Department of Mathematics
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Discrete Mathematics

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Chapter Two

SET THEORY

Section 2.1
Sets

Definition:

    A set is a collection of objects, **the objects** in given set are called **elements** or **numbers of the set**.

    "$x \in A$" : denotes that x is an elements of the set A.

Example:

    If A is the set of all integer and $x = 3$, $x \in A$.

Definition:

    Two sets A and B are equal if they contain the same elements.

Example:

    A = { 1, 2, 3 }
    B = { 1, 2, 2, 3, 3 }
    A = B

Definition:

    If a set Ś contains one element Ś then we called it **a singleton** set.

Example:

    Ś = { 1 }
    B = { 0 }   are singleton sets
    C = { y }

Let A = { 2, 4, 6, 8, ……. } then A is the set of all even natural numbers

    B = { 1, 3, 5, 7, ……… } then B is the set of all odd natural numbers

Set – Builder Notation

Is a method to denote the numbers of a set A.

To do this we need a predicate P (x) so that an element x is in A if P (x) is true.

A = { x: x = 2n for some integers n }

                P (x)

Ś = { x: x = P (x) is true }

      Builder Notation

X = { x: x is real number and $2 < x < 5$ } = (2, 5)

Y = { x: x is natural numbers divisible by 5 } Y = { 5, 10, 15, 20, …… }

Example:

        A = { x: x is even prime number } = { 2 }