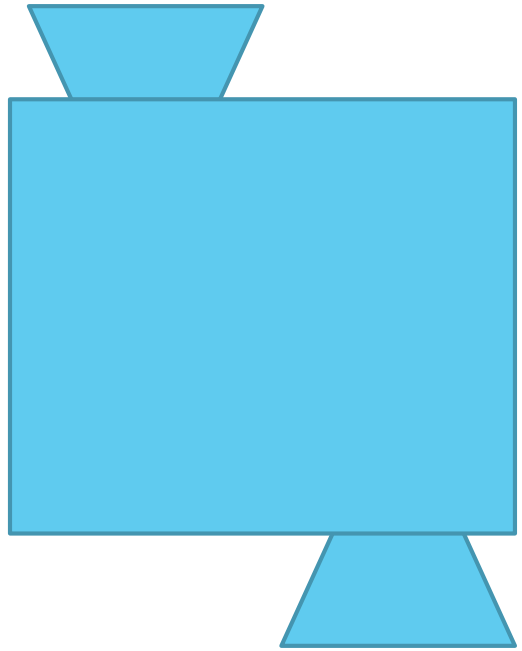
4.1: Relations & Functions

SWBAT explain what a function is and identify whether a given diagram, chart, or graph represents a function.

Assignments:
HW24

- Create two lists:

1. Common household objects
2. Rooms in a house



Relations

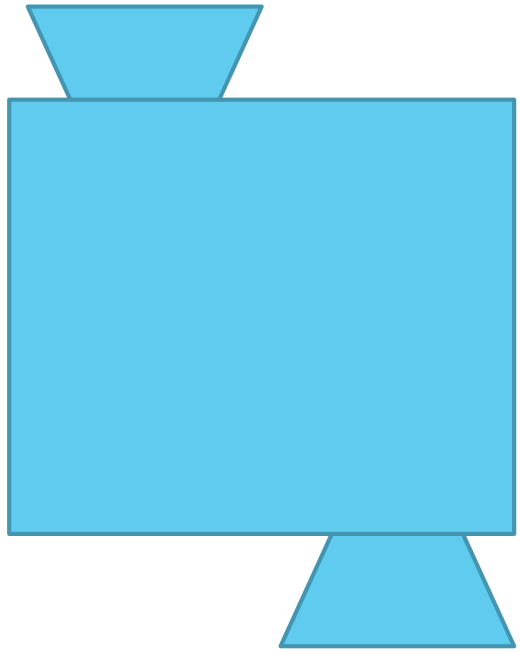
Relation: two sets, objects of which can be paired together

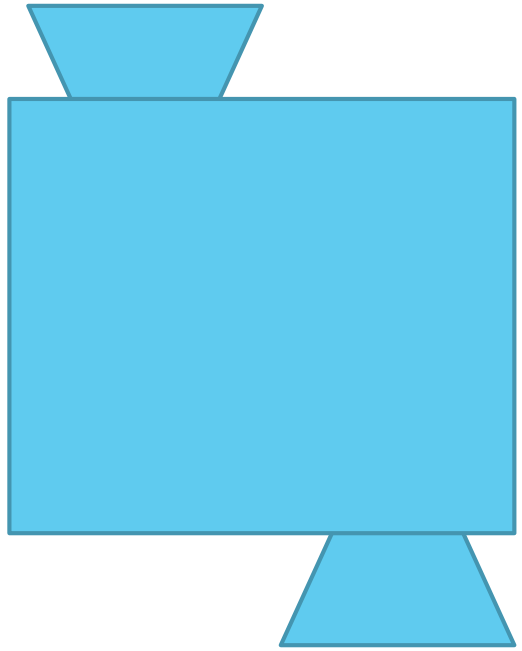
Examples of relations are usually written in ordered pairs.

Example: All first names are related to all last names since a person's first name and last name are paired together – (Kathryn, Rowland)

Which of the following sets are related? Give examples of pairs.

