Study Guide

Sets Subsets Solutions Sets
02/29/2012

Sets/Subsets/Solution Sets

A set is a collection of numbers. A subset is a collection of numbers that all belong to a larger set. Every set is also a subset of itself. If Set C is a subset of Set D, then every element of Set C is also in Set D. Set C is a part of (a subset of) Set D. A solution set of an open sentence is the set of all elements which make the sentence true when replaced for the unknown.

Sets are indicated by braces, { }. The empty set, $\{\varnothing\}$, is a subset of every set.

Example 1: Find the solution.

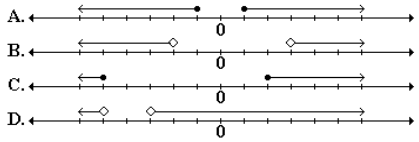
$2x + 3 = 3(x + 3)$

$$
\begin{array}{rl}
 & 2x+3=3(x+3) \\
(1) & 2x+3=3(x)+3(3) \\
 & 2x+3=3x+9 \\
(2) & -2x \quad -2x \\
\hline
 & 3=1x+9 \\
(3) & -9 \quad -9 \\
\hline
 & -6=1x \\
(4) & x=-6
\end{array}
$$

Step 1: Distribute the 3 to the numbers in the parentheses. This involves multiplying each term in the parentheses by 3.
Step 2: We want the variable on one side by itself. Subtract 2x from each side of the equation to get the variable on one side of the equation.
Step 3: Subtract 9 from each side of the equation to isolate the variable on one side of the equation.
Step 4: Rewrite -6 = 1x with the variable first. x = -6

Answer: x = -6

Example 2: Choose the corresponding number line: $y < -2$ or $y > 3$.

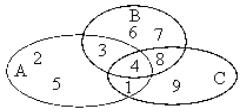


The answer is B.

We are also able to determine sets and subsets from Venn diagrams. Venn diagrams are drawings that show relationships among sets of items. Venn diagrams are usually sets of overlapping circles or ovals. The relationships between the sets can be represented by the following symbols.

Symbol	Word Meaning	Example	Definition
$\cup$	Union	$A \cup B$	The terms that A and B do NOT have in common.
$\cap$	Intersection	$A \cap B$	The terms that A and B have in common.

Example 3: Given the sets A, B, and C expressed in the diagram, which option is NOT true?



A. $A \cap C = \{1, 4\}$
B. $A \cup C = \{2, 3, 5, 8, 9\}$
C. $B \cap C = \{4, 8\}$
D. $B \cup C = \{3, 6, 7, 9\}$

Set A = {1, 2, 3, 4, 5}
Set B = {3, 4, 6, 7, 8}
Set C = {1, 4, 8, 9}

Step 1: Determine the numbers that are in each set.

Step 2: Use the sets to determine which of the four answer choices is NOT true.

Answer: Choice D is NOT true.