# Chapter #5 Relations & Functions

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10:52 AM

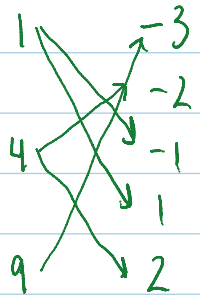
## 5.1 & 5.2 Representing Relations and Properties

A relation associates the elements of one set with the elements of another set
↳ can be represented as:
- a table
- an arrow diagram
- in words

TABLE of Values

| (h) hours worked | (P) gross pay ($) |
|---|---|
| 1 | 12 |
| 2 | 24 |
| 3 | 36 |

ARROW diagram




In words

domain: the 1st set of elements

range: the 2nd set

**ordered pairs**

- 2 #'s in order ex. (2, 4) on a grid

**domain**

- the 1st set of elements (along the x-axis)

**range**

- the 2nd set (along the y-axis)

Ex.

↗ hours worked (h) | Gross Pay (P) ←dependent

Ex.

| hours worked (h) ← independent variable | Gross Pay (P) ← dependent variable |
|---|---|
| 1 | 12 |
| 2 | 24 |
| 3 | 36 |
| 4 | 48 |
| 5 | 60 |

domain: 1, 2, 3, 4, 5 — range: 12, 24, 36, 48, 60

Ordered pairs: ex. (2, 24)

horizontal coordinate — X axis

vertical coordinate — Y axis

Domain and Range can be written using 3 different methods:

1. Number Line

2. Set Notation

domain $\{x \mid x \in R\}$

range $\{y \mid y \in R\}$

greek lowercase letter "e" called epsilon

3. List

$\{3, 5, 7, 9\}$

Ex. #1

State the domain of this function in set notation

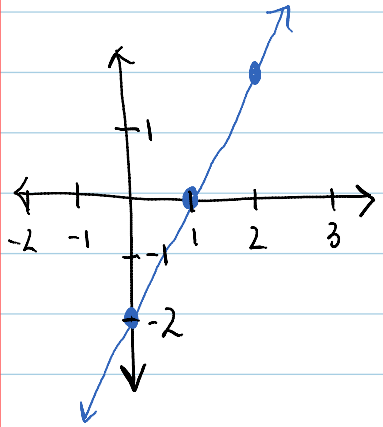
↑ means values of x

means values of x

$\{x \mid x \in R\}$

Real numbers — any # that rational or irrational

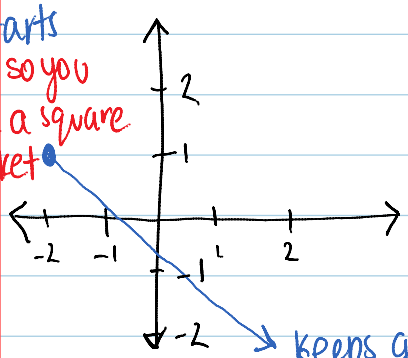
means "x is an element ...."



this is a continuous line !!

Ex. #2

State the range of the following relation



starts @ 1 so you use a square bracket

keeps going to infinity! but in the negative direction

* only 1 end is continuous

$(-\infty, 1]$

or

$y \leq 1$

square bracket vs ) round bracket → the point is included and ends there on the graph

Function

- a special type of relation where each element in the domain is associated with exactly 1 element in the range.

Ex. #3 have worked | cross out

Ex. #4 Arrow diagram

Ex. #3

| hours worked | gross pay |
|---|---|
| 1 | 12 |
| 2 | 24 |
| 3 | 36 |
| 4 | 48 |

✓ a function

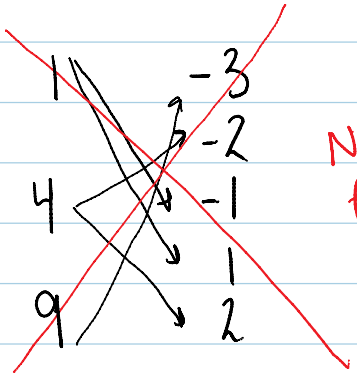
Ex. #4 Arrow diagram

Jan → 28
Feb.
Mar. → 30
April → 31

✓ a function

# each ordered pair has a different 1st element

Ex. #5




NOT a function # b/c each of the #s 1 and 4 in the 1st set associates with more than 1 # in the 2nd set

