

Date: 16-May-2024

⇒ Percentage

↓
divide (/)
per person

century (latin) → 100
hundred

sign → %

Statistic

~~Population ranked~~ Pakistan ranked first in
the world diabetes index
↓
Diabetes → 30%

out of 100 → 30

$$\text{Percentage} = \% = \frac{1}{100}$$

$$1 \text{ percent} = 1\% = \frac{1}{100}$$

$$1\% = \frac{1}{100}$$

$$\% = \frac{1}{100}$$

Change from percentage in to common fraction

$$40\% \rightarrow \frac{40}{100} = \frac{40}{100} \times \frac{1}{1} = \frac{2}{5}$$

$$80\% = \frac{80}{100} \times \frac{1}{1} = \frac{4}{5}$$

Change in to percentage

$$\frac{4}{5} \times 100 = 80\%$$



$$\frac{20}{80} \times 100 = 25\%$$

change $\frac{91}{2}$ into simple fraction

$$\frac{91}{2} \times \frac{1}{100} = \frac{91}{200}$$

→ multiplication

what is 25% of 80?

$$\begin{aligned} 25 \times 4 &= 100 \\ 20 \times 4 &= 80 \end{aligned}$$

~~25% of 80~~

$$\begin{aligned} 25\% \cdot (80) &= 20 \\ 25 \times 1 \times 80 &= 20 \\ \frac{100}{4} & \end{aligned}$$

what is the percentage rate of 5:4

$$\frac{5}{4} \times 100 = 125\%$$

A fruit seller has some apples. He sells 40% of apples and still has 420 apples. How many apples he had in total?

~~40% of 420~~

$$= 168$$

~~420 - 168 = 252~~

~~252 \times 4 = 1008~~

$$\begin{aligned} 100\% \cdot (x) &= 420 \\ (100\% - 40\%) \cdot x &= 420 \\ 60\% \cdot x &= 420 \end{aligned}$$

$$3 \overline{) 60} \times 1 \times x = 420$$

$$x = \frac{420 \times 5}{3} = 700$$

$$\begin{array}{r} 2 \\ 140 \\ \times 5 \\ \hline 700 \end{array}$$

Date: _____

GK-I \rightarrow PA \rightarrow 40

GK-II \rightarrow CA \rightarrow 40

GK-III \rightarrow GSA \rightarrow 40

GSA \rightarrow 100 \rightarrow 60% theoretical
40% Marks

MPT = 200 \rightarrow 60 \rightarrow Math

what is 70% of a Kg?

70% (1000)

$$70 \times \frac{1}{100} \times 1000$$

$$= 70 \times 10 = 700 \text{ g}$$

gram \rightarrow Kg
Kg \rightarrow gram
Mass
length
time

What percent of 40 is 14

$$x\% (40) = 14$$

$$x \times \frac{1}{100} \times 40 = 14$$

$$x \frac{4}{10} = 14$$

$$x = \frac{14 \times 10}{4}$$

$$= \frac{35 \cancel{4}}{\cancel{4}} = 35\%$$



Q) Angela love to travel. She spend 25% of the year on vacation and works the rest of the year. What fraction of the year does she travel?

Sol:-

Time spend by angela ~~2000~~ is travelling

$$25\% (12)$$

$$25 \times \frac{1}{100} \times 12 =$$

$$\frac{1}{4} (12) = \frac{1}{4}$$

angela
travel

one fourth
year on
vacation

Q) In a flower vase, there are 20 flowers there are 5 lilies and 15 roses. What percent of flowers are lilies?

Sol:-

$$= x\% (20) = 5$$

$$x \times \frac{1}{100} (20) = 5$$

$$x = 5 \times 5$$

$$x = 25\%$$

① Give data

② require data

③ solution

⇒ —

⇒ —

⇒ —

⇒ —

④ Hence

Date: _____

Q) When 40% of a number is added to 42 the result is the no. itself. Find the number

Sol: -

Let the number = x

$$40\% \text{ of } (x) + 42 = x$$

$$40 \times \frac{1}{100} (x) + 42 = x$$

$$\frac{4(x) + 42}{10} = x$$

$$\frac{4x}{10} + 42 = x$$

$$\frac{4x}{10} - x = -42$$

$$\frac{4x - 10x}{10} = -42$$

$$\frac{-6x}{10} = -42$$

$$x = \frac{42 \times 10}{6}$$

$$x = 70$$

Date: _____

(SSC 2017)

Q) A man buys 5 kg of meat at Rs 500/kg. In addition for every ~~kg~~ kg he purchased he has to pay a consumption tax of 6% on the selling price. Calculate the total amount of money that he has to pay?

