

## 6.1 Functions

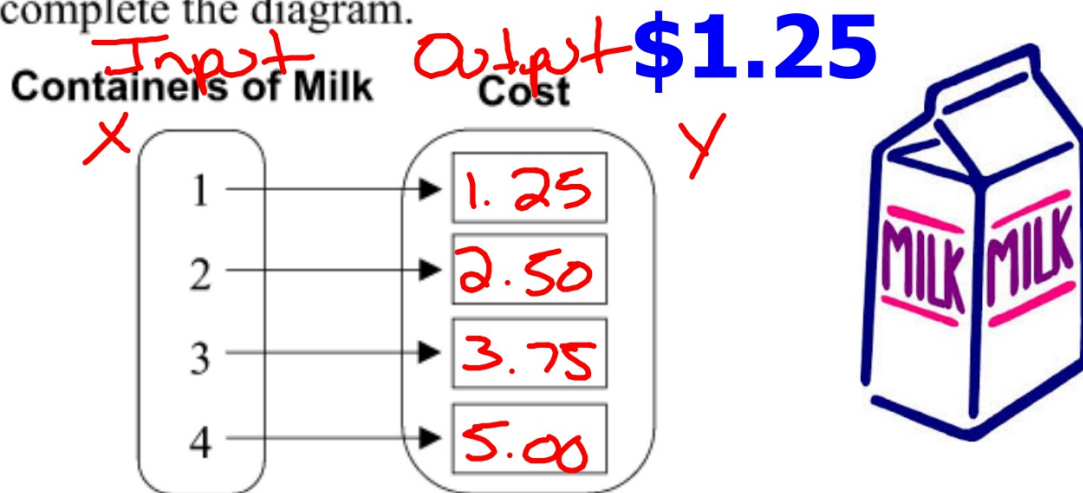


### Learning Targets

- (Understand a Mapping Diagram)
- List Ordered Pairs
- Determine Whether Relations Are Functions
- Describe a Mapping Diagram
- Use a graph

## Understand a Mapping Diagram

Use the cost of a container of milk at your school cafeteria to complete the diagram.



This type of diagram is called a *mapping diagram*. Why do you think it is called that?

# Relations and Mapping Diagrams

Ordered pairs can be used to show **inputs** and **outputs**.



**Input** **Output**  
 $(x, y)$

## Key Idea

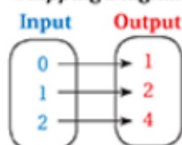
### Relations and Mapping Diagrams

A **relation** pairs inputs with outputs. A relation can be represented by ordered pairs or a **mapping diagram**.

#### Ordered Pairs

(0, 1)  
(1, 2)  
(2, 4)

#### Mapping Diagram

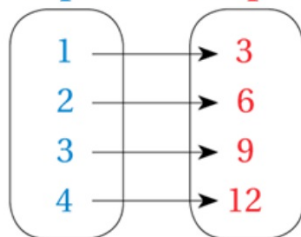


Learning  
Target 1

## Listing Ordered Pairs of a Relation

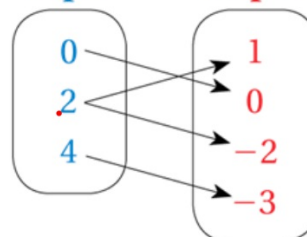
List the ordered pairs shown in the mapping diagram.

a. **Input**      **Output**



∴  $(1, 3)$   $(2, 6)$   
 $(3, 9)$   $(4, 12)$

b. **Input**      **Output**



∴  $(0, 1)$   $(2, 0)$   
 $(2, -2)$   $(4, -3)$

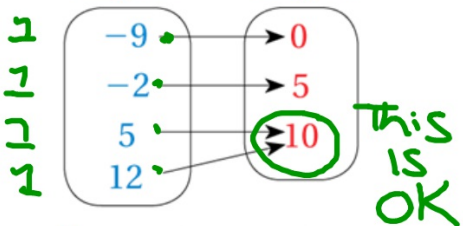
Learning  
Target 2

# Determine if a Relation is a Function

A relation is a function if  
each input has exactly one output

Determine whether each relation is a function.

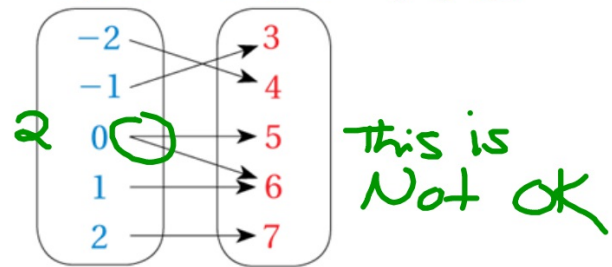
a. Input Output



Each input has exactly one output. So, the relation is a function.