- The set of mothers
- The set of first born children
- The set of cities
- The set of vegetables
- The set of colors
- The set of Heritage Academy scholars
- The set of phone numbers
- The set of Social Security numbers
- The set of US Presidents
- The set of US citizens
- The set of types of soda
- The set of states





Vending Machines

Definitions

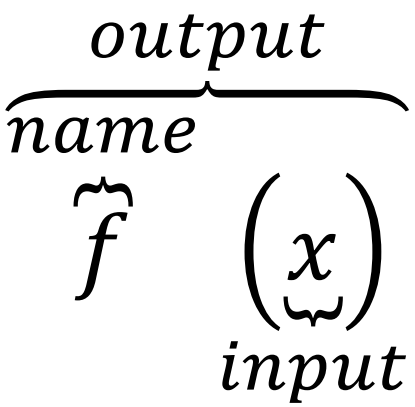
- Function: a special type of relation where one input is matched with exactly one output
- Domain: the set of inputs
- Range: the set of outputs
- One output may match with multiple inputs

Does the relation between any of the sets represent a function? If so, identify the domain and range.

- The vending machine code and the snack it produces
- The cell-phone owner and the number of the cell phone
- The number of miles driven in a car and the number of gallons used
- The money you earn and the number of hours you work
- A student ID number and the scholar it represents
- A teacher and a scholar they teach

Function Notation!

- Function name
- Function input (from domain)
- Function output (from range)



- While the function name is usually a single letter, it can be *anything*. f, g, and h are the most common, but names can be more than 1 letter.
- The function input is always represented by a single variable.
- We will talk about additional parts to function notation next class.

Use function notation to describe the functions.

- The vending machine code and the snack it produces
- The cell-phone owner and the number of the cell phone
- The number of miles driven in a car and the number of gallons used
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Ordered Pairs

- In an ordered pair, the input/domain is the x-values, and the output/range is the y-values.
- Determine the domain and range, and whether the relationship is a function.
- $\{(0,3),(-1,4),(0,-1),\ (2,-10)\}$

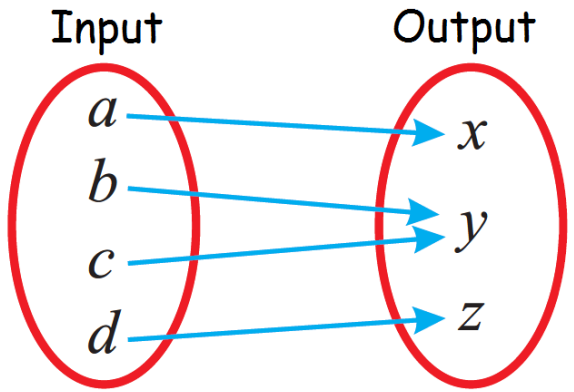
Other Ways to Visualize Relations and Functions

- Input/Output Tables

Input						
Output						

Input	Output

- Mapping Diagrams



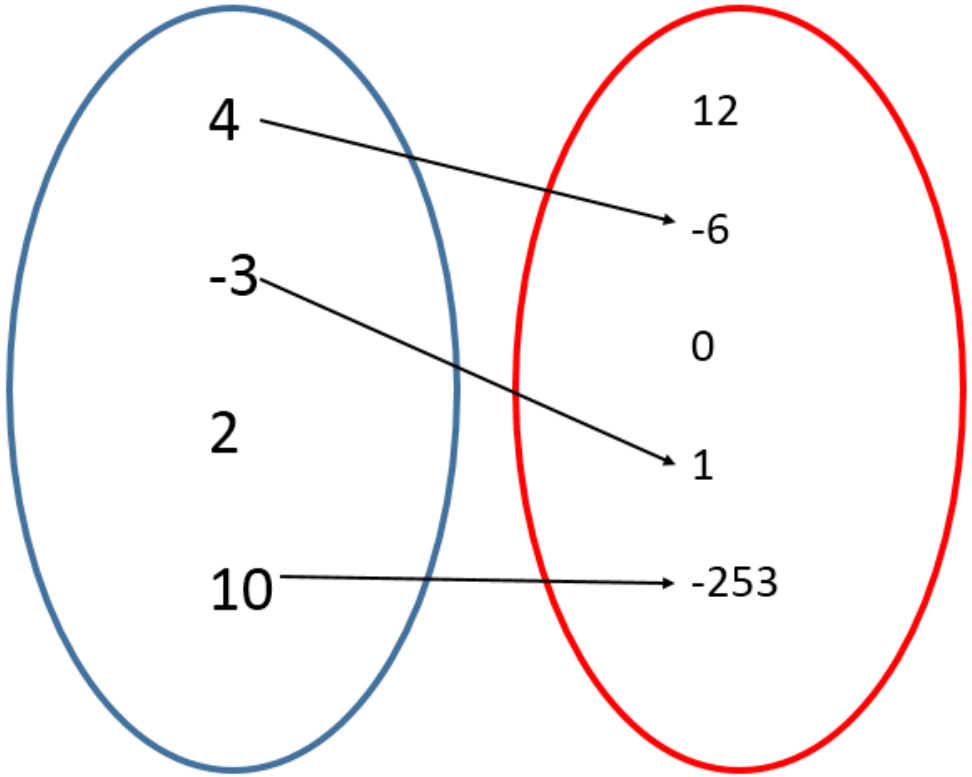
- Graphs
  - ***Vertical line test***: If a graph represents a function, any vertical line will touch the graph no more than once