Sol:-

Total kg of meat the man has bought = 5 kg
Total price of meat = $500 \times 5 = 2500$
Consumption tax = 6%

$$= 6\% \cdot (500)$$

$$= \frac{6 \times 1}{100} (500)$$

$$= 30 \times 5 = 150$$

Total tax on 5 kg = 150

The total amount of money that he has to pay is = $2500 + 150 = 2650$

selling
Price

tax

(CSS 2023)

Q1 Ali ~~600~~ buy an oven for Rs 36800 and sell it at a gain of 8.5%. For how much does he sell it?

Sol:-

Cost price of oven = 36800

Profit/gain % = 8.5%

8.5% (36800)

$$8.5 \times \frac{1}{100} \times 36800$$

3128

$$= 36800 + 3128$$

$$= 39928$$

36800
x 8.5%

3128

36800
x 85%

31280

3128.0

Sets :-

It is the collection of well defined object. object of elements are referred as elements.

- > sets are denoted by capital letters/alphabets.
- > elements of sets are denoted by small alphabets.
- > Domain/boundary of set is denoted by curly brackets

set of natural numbers less than 10

$$V = \{1, 2, 3, \dots, 9\}$$

$$V = \{a, e, i, o, u\}$$

Symbols of sets :-

\in -> belongs to

\notin -> does not belongs to

\emptyset -> Null or empty set

\cup -> union of sets and denoted by capital U

\cap -> Intersection of sets

\mathbb{Z} -> integers

\mathbb{N} -> natural

ω -> whole

Representation of sets

→ Statement Form

↳ Roster Form

↳ set builder Form/notation

① Statement Form :-

In the form a well defined statement is written e.g

set of vowels

set of natural number

set of capital set in the written form

② Roster Form

$$N = \{1, 2, 3, \dots, 9\}$$

$$E = \{0, 2, 4, 6, 8, \dots, 10\}$$

③ Set-builder notation

A mathematical notation for describing a set by enumerating its properties, which the element must satisfy.

$$S = \{x \mid \text{criteria}\}$$

name of set \downarrow \downarrow element of set

$$A = \{1, 2, 3, 4, 5\}$$

→ Roster form

$$A = \{x \in \mathbb{N}, 1 \leq x \leq 5\}$$

↓ set builder form

⇒ types of sets

① Empty set:-

A set which has no element is called empty set.

$$A = \{ \} \text{ } \emptyset$$

set of prime number less than 2

$$P = \{ \} \text{ } \rightarrow \text{empty set}$$

or
 ~~\emptyset~~

② Finite set:-

A set which has limited number of elements is called finite set

$$A = \{1, 2, 3, 4, 5\}$$

③ infinite set:-

A set in which has unlimited number of elements is called infinite set.

$$A = \{1, 2, 3, 4, 5, \dots\}$$

Equal set

Two sets can be called equal sets if they have the same elements even though they could be out of order e.g

$$A = \{a, b, c, d, e\}$$

$$B = \{b, a, e, d, c\}$$

Equivalent set

Two sets can be set equivalent if they have the same number of elements the element can be different or less one another e.g

$$A = \{1, 2, 3, 4, 5\} \text{ no. of elements}$$

$$B = \{a, e, i, o, u\} \text{ no. of elements}$$

universal set:-

A set containing all the elements of the set under discussion is called universal set

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

$$B = \{4, 5, 6\}$$

$$U = \{1, 2, 3, 4, 5, 6, \dots, 10\}$$

operation on sets

① union of sets:-

It is the combination of sets

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

$$B = \{7, 8, 9\}$$

$$A \cup B = \{1, 2, 3, \dots, 9\}$$

② intersection of sets:-

Common element in both sets is called intersection of sets.

$$A = \{1, 2, 3, 4\}$$

$$A \cap B = \{2, 4\}$$

$$B = \{2, 4, 6, 8\}$$

③ complement of set:-

When we subtract a set from universal set is called complement of a set.

It is denoted by,

$$A' = U - A$$

$$U = \{1, 2, 3, \dots, 10\}$$

$$A = \{2, 4, 6, 8, 10\}$$

$$A' = U - A \rightarrow \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6, 8, 10\}$$

$$A' = \{1, 3, 5, 7, 9\}$$



subset:-

$$A = \{1, 2, 3, 4, 5\}$$

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

When element of the set are completely present another sets is called subset.

$$B \subseteq A$$

proper subset
When few element of a set are present in another set.

$$A = \{a, e, i, o, u\}$$

$$B = \{a, e\}$$

$$B < A$$

improper subset
When all element of a set are present in another set is called improper subset.

