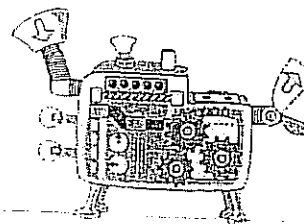


UNIT 1 – INTRODUCTION TO FUNCTIONS



Expectations

Solution

By the end of this unit, you will be able to:

1. explain the meaning of the term function.
2. distinguish between a function and a relation.
3. use function notation to represent functions.
4. define domain and range.
5. describe the domain and range of a relation.
6. find the inverse of a function both algebraically and graphically.
7. understand the relationship between the domain and range of a function and the domain and range of its inverse.
8. describe the roles of the parameters a , k , d , and c in functions of the form $y = af(k(x - d)) + c$.
9. sketch graphs of $y = af(k(x - d)) + c$ and state the domain and range of the transformed functions.


Homework

The schedule and homework assignments below are subject to change at the teacher's discretion.

Day	Topic	Homework
1 Friday	Functions and Relations	Pg. 12 #(1-4)first and last, 5, 6abcd, 8*, 11EOO, 15, 19*
2 Mon	Function Notation	Pg. 22 (1-3)first a & last, 5-7, 13, 15, 16cd, 19, 22*, 23**, 24***
3 Tu	Domain and Range 8 Basic Functions	Handouts Quiz on radical # → Wed and Th lesson
4 Wed	Transformations Translations	Pg. 102 #(2-5)ac, 6bdfhj, 8, 15*, 16, 19*
5 TH	Transformations Reflections	Pg. 110 #(2-4)EOO, 5, 6, 7, 12, 13, 14*, 15*
6 Fri	Transformations Stretches	Pg. 119 #(2-4)EOO, 6, 7, 11, 15*, 18*
7 Mon	Combinations of Transformations	Handouts
8 Tu	Combinations of Transformations	Pg. 129 #1, 3, 4, 10, 11acd, 13*, 15*
9	Graphing Assignment	Handout
10 Wed	Inverse Functions Quiz	Pg. 138 #1ab, 3, 4bd, 5, 7abc, 11, 12, 15ii), 17ab
11	Review	Pg. 70 #1acd, 2acd, 3 Pg. 72 #2-4, 7-9 Pg. 142 #7-15a, 16 Pg. 144 #1-5, 9-11, 12ab
12	Test	

Mar 3

Relation: is a set of ordered pairs

* Youtube clip 

"Domain and Range of a function" by Khan Academy

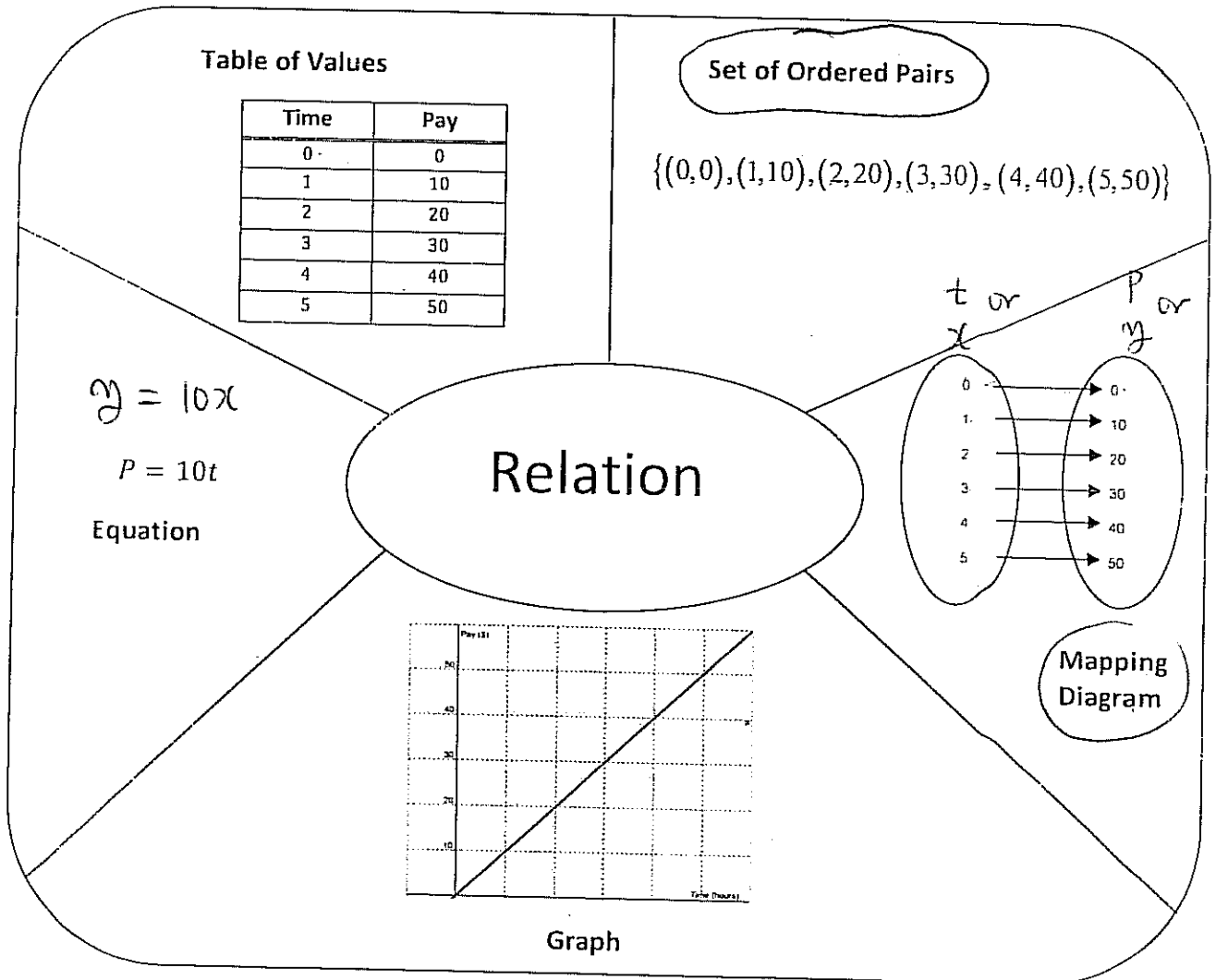
* Tues (Feb 24) : Quiz on radicals (not test)

