Notion of a Set

Learning Objectives:

Upon completion you should be able to:

1. Give examples of well-defined sets;
2. Name the elements of a set;
3. Describe a set using roster or rule methods;
4. Give examples of empty and universal set.

Notion of a Set

A SET is a well-defined collection of objects, real or imagined.

Examples: Which of the following is a well-defined set?

1. All provinces of the Philippines
2. All loving people in this room
3. Beautiful flowers in the Botanical Garden
4. All small positive numbers
5. All letters in the Filipino alphabet

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Remember:

A set is well-defined if it is possible to determine whether a given object _____ to the set or not.

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Given the set of all players in the Purefoods basketball team for 2007 season.

Who are included in this team?

James Yap?

Noy Castillo?

Richard Yee?

Olsen Racela?

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To name a set, we usually use capital letters. For this given set, the set of all players in the Purefoods basketball team for 2007 season, we will use P (for Purefoods).

The objects that make up a set are called elements.

Thus, the elements of P are _____, _____ and _____ while _____ is not an element of P.

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In symbols, we write $a \in A$, in case a belongs to set A.

Otherwise, we write $a \notin A$.

Thus, in our example, we write

James Yap $\in$ P while Olsen Racela $\notin$ P.

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Sets can be described by enumerating the elements, separated by commas, and enclosed in a pair of braces.

Thus, the set of all vowels in the English alphabet, denoted by V, can also be described as

V = { a, e, i, o u}

This method of describing sets is called roster or enumeration method.

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Describe the following sets using the roster method:

1. Set of all possible outcomes when you throw a die

2. Set of colors found in the rainbow

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Another way of describing sets is by the rule method.

In this method, a variable is used to represent the elements, this is followed by a bar, and then a rule describing the property common to all the elements.

Of course, these are enclosed in a pair of braces.

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Example. The set of all degree programs in UPLB, denoted by D, can be written using the rule method in the following way:

D = {x | x is a degree program in UPLB}

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When is the rule method more advantageous to use than the roster method?

When is the roster method more useful than the rule method?

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There are sets that are so special they are given specific names.

One of them is the empty set, denoted by { } or ∅.

The empty set has no element.

Examples are:

1. The set of months that start with Q

2. The set of dogs that can talk

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Is this an empty set? {∅}

Identify some more empty sets.

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Another special set is the universal set denoted by U.

The universal set is the set of all possible elements in a given situation.

For example if we consider {boxing, basketball, fencing}

Then a possible universal set is the set of all sports.

Thus U = set of all sports

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Give a universal set from which the members of the following sets could be chosen:

1. { 10, 20, 30,40}

2. {sampaguita, rosal, ilang-ilang, euphorbia}

3. {AB, JR, AM, EJ, DS, GS}

Notion of a Set

In this section, we learned the ff:

- When a set is well-defined or not
- Sets are denoted by capital letters.
- Objects belonging to a set are called elements.
- If a belongs to set B we write $a \in B$.
- Otherwise, we write $a \notin B$.
- Sets can be described by either roster or rule method.
- There are two special sets, namely, empty and universal sets.