AQA Further Pure 1

Complex Numbers

Glossary

Complex number
A complex number is a number of the form $x + y\text{i}$ where x and y are both real numbers. For example

$3 + 2\text{i}$

$-2 - \sqrt{2}\,\text{i}$

πi

are all complex numbers.

Conjugate (or complex conjugate)
The conjugate (sometimes called the complex conjugate) of a complex number $x + y\text{i}$ is the complex number $x - y\text{i}$. The complex conjugate of z is denoted by z^*.

Imaginary number
This is just another term for a complex number. Note the difference between this and a **pure imaginary** number.

Imaginary part of a complex number
For the complex number $z = x + y\text{i}$, y is called the imaginary part of the complex number. The imaginary part of a complex number z is denoted by Im(z).

For example: $\text{Im}\,(5 + 4\text{i}) = 4$

$\text{Im}\,(-1) = 0$

$\text{Im}\,(-3\text{i}) = -3$

Notice that the imaginary part of a complex number is itself a real number.

Integers
The set of integers consists of all the whole numbers (positive and negative), including zero.

i
i is a number whose defining property is that $\text{i}^2 = -1$. It is sometimes denoted by j.

Natural numbers
Also known as the counting numbers, the natural numbers are the numbers
1, 2, 3, 4…..

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Pure imaginary number

A complex number is pure imaginary if its real part is zero. For example, 5i is pure imaginary, whereas 3 – 4i is not.

Real numbers

The set of all numbers whose **imaginary part** is zero. Real numbers include all **rational** and irrational numbers.

Real part of a complex number

For the complex number $z = x + y\mathrm{i}$, x is called the real part of the complex number. The real part of a complex number is denoted by Re(z).

For example: $\mathrm{Re}\,(5 + 4\mathrm{i}) = 5$

$\mathrm{Re}\,(-1) = -1$

$\mathrm{Re}\,(-3\mathrm{i}) = 0$

Rational numbers

A rational number is any number which can be expressed in the form $\frac{m}{n}$ where m and n are integers with $n \neq 0$.

For example: $\frac{27}{29}$ is rational

0.213 is rational because it can be expressed as $\frac{213}{1000}$

$\sqrt{2}$ is **not** rational

π is **not** rational.