Modelling Relations

Pay = Depends on hours = Dependent Variable
= y

Bob has a summer job cutting lawns for \$10/hour. The amount he earns is related to the number of hours he works.

Hours or Time = Independent Variable = x



Domain: the set of all x values (independent variable)

$$D = \{0, 1, 2, 3, 4, 5\}$$

Range: the set of all y values (dependent variable)

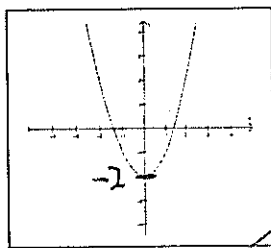
$$R = \{0, 10, 20, 30, 40, 50\}$$

* x = independent variable

* y = dependent variable

Find the domain and range of

a)

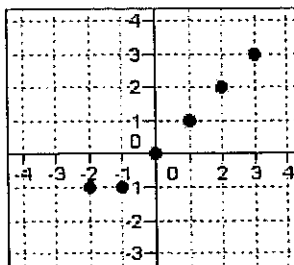


belongs to
Real numbers

$$D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R}, y \geq -2\}$$

b)



$$D = \{-2, -1, 0, 1, 2, 3\}$$

$$R = \{-1, 0, 1, 2, 3\}$$

c) $\{(1, 3), (1, 4), (1, 5), (1, 6)\}$

$$D = \{1\}$$

$$R = \{3, 4, 5, 6\}$$

d) $y = \sqrt{x}$

$$D = \{x \in \mathbb{R}, x \geq 0\}$$

$$R = \{y \in \mathbb{R}, y \geq 0\}$$

* For a fraction to be zero, its numerator must become zero.

In (e), numerator is always 1, $\therefore y$ can never become zero

e) $y = \frac{1}{x}$

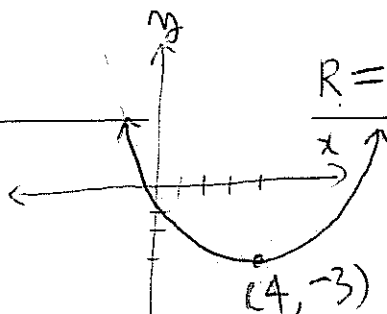
$$D = \{x \in \mathbb{R}, x \neq 0\}$$

$$R = \{y \in \mathbb{R}, y \neq 0\}$$

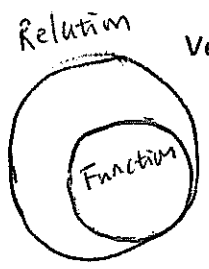
f) $y = (x - 4)^2 - 3$

$$D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R}, y \geq -3\}$$

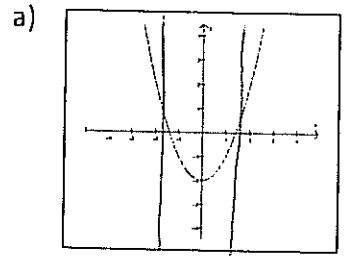


Function: is a relation in which each x value has one y value. (or every)

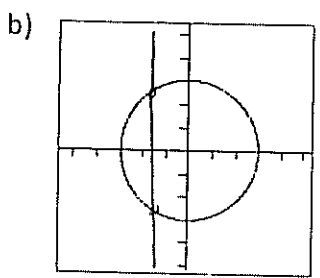


Vertical Line Test: is used to determine if a relation is a function. If a vertical line crosses a graph only once, then it is a function.

