

## Describing a Set

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- A **set** is a collection of objects.
- The objects that make up a set are called its **elements** or **members**.
- We denote sets with capital letters (such as  $A, B, C, \dots, Z$ ) and lower-case letters denote elements (such as  $a, b, c, \dots, z$ ) of sets. If  $a$  is an element of set  $A$ , then we write  $a \in A$ , if  $a$  is not in  $A$  we write  $a \notin A$ .
- The set that contains no elements is the **empty set** (or sometimes called the **null set** or **void set**).
- The empty set is denoted  $\emptyset$ .
- We can also write  $\emptyset = \{\}$
- We use  $N$  to denote the set of all **positive integers** or **real numbers**. That is

$$N = \{1, 2, 3, \dots\}$$

- The set of all integers is denoted by  $Z$

$$Z = \{\dots, -2, -1, 0, 1, 2, \dots\}$$

- The set of **real numbers** is denoted  $R$  and the set of positive real number is denoted by  $R^+$ .
- A real number that can be expressed in the form  $\frac{m}{n}$ , where  $m, n \in Z$  and  $n \neq 0$ , is called a **rational number**.

The set of all rational numbers is denoted  $\mathbf{Q}$ .

- A real number that is not rational is called **irrational**.
- The set of all irrational numbers is denoted  $I$
- The number  $|S|$  denotes the number of elements in set  $S$
- A set is **finite** if  $|S| = n$  for some non-negative integer  $n$
- A set is **infinite** if it is not finite.
- A **complex number** is a number of the form  $a + bi$ , where  $a, b \in R$  and  $\sqrt{-1}$