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

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

$$A \subseteq B$$

Power set:-

it is the combination of all possible subset of a set. it is denoted by P

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

$$\text{Formula} = 2^{n \rightarrow \text{element of set}}$$

$$= 2^3 = 8$$

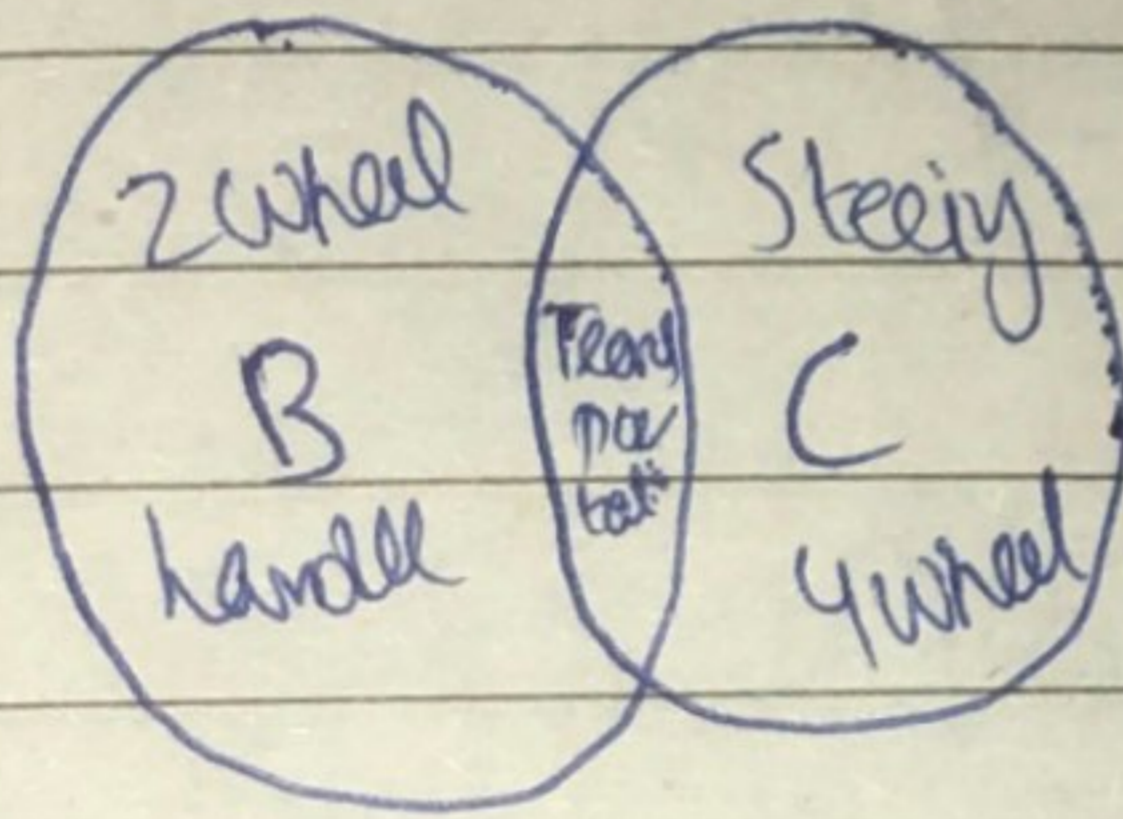
$$P(A) = \{ \emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\} \}$$

Venn diagram

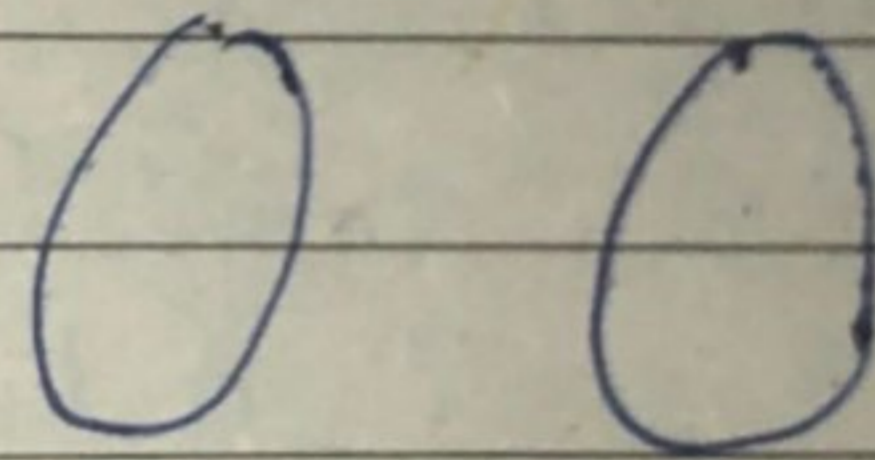
A diagram that shows a connection b/w finite elements of sets

