**Core Pure 1**

**Complex Numbers**

Chapter Overview

**1**: Understand and manipulate () complex numbers.

**2**: Find complex solutions to quadratic equations.

3: Find complex solutions to cubic and quartic equations.





Complex Number Basics

Examples: Write the following in terms of

Simplify:

=

Solving Quadratic Equations

Examples

1. Solve
2. Solve

Exercise 1A/B Page 3 – 5

Multiplying Complex Numbers

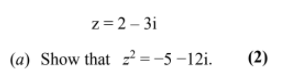
Examples

1. Express each of the following in the form , where are integers.

4. Determine the value of and

Test Your Understanding:

1. Edexcel FP1 June 2010



1. Expand and simplify

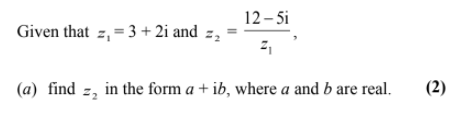
Exercise 1C Page 6

Complex conjugates

Example:

Write in the form

Test Your Understanding



Exercise 1D Page 7-8

Roots of Polynomials

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

Roots of Quadratics

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

Example:

Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

[Textbook] Given that is one of the roots of a quadratic equation with real coefficients,

(a) state the value of the other root, .

(b) find the quadratic equation.

Proof that Complex Roots Appear in Complex Pairs

Proof 1

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

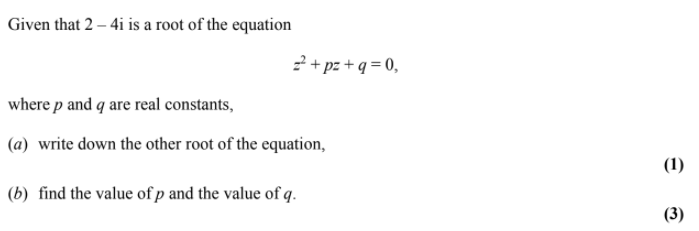
Proof 2

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

Test Your Understanding

Exercise 1E Page 9 -10



Roots of Cubic and Quartic Equations

Cubics

Quartics

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

Quartics

Example 1: Find the quadratic equation with roots α = 2+ 4i and β = 2 – 4i in the form

(2 Methods)

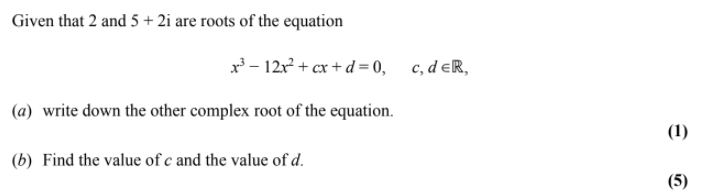
Examples

1. [Textbook] Given that is a root of the quartic equation

, solve the equation completely.

2. [Textbook] Show that is a factor of . Hence solve the equation

Test Your Understanding:



Exercise 1F Page 13 - 14