SETS VOCABULARY

Set – collection of objects. Use Capital letters to represent the set name.

Element – a member of a set. Use lowercase letters to represent the elements of the set.

The <u>cardinal number</u> of set A is the number of elements in set A. It is denoted n(A) and read "The number of elements in the set A". A set is <u>finite</u> if its cardinal number is a whole number. An <u>infinite</u> set is one that is not finite.

Example: $A = \{2, 4, 6, 8\}$ 2 is an element of A or $2 \in A$ 3 is not an element of A or $3 \notin A$ The cardinality of set A is 4 or n(A) = 4. Set A is a finite set

Representing a Set with the Listing Method

Write the set by listing its elements inside braces.

Example: $A = \{2, 4, 6, 8, \dots\}$

Representing a Set with the Set-builder Notation

<u>Is</u> there a characteristic that all the elements in the set share that can be used to describe the set in words or by a formula?

<u>Example</u>: $A = \{2, 4, 6, 8, ...\} = \{x \mid x \text{ is an even integer}\}$ We read this as "The set A is equal to x such that x is and even integer."

Familiar Sets of Numbers

The set of Natural (counting) Numbers $N = \{1, 2, 3, ...\}$

The set of Whole Numbers $W = \{0, 1, 2, 3, ...\}$

The set of Integers $I = \{..., -2, -1, 0, 1, 2, ...\}$

The set of Rational Numbers (fractions) $Q = \{x : x \text{ can be written in the form } a / b \text{ ,where } a \text{ and } b \text{ are integers and } b \text{ is not zero}\}$

The set of Real Numbers $R = \{x : x \text{ has a decimal expansion}\}$

A set is <u>well-defined</u> if we are able to tell whether any particular object is an element of that set or not.

<u>Example</u>: $A = \{2, 4, 6, 8, \dots\}$ is well-defined because we know what numbers belong to A and what numbers do not belong to A

 $B = \{\text{tall men}\}\$ is not well-defined because the definition of "tall" is not specific

The set that contains no elements is called the <u>empty set or null set</u>. This set is labeled by the symbol \emptyset . Another notation for the empty set is $\{\ \}$.

The <u>universal</u> <u>set</u> is the set of all elements under consideration in the problem and is denoted by the capital letter U.