

5.3 Domain and Range

Review - Inequality Notation

Inequalities are read left to right.

$<$ less than

\leq less than or equal

$>$ greater than

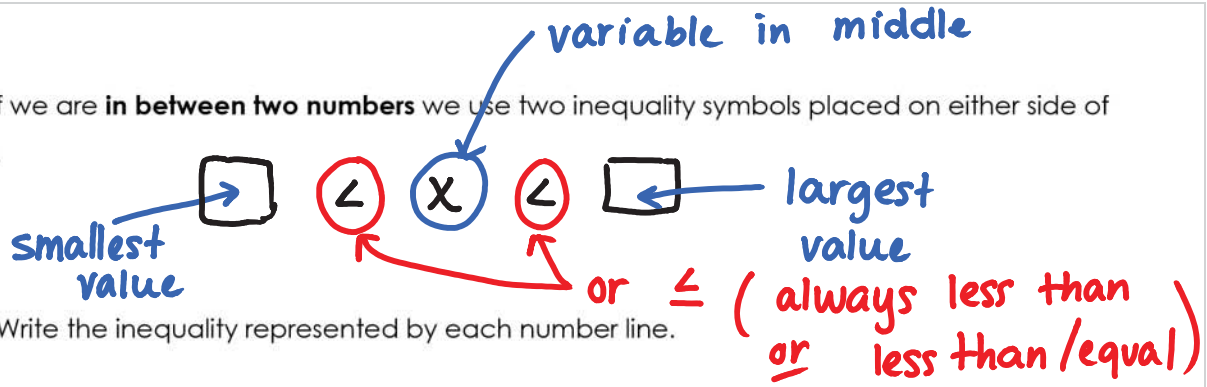
\geq greater than or equal

- Dots indicate an end or beginning. A solid dot means that number is included (use \leq or \geq) and an open dot means that number is not included (use $<$ or $>$)
- horizontal # line \rightarrow use "x"

Example 1: Write the inequality represented by each number line. vertical # line \rightarrow use "y"

Number Line	Inequality
	$x \geq 2$
	$x \leq -1$
	$x > -4$
	$x < 6$
	$x > 5$

To indicate if we are **in between two numbers** we use two inequality symbols placed on either side of the variable.



Example 2: Write the inequality represented by each number line.

Number Line	Inequality
	$-4 \leq x \leq 0$
	$-2 < x < 8$
	$1 < x \leq 6$
	$-5 \leq x < -1$

DOMAIN

In a relation, the set of first elements is called the domain. It is the set of values of the independent (x) variable.

RANGE

In a relation, the set of second elements is called the range. It is the set of values of the dependent (y) variable.

Set Notation

Since the domain and range are a set of elements, the brackets $\{ \}$ are used to indicate the numbers or other values included in each one.

Example 1: Determine the domain and range of each relation. Determine whether each relation is a function.

a) **Ordered Pairs:** $\{ (-3, 4), (5, -6), (-2, 7), (5, 3), (6, -3) \}$

1st set (all x-values): $\{-3, 5, -2, 5, 6\}$

2nd set (all y-values):
 $\{4, -6, 7, 3, -3\}$

Domain (x-values): $\{-3, -2, 5, 6\}$

\hookrightarrow no repeats
in order

Not a function
since "x" value (5) repeats.

Range (y-values):
 $\{-6, -3, 3, 4, 7\}$

b) The **table of values** indicates the number of children in each age group attending a summer camp.

Age	Children
6	5
7	22
8	14
9	9
10	11

independent
(x)

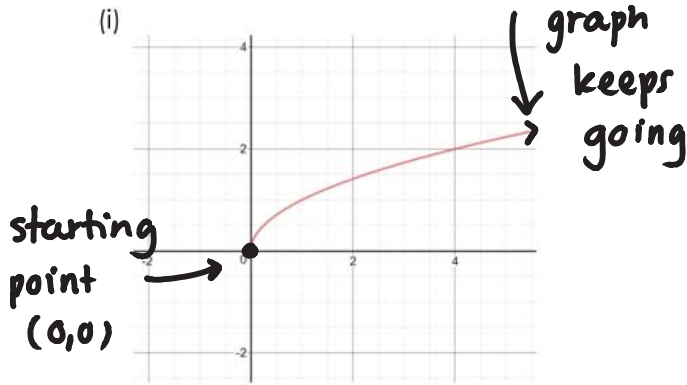
dependent
(y)

