Name: _____   Date: _____

Day 1: Introduction to Functions                             7/8A

**Aim**: What is a function and how can we identify one?

## Introduction to Functions

A relation is a set of ordered pairs. A **function** is a relation in which each input value, or *x*-value, corresponds to <u>exactly one output</u> value, or *y*-value. A function or other relation can be represented as a <u>set of ordered pairs in a table, as an equation, or by a graph.</u>

🔑 *The relationship represents a function if each input value is paired with only one output value.*

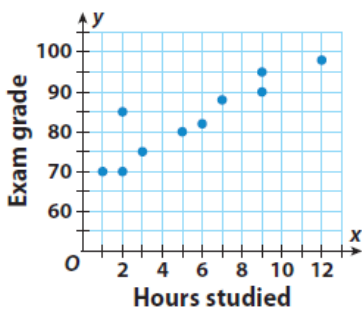*Example 1:* Determine whether each relationship is a function. Justify.

a:

| Input | Output |
|-------|--------|
| 5     | 7      |
| 10    | 6      |
| 15    | 15     |
| 20    | 2      |
| 25    | 15     |

b:

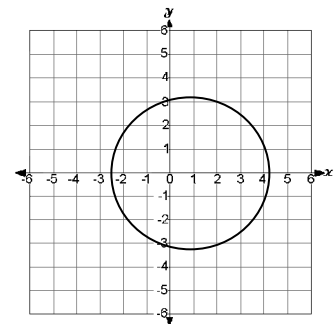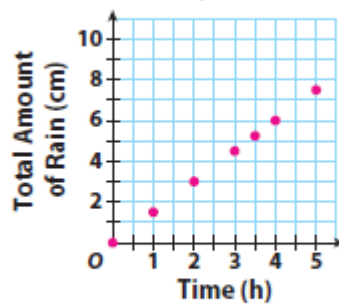| *x* | *y* |
|-----|-----|
| 1   | 10  |
| 5   | 8   |
| 4   | 6   |
| 1   | 4   |
| 7   | 2   |

*Example 2*: Determine if the relationships below represent the graph a function? Justify.



Hours Studied and Exam Grade



Heavy Rainfall



❖ **VERTICAL LINE TEST:**  If the line hits the graph more than once, it is not a function.

# Graphing Linear Functions

When the graph of a relationship is a **line**, the equation is a **linear equation**. Since there is exactly one value of y for each value of x, the relationship is a *function*. It is a **linear function** because its graph is a non-vertical line.
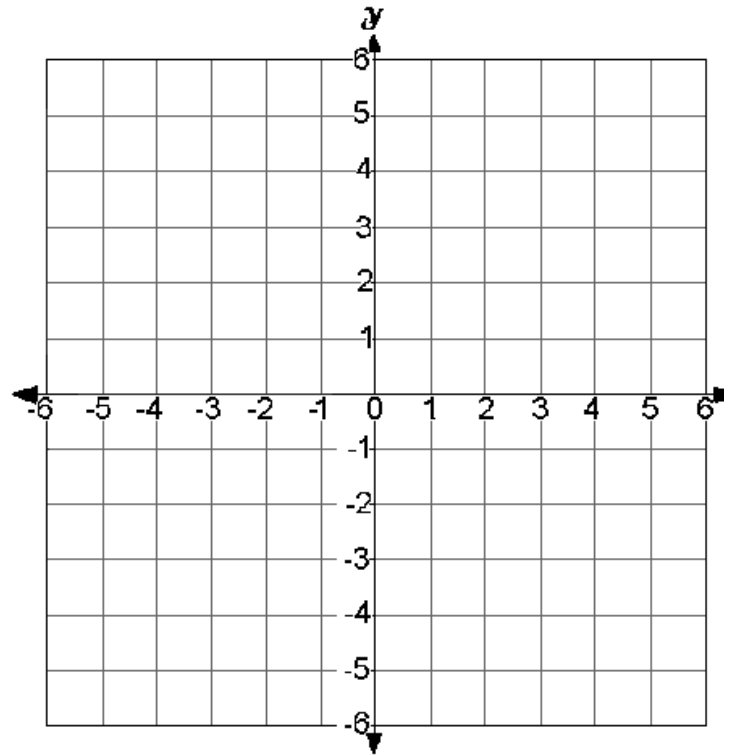
*Example 3:* Graph the function y = x + 3

Step 1: Create a table.
Step 2: Pick input values (x) to find the output values (y).
Step 3: Graph the ordered pairs.

| x | y = x + 3 | y | (x, y) |
|---|---|---|---|
| -2 | **(-2)** + 3 | 1 | (-2, 1) |
| -1 | | | |
| 0 | | | |
| 1 | | | |
| 2 | | | |