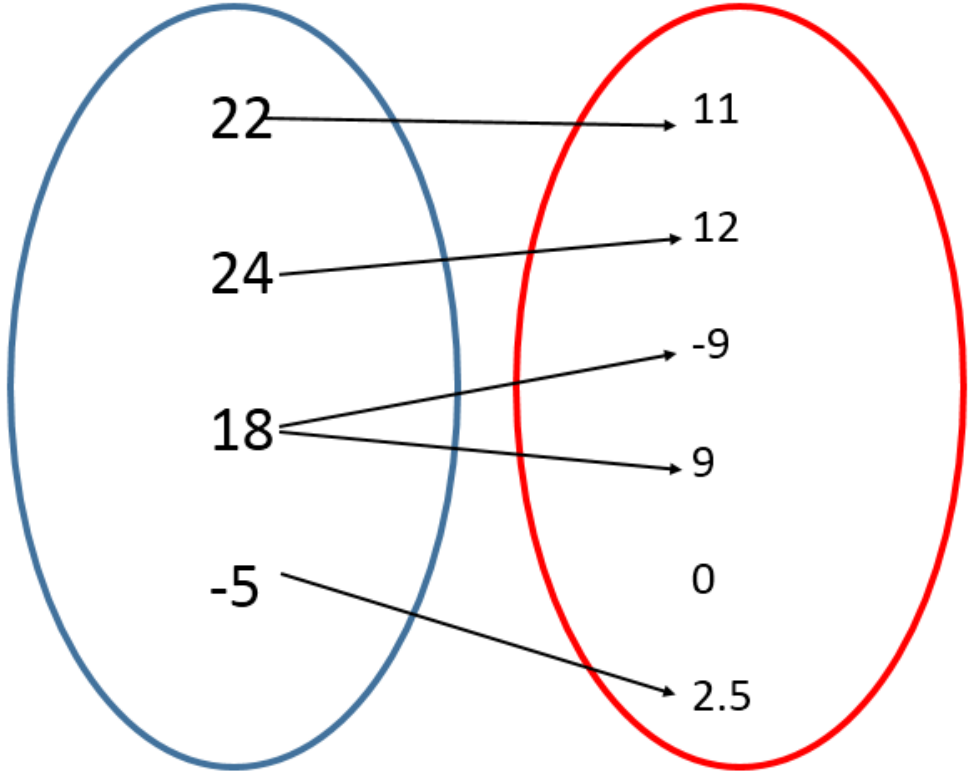
Input-Output Tables

Input	Output
4	16
-2	4
0	0
5	25
-10	100
13	169
-1	1

Input	Output
15	3
9	$\frac{9}{5}$
200	40
15	-3
30	-6
40	8
0	0

Determine whether the diagram represents a function. Identify the domain and range.





Use the vertical line test to determine if the graph is a function.

Vertical line test: If a graph represents a function, any vertical line will touch the graph no more than once