Domain: $\{6, 7, 8, 9, 10\}$

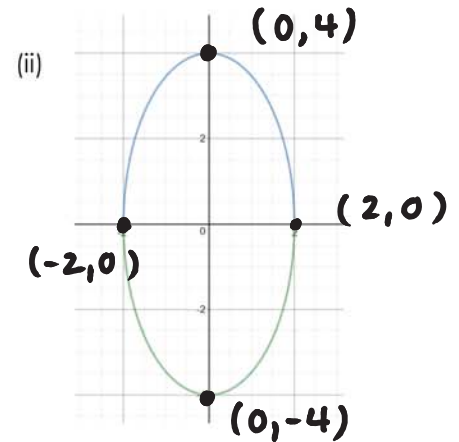
Range: $\{5, 9, 11, 14, 22\}$

This is a function
since "x" values don't repeat.

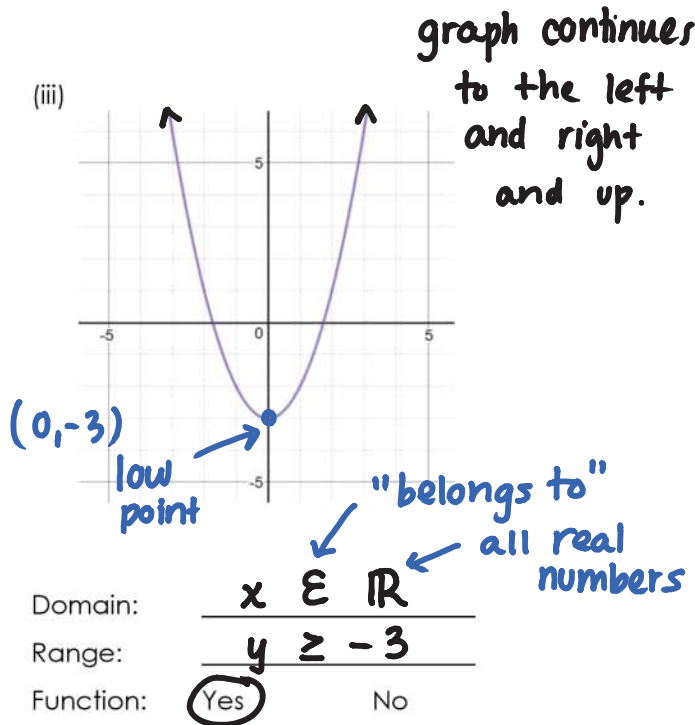
c) Graphs



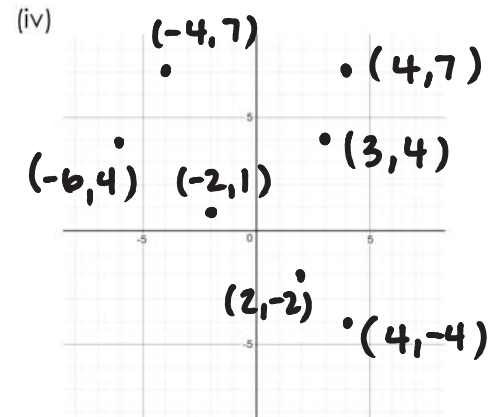
Domain: $x \geq 0$
 Range: $y \geq 0$
 Function: Yes No



Domain: $-2 \leq x \leq 2$
 Range: $-4 \leq y \leq 4$
 Function: Yes No



Domain: $x \in \mathbb{R}$
 Range: $y \geq -3$
 Function: Yes No



Domain: $\{-6, -4, -2, 2, 3, 4\}$
 Range: $\{-4, -2, 1, 4, 7\}$
 Function: Yes No