Complex Numbers

Definition

A **complex number** is of the form:

$$z = a + bi$$

where:

- a is the **real part**,

- b is the **imaginary part**,

- i is the imaginary unit ($i^2 = -1$).

Operations on Complex Numbers

1. **Addition**: $(3+2i) + (1-4i) = 4 - 2i$

2. **Multiplication**: $(2+i)(3-2i) = 8 - i$

3. **Division**: Use conjugates.

Modulus of a Complex Number

The modulus (absolute value) of z is:

$$|z| = \sqrt{a^2 + b^2}$$

Example:

Find the modulus of $z = 3 - 4i$.

$|z| = \sqrt{3^2 + (-4)^2} = 5$