Which of the following are functions? Justify your answer.



Yes it is a function. Vertical lines cross the graph only once = Each x value has only one y value.



This is not a function. Some vertical lines cross the graph twice. = Some x values have two y values.

c) $\{(1, 3), (2, 4), (3, 5), (4, 6)\}$

Function. Each x value has one y value.

d) $\{(1, 3), (1, 4), (1, 5), (1, 6)\}$

Not a function. For $x=1$, there are 4 y values.

e) $\{(3, 1), (4, 1), (5, 1), (6, 1)\}$

Function. Each x value has one y value.

f) $y = 2x + 1$

Function because linear graph means every x has only one y value.

g) $x^2 + y^2 = 25$
 $\sqrt{y^2} = \sqrt{25 - x^2}$
 $y = \pm \sqrt{25 - x^2}$

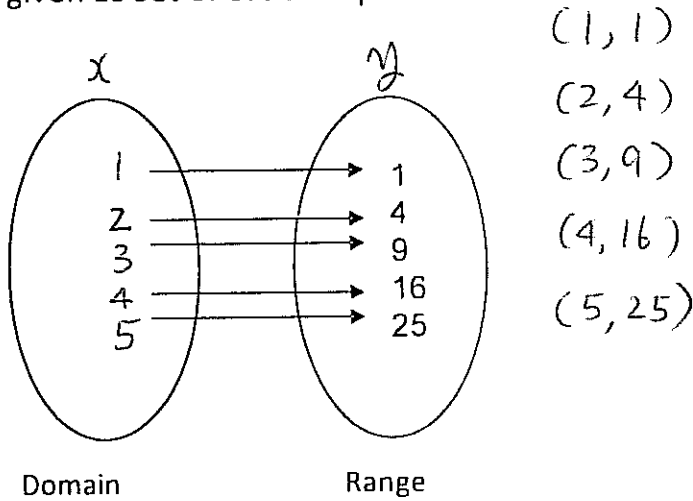
Not a function. Some x values have two y values

When $x=3 \rightarrow y = 4, -4$

Sub $x=3 \rightarrow \pm \sqrt{25 - (3)^2}$
 $= \pm \sqrt{25 - 9} = \pm \sqrt{16} = \pm 4$

Mapping

A mapping diagram is a representation that can be used when the relation is given as set of ordered pairs



- (1, 1)
- (2, 4)
- (3, 9)
- (4, 16)
- (5, 25)

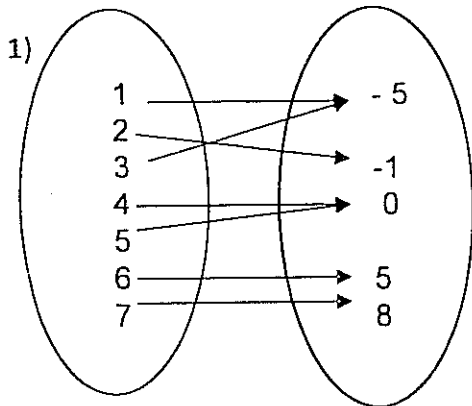
$$D = \{1, 2, 3, 4, 5\} \quad R = \{1, 4, 9, 16, 25\}$$

Use the mapping diagram:

- a) write the set of ordered pairs of the relation
- b) state if the relation is a function because we can easily see whether all x values have only one y value.

(a)

- (1, -5)
- (2, -1)
- (3, -5)
- (4, 0)
- (5, 0)
- (6, 5)
- (7, 8)



(b) Yes it is a function

(c) Domain Range

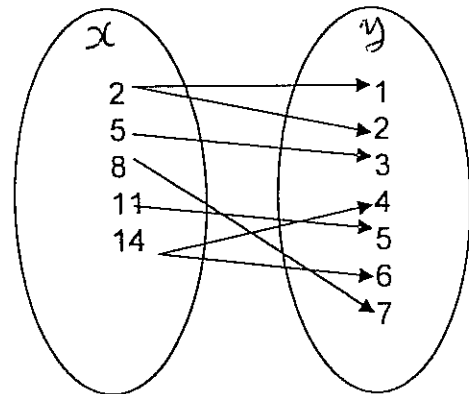
$$D = \{1, 2, 3, 4, 5, 6, 7\}$$

$$R = \{-5, -1, 0, 5, 8\}$$

(a)

- (2, 1)
- (2, 2)
- (5, 3)
- (8, 7)
- (11, 5)
- (14, 4)
- (14, 6)

2)



(b) No it is not a function.

(c) Domain Range

$$D = \{2, 5, 8, 11, 14\}$$

$$R = \{1, 2, 3, 5, 6, 7\}$$