

3.5 Working with Sets

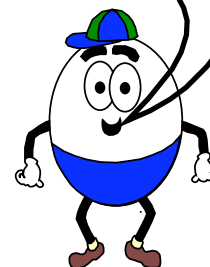
Sunshine State Standard:

MA.912.D.7.1

Objective: The student will write sets and identify subsets.

The student will find complement of a set.

Don't forget to raise your hand

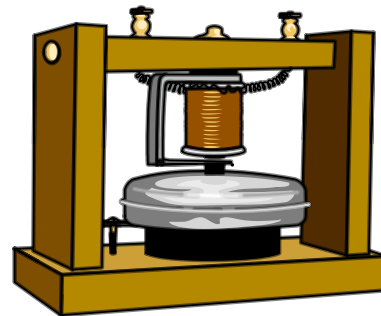


Notes:

Review

A **Set** is a collection of distinct elements.
(identifiable things)

A **Subset** contains element from a set



Notes:

List the days, D , of the week in:

Roster form uses braces and commas:

$D = \{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$

Set Builder Notation uses $\{x|x \text{ description}\}$

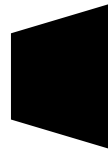
$D = \{x|x \text{ is a day of the week}\}$ or $D = \{x|x \text{ is Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$

How to read this? Page 210

Example 1: How do you write "T is the set of all natural numbers that are less than 6"

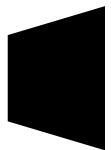
$$T = \{1, 2, 3, 4, 5\}$$

Roster Form:



$$T = \{1, 2, 3, 4, 5\}$$

Set-builder Notation:



$$T = \{x \mid x = 1, 2, 3, 4, 5\}$$

$$T = \{x \mid \text{x is a natural number, } x < 6\}$$

Example #2: How do you write "N is the set of even natural numbers that are less than or equal to 12"

Roster Form:

$$N = \{2, 4, 6, 8, 10, 12\}$$

Set-builder Form:

$$N = \{x \mid x = 2, 4, 6, 8, 10, 12\}$$

$$N = \{x \mid x \text{ is an even \# less than or equal to } 12\}$$

Pull

Example #3

Given a set, $C: 1 < x < 6$ this means the set is
 $C = \{2, 3, 4, 5\}$

The set containing all of the items is the universal
set. $C = \{2, 3, 4, 5\}$
 $\{2, 5\}$ is a subset of set C. ✓

Is $\{3, 4\}$ a subset? ✓

Is $\{6\}$ a subset? No

Practice:

Given a set, C: $2 < x < 5$ this means the set is
 $C = \{ 3, 4 \}$

Given a set, T: $5 < x < 8$ this means the set is
 $C = \{ 6, 7 \}$

$C = \{ x / x = 6, 7 \}$
 Given a set, C: $1 < x < 3$ this means the set is
 $C = \{ \quad \quad \}$

Inequalities and Set-Builders Notation

In set-builders notation, how do you write the solution of $-5x + 7 \leq 17$ *solve*

Write the original inequality.

Subtract 7 from each side.

Simplify.

Divide each side by -5

Simplify.

Set-builder Notation:

$$\underline{-5x} \leq \underline{10}$$

$$x \geq -2$$

$$\{x \mid x \geq -2\}$$

In set-builder notation, how do you write the solution of $9 - 4n > 21$

$$\begin{array}{r} -9 \quad -9 \\ \hline -4n > 17 \\ \hline -4 \quad -4 \end{array} \quad \{n < -3\}$$

$\{x \mid x < -3\}$ set builder

Notes: Finding Subsets

The **Empty set**, or null set, is the set that contains no elements. The empty set is a subset of every set. Use \emptyset or $\{\}$ to represent the empty set.

Example #1: What are the subsets of the set $\{3, 4\}$

$\{3\}$ $\{4\}$
 $\{3, 4\}$ $\{\}$

- (1) Start with the empty set.
- (2) List the subsets with one element.
- (3) List the subsets with two elements.
- (4) List the original set.

(1) What are the subsets of the set $P = \{a, b\}$ *4 answers*

$\{a\}$ $\{b\}$

$\{a, b\}$

$\{\}$

(2) What are the subsets of the set $T = \{2, 3, 4\}$ *There are 8*

$\{2\}$ $\{3\}$ $\{4\}$

$\{2, 3\}$ $\{2, 4\}$ $\{3, 4\}$

$\{2, 3, 4\}$

$\{\}$

$$\textcircled{5} \{x/x < 8\}$$

$$\textcircled{6} \{x/x > 210\}$$

Subsets:

Is set A a subset of set B?

$$A = \{-1, 0, 2\} \quad B = \{-2, -1, 0, 1, 2, 3\}$$

We can write this relationship as $A \subseteq B$

Is set C a subset of set D?

$$D = \{4, 6, 8, 10, 12, 14, 16\} \quad C = \{10, 14, 16\}$$

Notes:

The **complement** of a set are all the elements not in the given set:

Given the universal set: $U = \{-3, -2, -1, 0, 1, 2, 3\}$

$A = \{-3, -2, -1\}$

The complement is written with an apostrophe,

$A' = \{0, 1, 2, 3\}$

Suppose $U = \{1, 2, 3, 4, 5\}$ and $A = \{2, 3\}$
What is A' ?

HomeFun

Textbook

P 213 9-16 odd

P 213 18, 19

P 214 21-31 odd

Pre Activity

(1) Write the two words use to join inequalities to form a compound inequality.

(a) and (b) but (c) or (d) is

(2) Write as a single inequality: $-2 < n$ and $n < 6$

(3) Graph: $-3 < n < 6$.

(4) Graph: $t < -3$ or $t > 1$