

### **Section 1.A**

**Complex Numbers:** A complex number is an ordered pair  $(a, b)$ , where  $a, b \in \mathbf{R}$ , but we will write this as  $a+bi$ . The set of all complex numbers is denoted by  $\mathbf{C}$  :

$$\mathbf{C} = \{a + bi : a, b \in \mathbf{R}\}$$

Addition and multiplication on  $\mathbf{C}$  are defined by

$$(a + bi) + (c + di) = (a + c) + (b + d)i$$

$$(a + bi)(c + di) = (ac - bd) + (ad + bc)i$$

here  $a, b, c, d \in \mathbf{R}$

***Properties of complex arithmetic:***