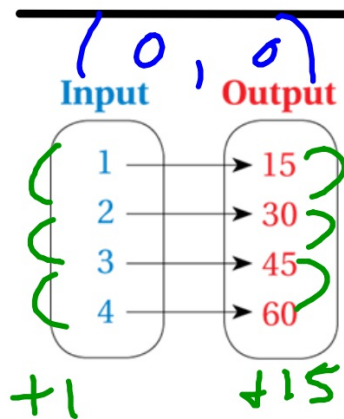
Yes

b. Input Output



The input 0 has two outputs, 5 and 6. So, the relation is *not* a function.

## Describe a Mapping Diagram



Consider the mapping diagram at the left.

a. Determine whether the relation is a function.

Each input has exactly one output.

∴ Yes

b. Describe the pattern of inputs and outputs in the mapping diagram.

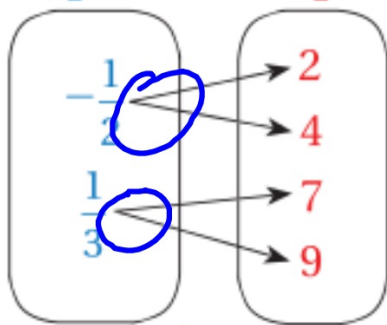
LA  
Sentence

$$m = \frac{15}{1}$$
$$y = 15x$$

∴ As the inputs increase by 1, the outputs increase by 15.

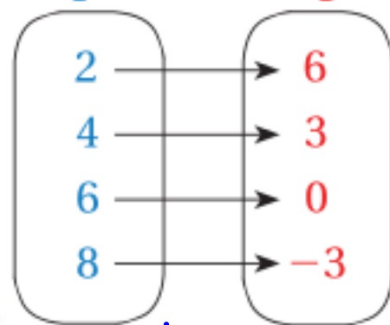
Determine whether the relation is a function.

3. **Input**      **Output**



No

4. **Input**      **Output**



+2

Yes

-3

5. Describe the pattern of inputs and outputs in the mapping diagram #4

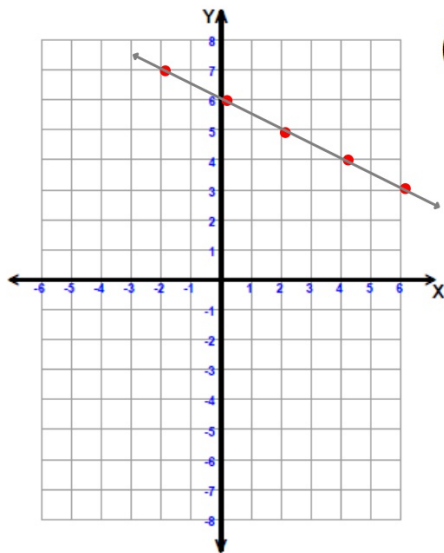
As the **inputs** increase by **2**,  
the **outputs** decrease by **3**.



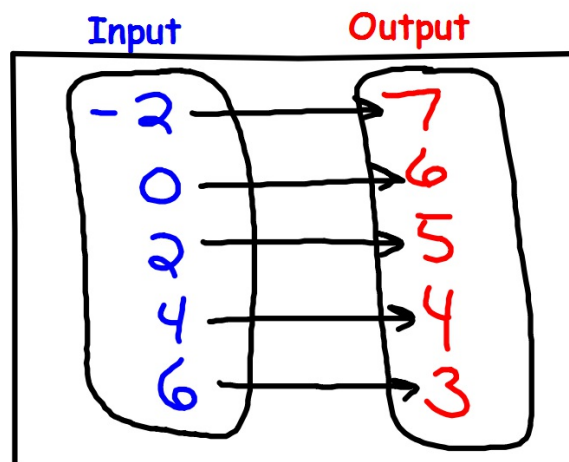
Learning  
Target 4

## Use a Graph To Draw a Mapping Diagram

Draw a mapping diagram for the graph  
Then describe the pattern of inputs and outputs.



$(-2, 7)$   $(0, 6)$   $(2, 5)$   $(4, 4)$   $(6, 3)$



As each input increases by 2, the output decreases by 1



## Homework

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#1, 6, 7, 9-11,  
13, 15-18