Bike
Two wheel
handle
transportation

Car
4 wheel
steering
transportation



Joint overlapping sets



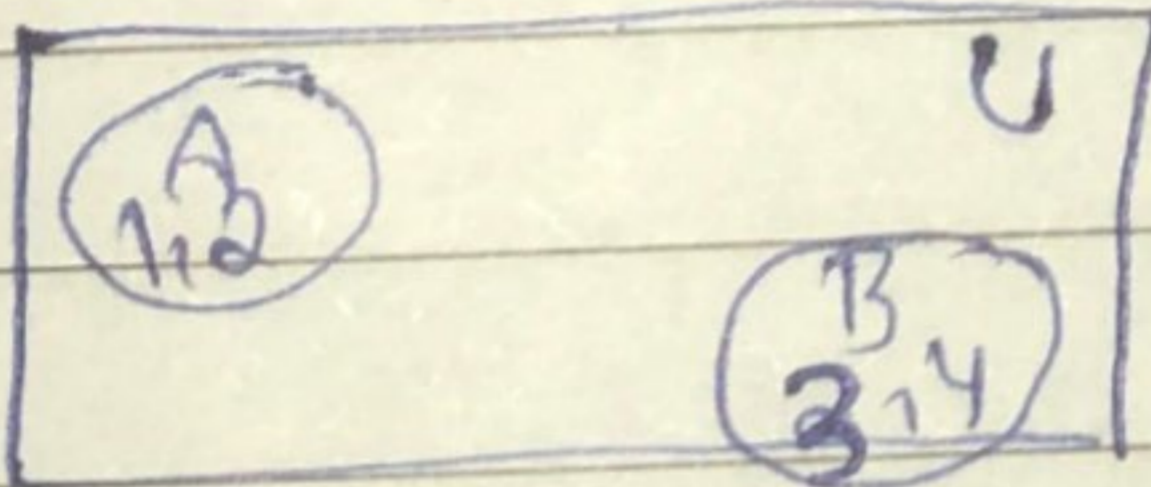
disjoint sets

disjoint sets :-

