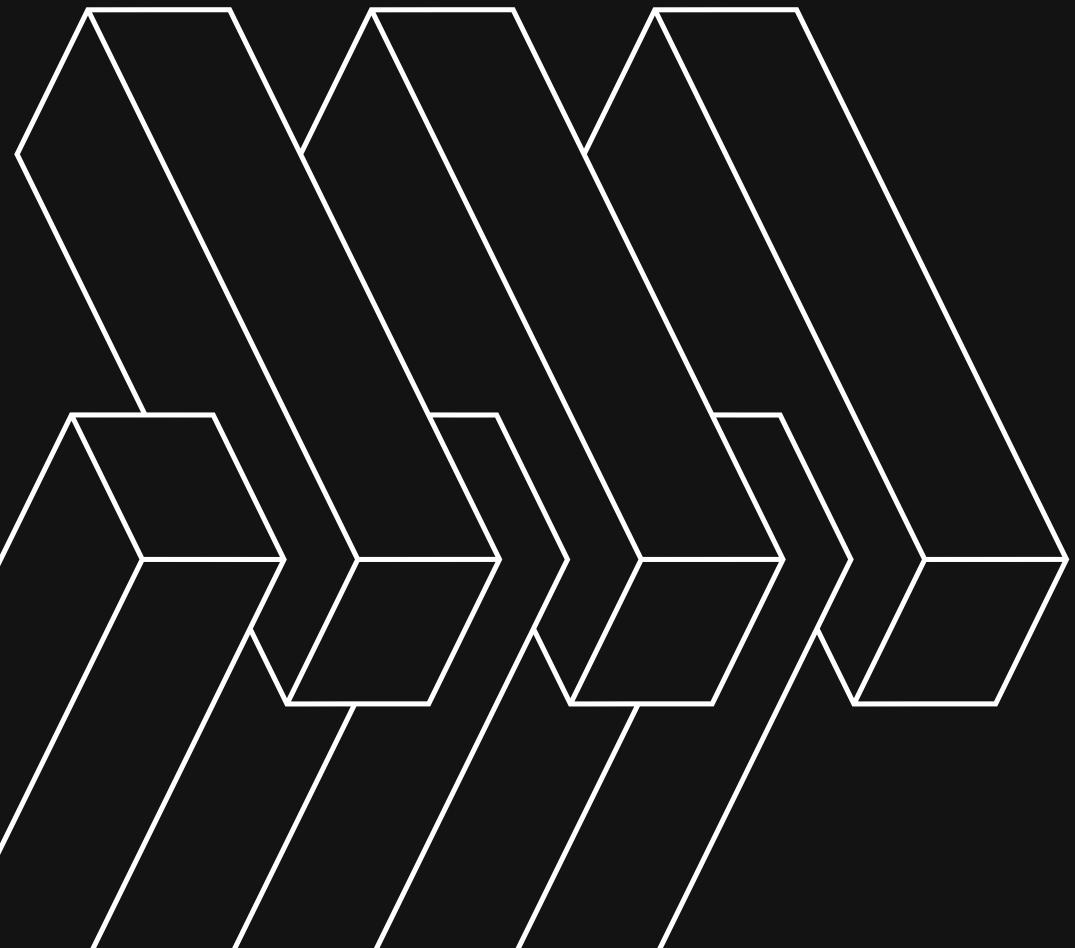


TASK

AHMED HATEM ELSAWY



MATH – SESSION 1

A set is an unordered collection of unique items. Sets are used for membership testing and eliminating duplicate entries.

or it is a well-defined collection of distinct objects.

Examples:

1. Set of days of the week = {Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday}
2. Set of even numbers less than 10 = {2, 4, 6, 8}
3. Set of vowels in English = {a, e, i, o, u}

a) {1, 2, 3, 4}

Set

✓ Elements are clear and well-defined.

b) {Tall people}

Not a set

✗ “Tall” is not well-defined (no specific height).

c) {a, b, c, d}

Set

✓ Elements are clearly specified.

