

Working with Sets Guide Notes

SET is a collection of elements or members. Use braces, $\{ \}$, to denote a set.

ROSTER FORM lists elements of a set within braces.

Example:

- a. The set, S , that contains the elements 1,2,3, and 4 when written in roster form is:

- b. The set, N , than contains all natural numbers when written in roster form is

SET-BUILDER NOTATION describes elements of a set. It uses a variable and limits, or conditions, on the variable.

Example:

- a. The set $S = \{1, 2, 3, 4\}$ when written in set-builder notation is:

and read as: “the set of all values of x such that x is natural number and less than 5”

- b. The set $N = \{1, 2, 3, 4, 5, 6, \dots\}$ when written in set-builder notation is:

and read as: “the set of all values of x such that x is natural number”

Sample Problem 1: Write each set in Roster Form and Set-Builder Notation.

- A. M is the set of even whole number less than 13

- B. N is the set of natural number greater than or equal to 11

- C. R is the set of negative whole number less than -3

- D. S is the set of even prime number

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Sample Problem 2: Write the solutions of each inequality in set-builder notation.

A. $2x + 2 < 24$

B. $-(3x + 5) \leq -23$

C. $3(x - 5) > 10 - 6x$

D. $-3(x + 7) \geq 2x - 16$

SUBSET is consists of elements from any given set.

NULL SET or **EMPTY SET** is a set that contains no elements. It is a subset of every set. Use $\{ \}$ or \emptyset to represent the null set.

Example: If $A = \{3, 6, 9\}$ then its subsets are

Null set

With one element

With two element

With the original set

The 8 subsets of $A = \{3, 6, 9\}$ are

Sample Problem 3: List all possible subsets of each given set.

A. $J = \{7, 11\}$

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B. $K = \{5, 9, 18\}$

C. $D = \{-1, 9\}$

D. $F = \{-5, -2, 1\}$

UNIVERSAL SET is the largest set that consists of all elements from the given set.

COMPLEMENT OF A SET is a set that contains the elements of a universal set not contained in a given subset. Use A' to represent the complement of set A .

Example: If $A = \{4, 8, 12, 20, 24, 28\}$ is the universal set and $B = \{20, 24, 28\}$. Find the B' .

Sample Problem 4:

A. Given $A \subseteq B$, $B = \{1, 2, 4, 8, 16, 32\}$, and $A = \{2, 8, 32\}$. Find A' .

B. Given $J \subseteq K$, $J = \{-3, 5, 9, 17, 21\}$, and $K = \{-3, 1, 5, 9, 13, 17, 21, 25\}$. Find J' .

C. Given $E \subseteq D$, $D = \{-10, -8, -4, 2, 10, 20, 32\}$, and $E = \{-8, 10\}$. Find E' .

D. Given $X \subseteq Y$, $Y = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$, and $X = \{2, 5, 7, 13, 17, 19\}$. Find X' .