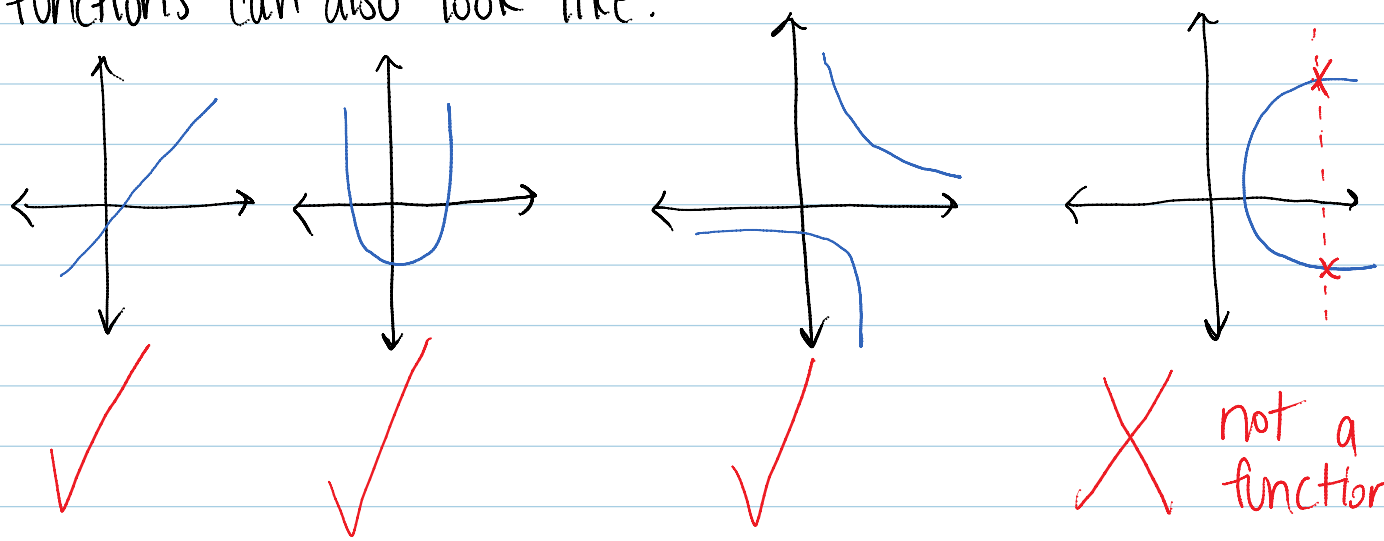
Ex. #6

{(3, 4), (6, 8), (9, 5), (3, 3)}

X not a Function!

same 1st #

Functions can also look like:



✓ ✓ ✓ X not a function

# try the vertical line test!!

We can represent functions using Equations called:

## Function Notation

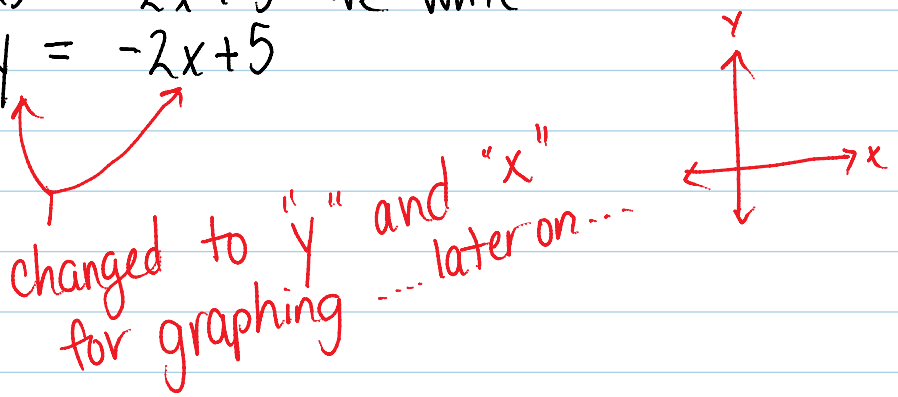
- used to show the independent variable in a function

ex. $f(x)$ means the value of the function $f$ depends on the value of the independent variable $x$

* other letters can also be used *
↳ we can write an equation in fuction notation as an equation in 2 variables

ex. #1 for the equation $C(n) = 300 + 25n$ we write
$C = 300 + 25n$

Ex. #2 $g(x) = -2x+5$ we write
$y = -2x+5$




changed to "y" and "x" for graphing .... later on...

You can substitute a value and solve for 1 variable

Ex. #3 $V(d) = 26$ for the function $V(d) = -0.08d + 50$

$V(d) = -0.08d + 50$
$26 = -0.08d + 50$
$-50 \quad -50$
$-24 = -0.08d$
$\frac{-24}{-0.08} = \frac{-0.08d}{-0.08}$

$300 = d$

pg. 270 # 4-10, 14, 15.