

1

GROUPS

1.1 Some Sets of Numbers

The reader is familiar with the following sets of numbers :

1. $\mathbf{N} = \{1, 2, 3, \dots\}$
is the set of *natural numbers*.
2. \mathbf{I} or \mathbf{J} or $\mathbf{Z} = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$
is the set of *integers*.
 \mathbf{Z}^+ denotes the set of all non-negative integers.
3. $\mathbf{E} = \{\dots, -6, -4, -2, 0, 2, 4, 6, \dots\}$
is the set of *even integers*.
4. $\mathbf{Q} = \left\{ \frac{m}{n} : m, n \in \mathbf{Z} \text{ and } n \neq 0 \right\}$
is the set of *rational numbers*.
5. \mathbf{R} is the set of *real numbers*. \mathbf{R} contains all rational and irrational numbers.
 \mathbf{R}^+ denotes the set of all non-negative real numbers.
6. $\mathbf{C} = \{x + iy : x, y \in \mathbf{R} \text{ and } i = \sqrt{-1}\}$
is the set of all *complex numbers*.

1.2 Mappings

If S and T are two non-empty sets, then a mapping from S to T is a rule, written as $f: S \rightarrow T$, which associates to each element $x \in S$, a unique element $y \in T$. The element y is called the *image* of x under f and is written as $y = f(x)$. The element x is called a *pre-image* of y . The set S is called the *domain* of f , and T its *co-domain*.

A mapping $f: S \rightarrow T$ is called *one-to-one*, if

$$x \neq y \Rightarrow f(x) \neq f(y) : x, y \in S.$$

Or

$$f(x) = f(y) \Rightarrow x = y : x, y \in S.$$

A mapping $f: S \rightarrow T$ is called *onto*, if for each $t \in T$, there exists some $s \in S$ such that $f(s) = t$.

Two mappings $f: S \rightarrow T$ and $g: S \rightarrow T$ are said to be equal, if

$$f(x) = g(x) \text{ for each } x \in S.$$

The mapping $i: S \rightarrow S$ defined as $i(x) = x \forall x \in S$ is called the *identity mapping*.

(1)

Abstract Algebra By R Kumar

Jessica J Manson



Abstract Algebra By R Kumar:

Abstract Algebra By R Kumar Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Abstract Algebra By R Kumar**," published by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we will delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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