$A = \{1, 2, 3\}, B = \{3, 2, 1\}$

Equal sets

Same elements regardless of order.

$C = \{a, b, c\}, D = \{1, 2, 3\}$

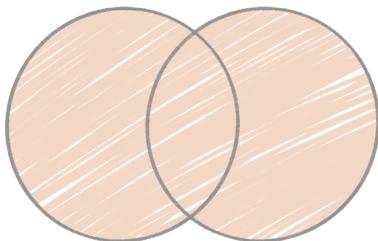
Equivalent sets

Same number of elements, different elements.

Let:

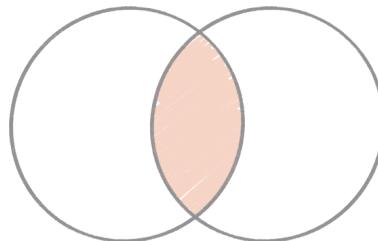
$$A = \{1, 2, 3\}$$

$$B = \{3, 4, 5\}$$



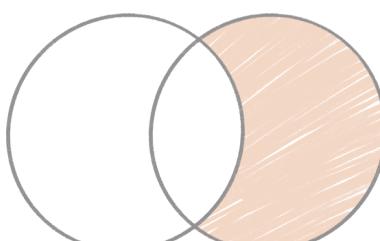
a) $A \cup B$

$$\text{Union} = \{1, 2, 3, 4, 5\}$$



b) $A \cap B$

$$\text{Intersection} = \{3\}$$



c) $A - B$

$$\text{Difference} = \{1, 2\}$$

Problem (Union & Intersection)

In a class of 40 students:

- 25 like Math
- 20 like Physics
- 10 like both

Solution:

Students who like Math or Physics:

$$\begin{aligned}n(M \cup P) &= n(M) + n(P) - n(M \cap P) \\&= n(M) + n(P) - n(M \cap P) \\&= n(M) + n(P) - n(M \cap P) \\&= 25 + 20 - 10 = 35 = 25 + 20 - 10 = 35\end{aligned}$$

Answer: 35 students

MATH – SESSION 2

Determine whether each relation is a function

a) $\{(1,2), (2,3), (3,4)\}$

Function

✓ Each input has only one output.

b) $\{(1,2), (1,3), (2,5)\}$

Not a function

✗ Input 1 has two outputs (2 and 3).

Domain & Range

For:

$$f = \{(2,4), (3,9), (4,16)\}$$

Domain = {2, 3, 4}

Range = {4, 9, 16}

$$f(x) = x^2 - 2x$$

For the function $f(x) = 2x + 3$, compute:

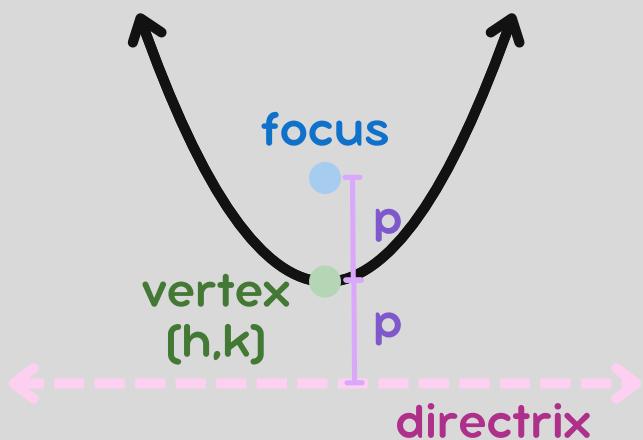
$f(0)$, $f(1)$, $f(5)$

- $f(0) = 2(0) + 3 = 3$
- $f(1) = 2(1) + 3 = 5$
- $f(5) = 2(5) + 3 = 13$

quadratic function

X	f(x)
0	0
1	-1
2	0
3	3
4	8

$$(x-h)^2 = 4p(y-k)$$



Vertical Line Test

If any vertical line cuts the graph more than once → ✗ Not a function

If every vertical line cuts the graph once only → ✓ Function