> ❖ A *solution* to the function is any point that lies on the line.
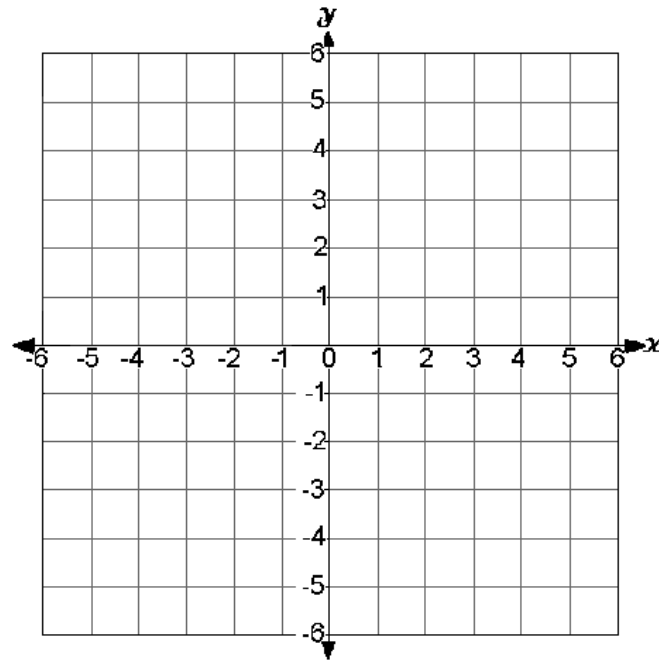
→Is (-4, -1) a solution for this linear function? Justify.

→Is (10, 15) a solution for this linear function? Justify algebraically.

*Examples:*

1. Complete the table and graph the function y = –3x + 1.

| x | y = –3x + 1 | y | (x, y) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



2. Is (–12, 35) a solution to the previous linear function? Justify.

3. Tell whether each relationship is a function. Justify.

a:

| Input | Output |
|---|---|
| 1 | 6 |
| 2 | 7 |
| 3 | 7 |
| 4 | 6 |

b:

| x | y |
|---|---|
| –1 | 14 |
| 0 | 15 |
| 1 | 16 |
| –1 | 17 |

c:  { (2, 1), (4, 2), (6, 3) }

*On your own!*

**(#1-2) Determine whether each relationship is a function. Explain.**

1.

| Input | Output |
|-------|--------|
| 52 | 53 |
| 24 | 24 |
| 32 | 32 |
| 17 | 17 |
| 45 | 45 |

2.

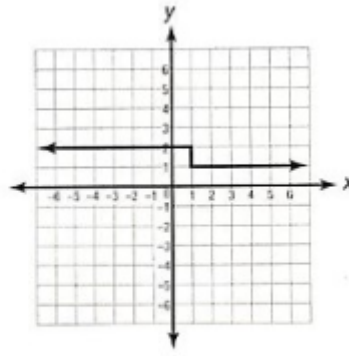| x | y |
|---|---|
| 14 | 52 |
| 8 | 21 |
| 27 | 16 |
| 36 | 25 |
| 8 | 34 |

3.     Which of the following graphs represent a function? Justify your answer.
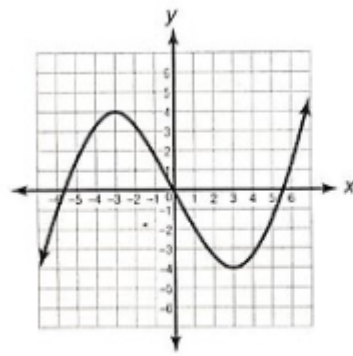


Graph 1                                      Graph 2

4.     Which set of ordered pairs represent a function?

a:     (–2, 1), (0, 1), (1, –2), (3, 4)          b:     (–1, 5), (–2, 3), (–2, 1), (–3, –1)

c:     (12, 36), (9, 27), (–6, 30), (9, 18)          d:     (3, 17), (–2, 11), (1, 8), (3, 5)

5.      Which table does **not** represent a function?

a:

| x | 7 | 8 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| y | 7 | 14 | 21 | 28 | 35 |

b:

| x | −2 | −1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| y | −8 | −1 | 0 | 1 | 8 |

c:

| x | −8 | −4 | 0 | 4 | 8 |
|---|---|---|---|---|---|
| y | 2 | 0 | −1 | −3 | −5 |

d:

| x | −10 | −5 | 0 | 5 | 10 |
|---|---|---|---|---|---|
| y | 5 | 5 | 5 | 5 | 5 |

6.      Is the relationship in the graph a function? Justify.

**Weights and Shipping Costs**
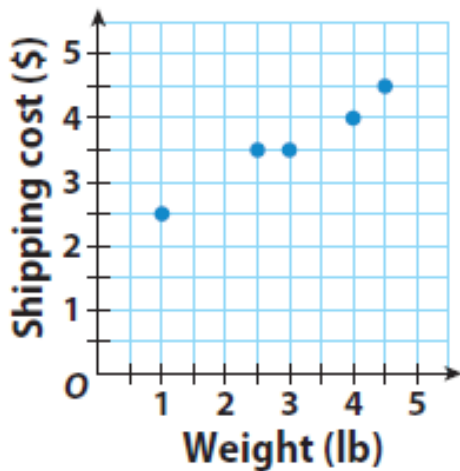


7.      Given the function **y = −2x + 1**, is (−13, 27) a solution to this function? Justify.