However, within the real numbers there is no solution to an equation such as $z^2 + 4 = 0$.

The complex numbers are an extension to the real numbers in which there is a solution to the equation above. It turns out that the complex numbers are the final extension we need for the number system, as all possible polynomial equations have solutions in the complex numbers.

In this section you will learn to manipulate complex numbers, and some of the basic terminology associated with complex numbers.

Detailed work plan



1. Read the introduction and sections 7.1 – 7.2 (pages 97 – 99). Examples 1 and 2 in the **Notes and Examples** show addition, subtraction and multiplication of complex numbers.



2. **Exercise 7A**
Attempt all the questions.



3. For extra practice try the interactive questions **Addition and subtraction of complex numbers** and **Multiplying complex numbers**.



4. Read the section on complex conjugates, and section 7.3 (pages 100 – 103), and look at Examples 3 and 4 in the **Notes and Examples**.



5. **Exercise 7B**
Attempt questions 1, 2, 4, 6, 7 and 10.
You can also try the **Complex numbers Hexagonal puzzle**.



6. For extra practice try the interactive questions **Complex conjugates** and the Flash resource **Working with complex numbers**.

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7. Read section 7.4 (pages 104 – 105). Equating real and imaginary parts is a key technique when working with complex numbers. There are three further examples in the **Notes and Examples**.



8. **Exercise 7C**
Attempt all the questions.