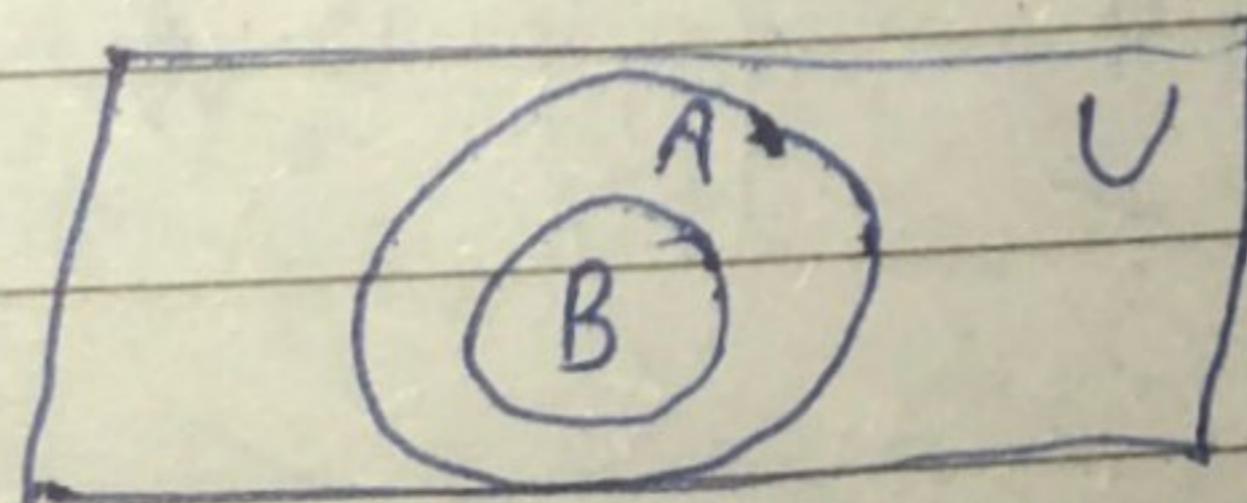
$$U = \{1, 2, 3, \dots, 10\}$$

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

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



Proper subset :-

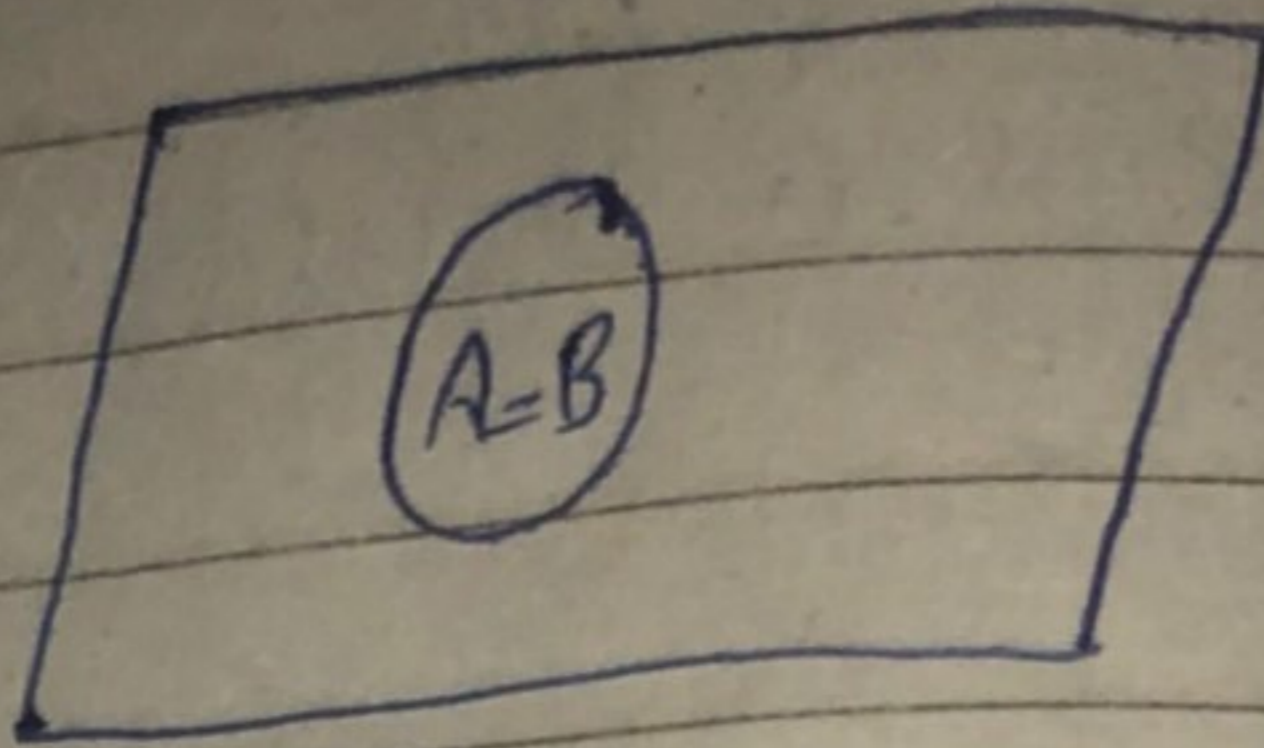


$$U = \{1, 2, 3, 4, 5, \dots, 10\}$$

$$A = \{1, 2, 3, 4, 5\}$$

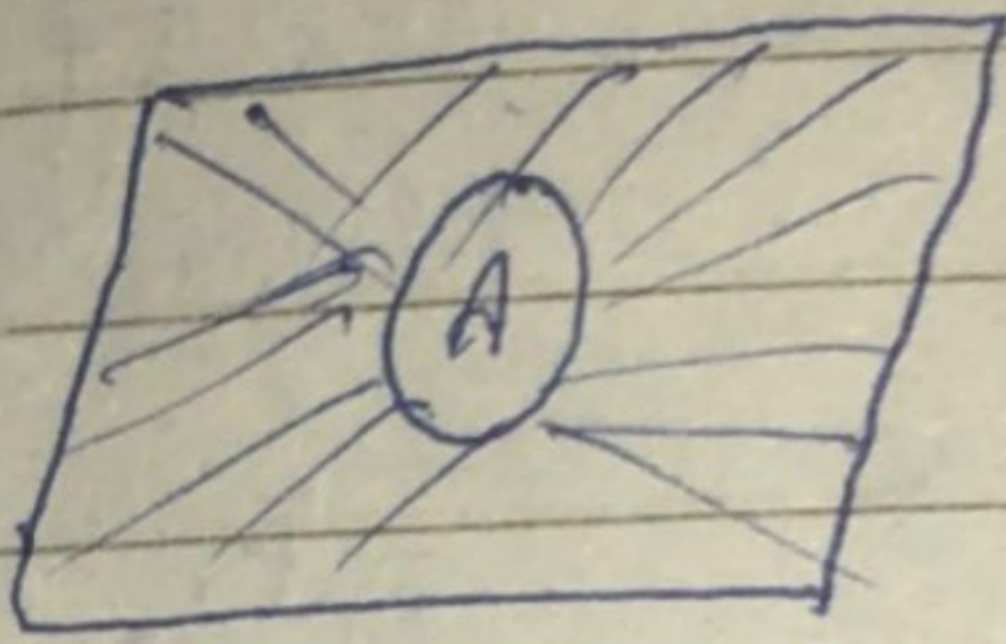
