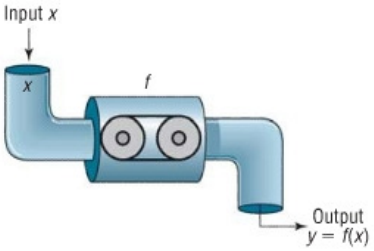
SM 2

Date: **Section:** 1.1

Objective: Determine whether a relation is a function and determine its domain and range (based on mappings, tables, lists of ordered pairs, and descriptions of real-life situations).

Function: A relationship between two sets called the _____ (the inputs) and the _____ (the outputs) where each input has only one output.

- Only 1 *x*-value for every *y*-value
- For every input there is one and only one output.



Domain: The set of all inputs (the *x*-values) of a relation.

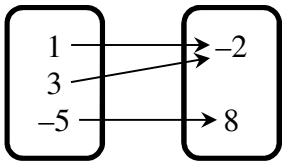
- If a relation is represented by a table, a mapping, or a list of ordered pairs, the domain is the set of all the *x*-coordinates.

Range: The set of all outputs (the *y*-values) of a relation.

- If a relation is represented by a table, a mapping, or a list of ordered pairs, the domain is the set of all the *y*-coordinates.

Examples: Decide whether each relation is a function. Write the relation as a set of ordered pairs (if applicable). Write the domain and range.

a)



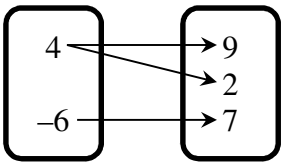
Function?

Ordered Pairs:

Domain:

Range:

b)



Function?

Ordered Pairs:

Domain:

Range:

c)

x	*y*
–2	5
–1	7
0	9
1	–2
2	–2

Function?

Ordered Pairs:

Domain:

Range:

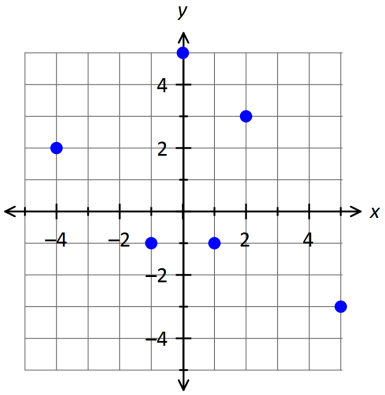
d) $\{(9,-7),(-1,6),(8,2),(9,5)\}$

Function?

Domain:

Range:

e)



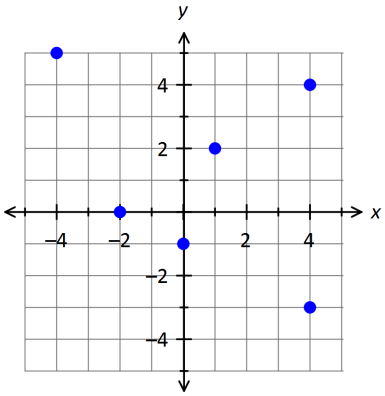
Ordered Pairs:

Function?

Domain:

Range:

f)



Ordered Pairs:

Function?

Domain:

Range:

Domain and Range in Real Life Situations: In real life situations, it's important to think through what values make sense in the problem. You also need to think about which variable is the input and which is the output.

- In real-life problems, the domain is the values of the *x* variable (input) that make sense in the problem and the range is the possible values of the *y* variable (output).

Examples: Determine if the situation is a function. Describe the real-world domain and range for each situation.

a) A teacher creates a list of ice cream flavors on the board. Then she has each student write their name next to the ice cream flavor they like best of the ones listed.

Is this a function? Why or why not?

Domain:

Range:

b) A teacher creates a table with the students' names in the first column. Then she has the students write down their favorite ice cream flavor next to their name.

Is this a function? Why or why not?

Domain:

Range:

Examples: Identify which variables represent the domain and range, then describe the real-world domain and range for each situation in words.

c) A ball is dropped from a window that is 64 feet above the ground. The ball takes 2 seconds to hit the ground. What are the domain and range if the height is a function of time?

Circle which variable represents the domain: Time or Height

Domain:

Circle which variable represents the range: Time or Height

Range:

d) You are getting ready for the Homecoming dance. Your dad is going to let you borrow his new car, but you need to wash and fill it. The car wash costs $5 and the gas costs $3.89 per gallon. The car can hold 15 gallons of gas. What are the domain and range if the total cost is a function of the number of gallons?

Circle which variable represents the domain: Cost or Number of Gallons

Domain:

Circle which variable represents the range: Cost or Number of Gallons

Range:

e) A cell phone plan charges a flat fee of $10 for up to 1000 texts and $0.10 per text over 1000. What are the domain and range?

Circle which variable represents the domain: Number of Texts or Cost

Domain:

Circle which variable represents the range: Number of Texts or Cost

Range: