

Exercise 1.3

$$Q3. \quad A = \{x \mid x \in \mathbb{Z} \wedge 8 \leq x \leq 25\}$$

$$B = \{y \mid y \in \mathbb{Z} \wedge -2 < y < 6\}$$

$$C = \{z \mid z \in \mathbb{Z} \wedge z \leq 8\}$$

Verify following laws through Venn Diagram.

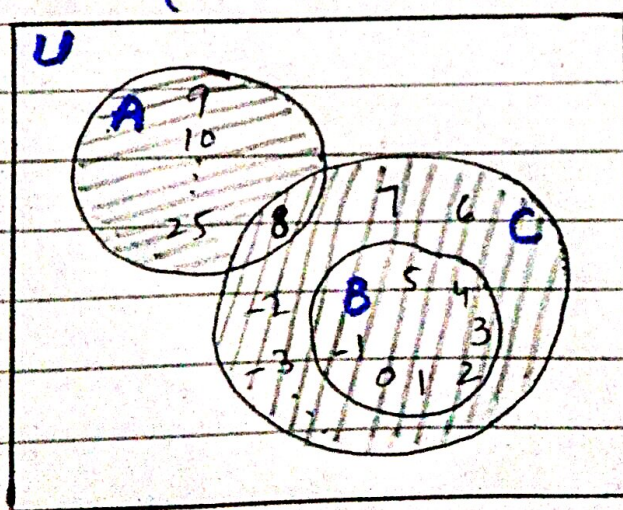
(i) Associative Law of union of sets.

$$A \cup (B \cup C) = (A \cup B) \cup C$$

$$A = \{8, 9, 10, 11, \dots, 25\}$$

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

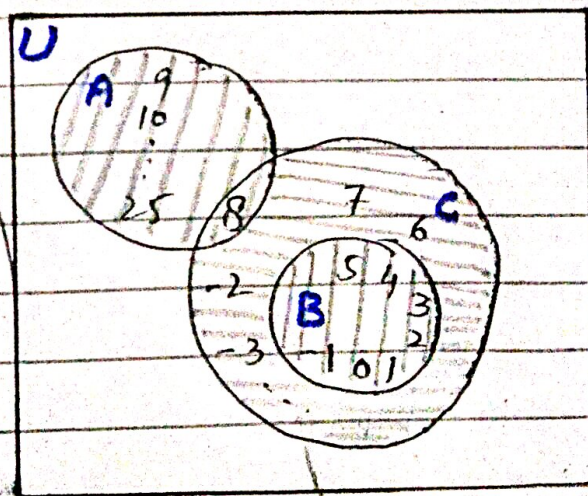
$$C = \{8, 7, 6, \dots\}$$



$A \cup (B \cup C)$

A

$B \cup C$

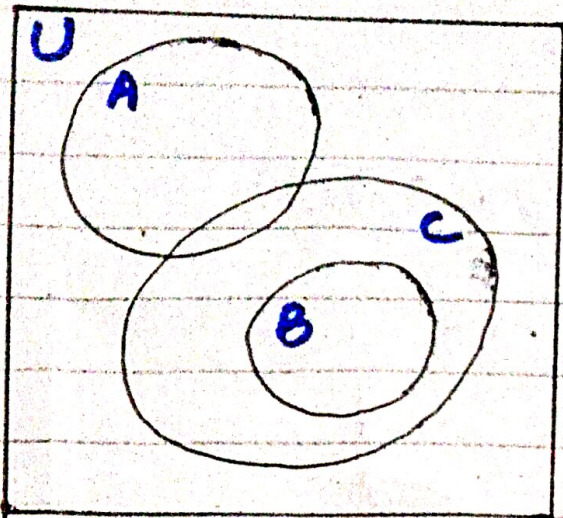


$(A \cup B) \cup C$

$A \cup B$

C

(ii) $A \cap (B \cap C) = (A \cap B) \cap C$

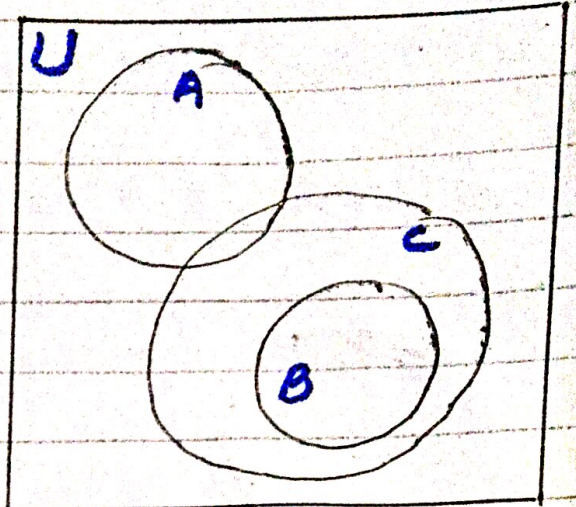


$A \cap (B \cap C)$

$B \cap C = B$

$A \cap (B \cap C) = \emptyset$

No element is common, No part has been shaded.

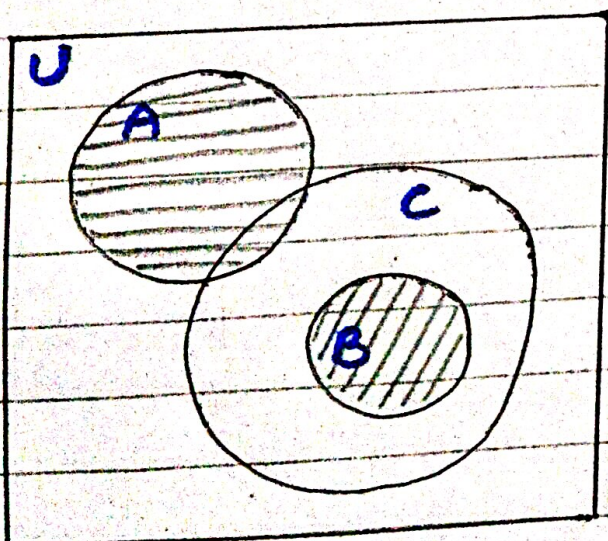




$(A \cap B) \cap C$

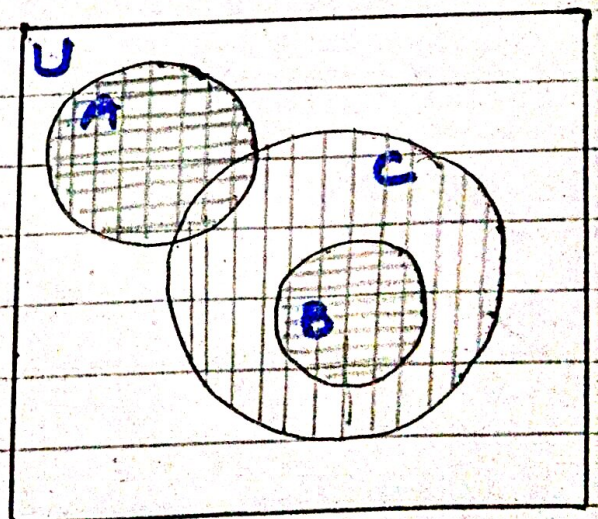
$A \cap B = \emptyset$


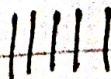
$\emptyset \cap C = \emptyset$


(iii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
 Distributive Law of union over intersection.



$B \cap C$ 
 A 

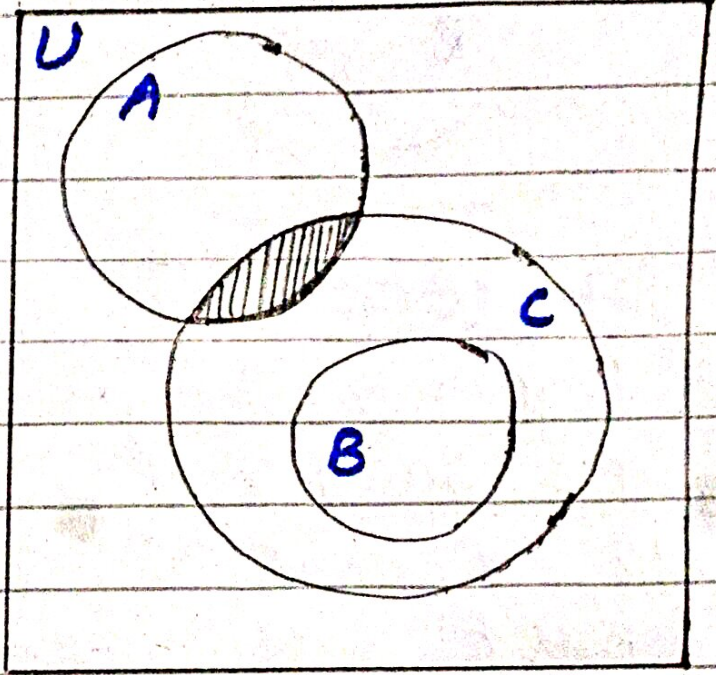
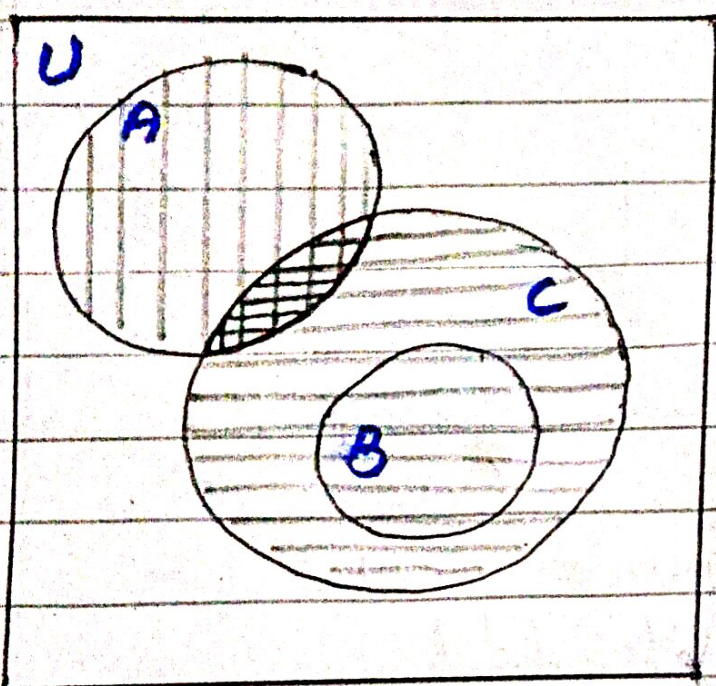


$A \cup B$ 
 $A \cup C$ 

$(A \cup B) \cap (A \cup C)$ 

(iv) Distributive Law of intersection over union.

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$



$$B \cup C = C \quad \equiv$$

$$A \cap (B \cup C) \quad \equiv$$

$$A \quad \equiv$$

$$A \cap B = \emptyset$$

$$\emptyset \cup (A \cap C) = A \cap C$$

$$A \cap C \quad \equiv$$