$$B = \{1, 2\}$$

Equal set



Compliment of a set:-

$$A' = U - A$$

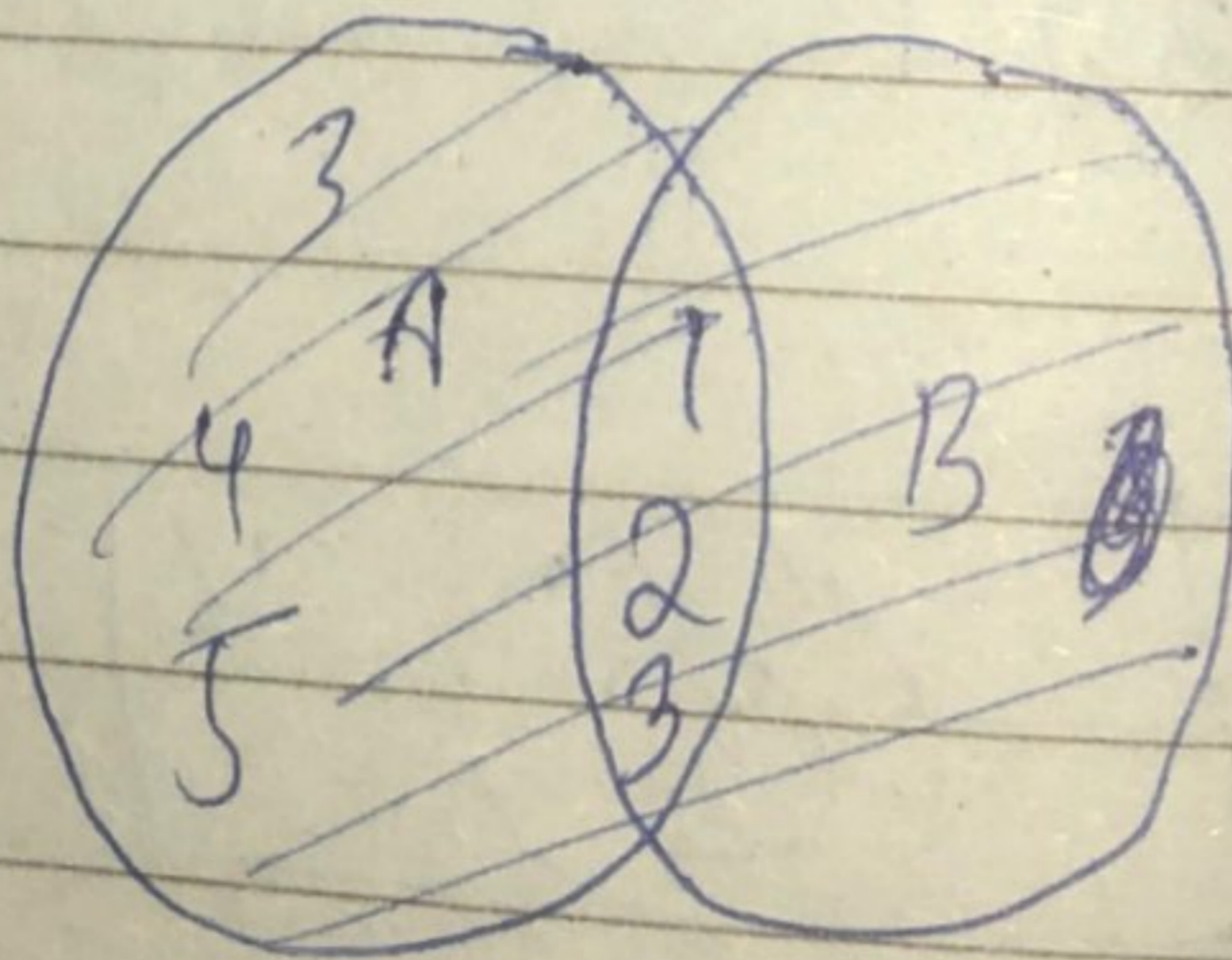
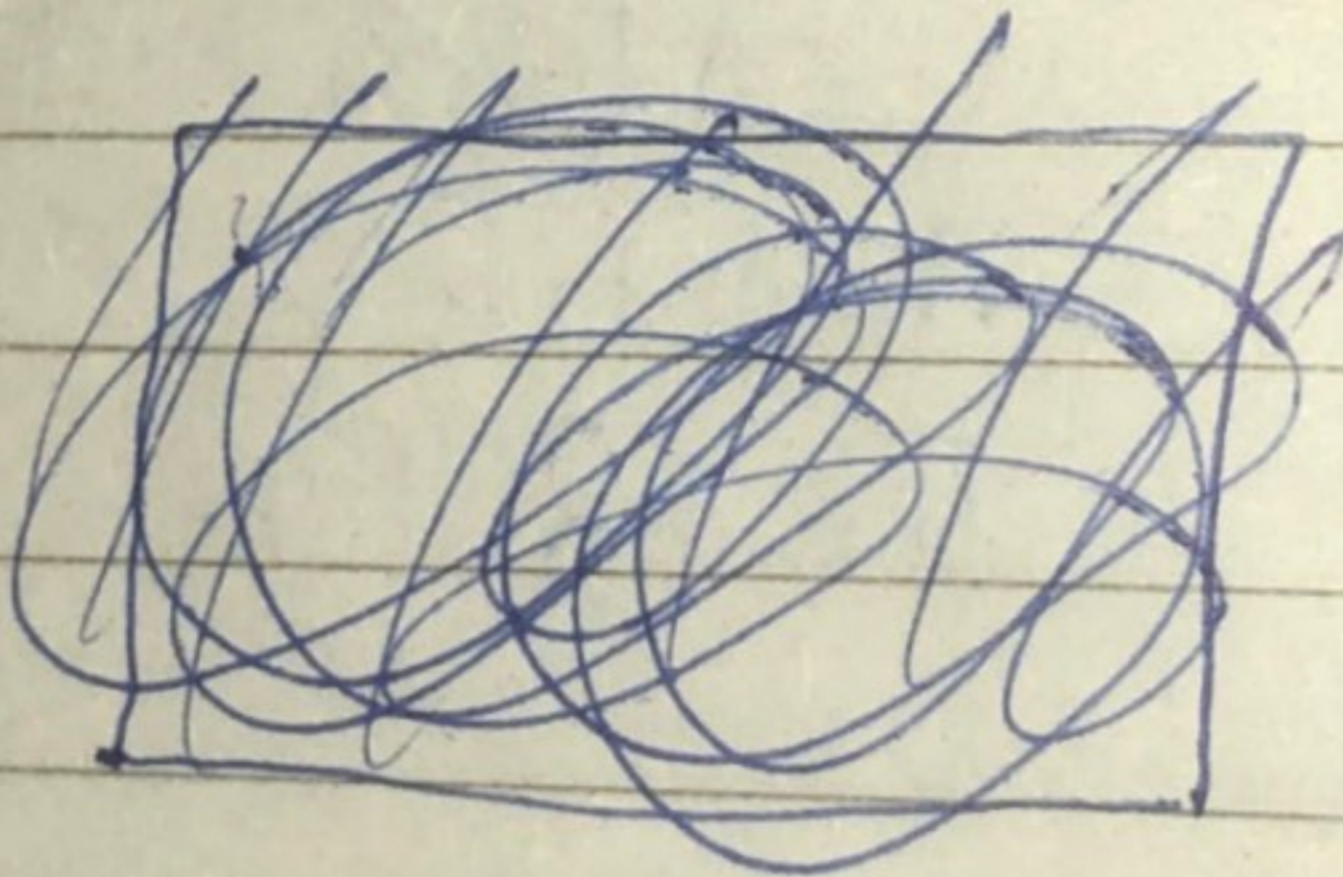


Union of set:-

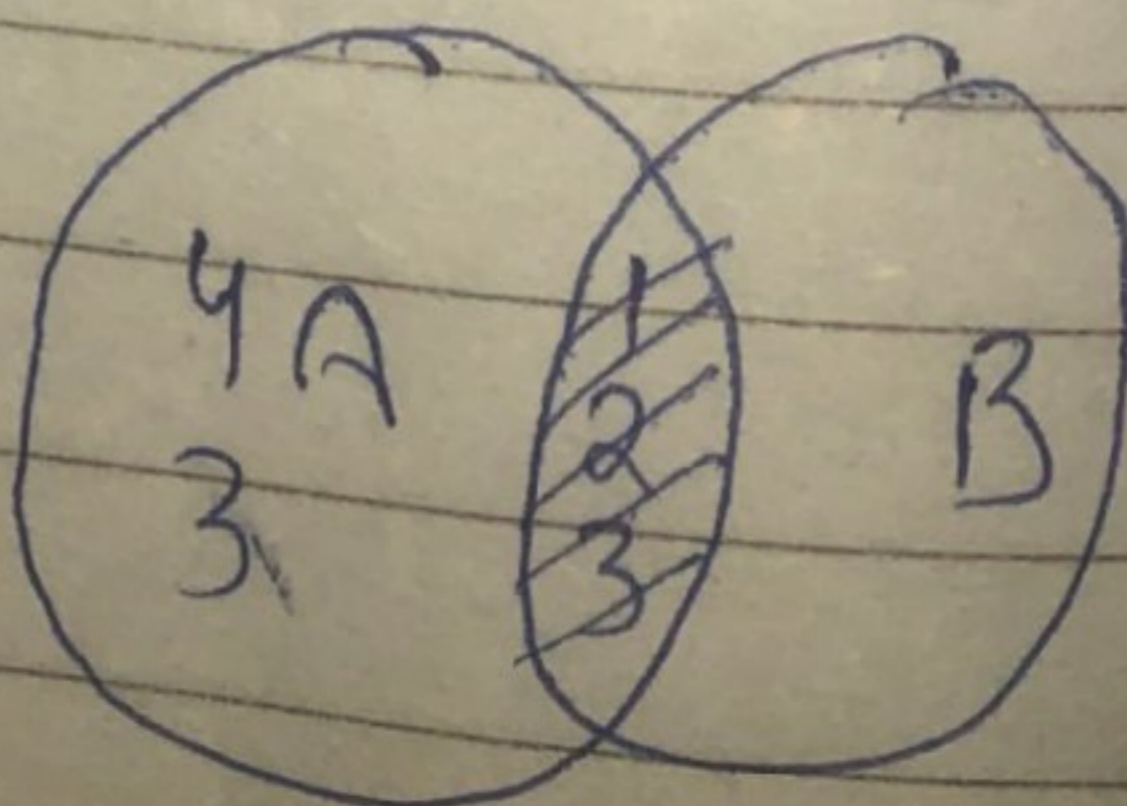
$$A = \{1, 2, 3, 4, 5\}$$

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

$$A \cup B = \{1, 2, 3, 4, 5\}$$

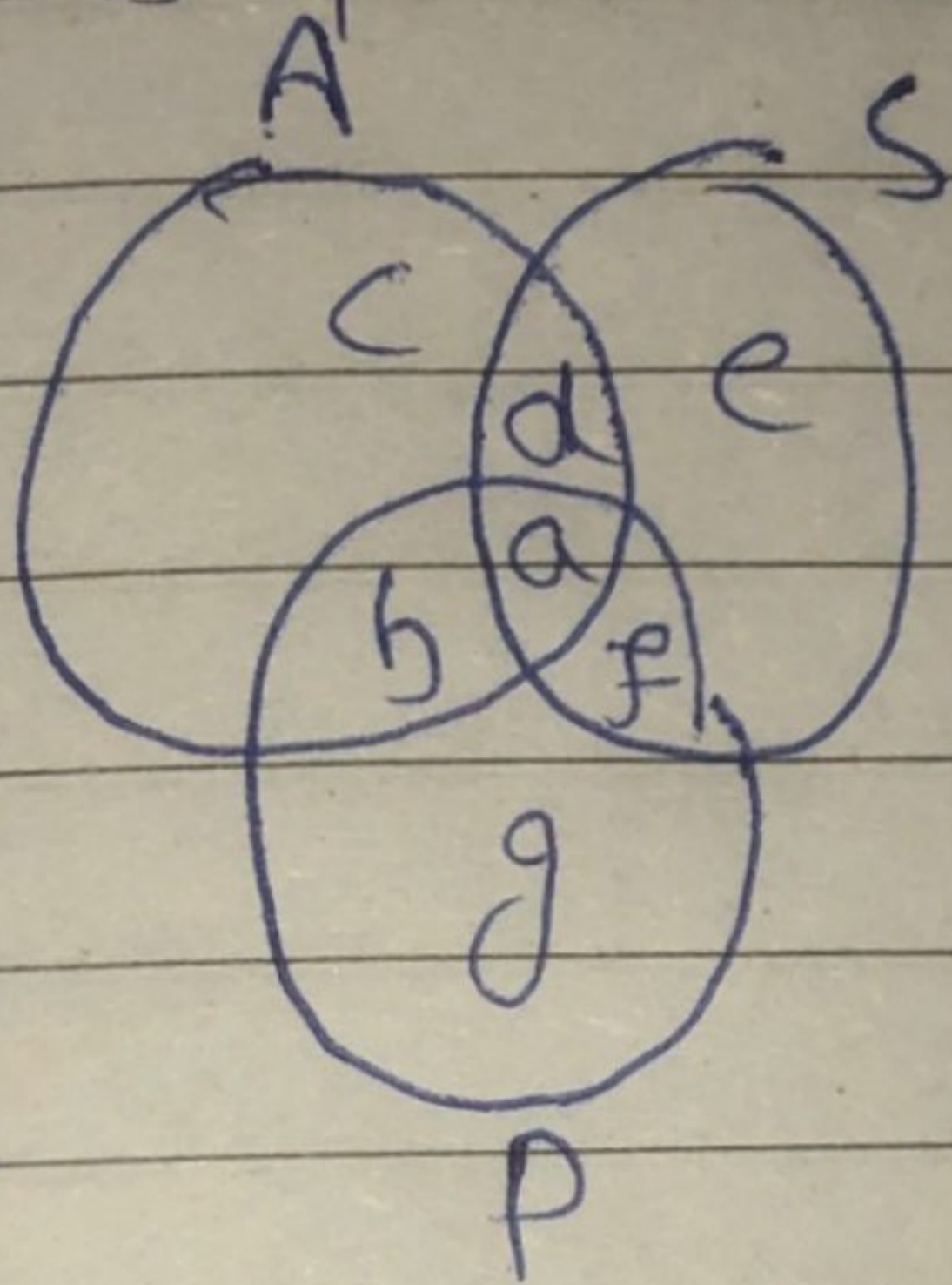


$$A \cap B = \{1, 2, 3\}$$



(CSS 2019)

Q) In the following diagram A represent American S represent scientists and P represent's politicians



(i) American those are politician but not scientist will be.

b

(ii) Scientist which are politician but not ~~not~~ American will be

f

H.w (

$U = \{ \text{whole number from 10 to 24} \}$

$A = \{ \text{Even number} \}$

$B = \{ \text{number divisible by 5} \}$

$A \cap B = ?$