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Changing your Tomorrow

SETS

PERIOD -5

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 6
CHAPTER NAME :SETS

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Learning outcome

Students will use a **Venn diagram** to compare and contrast information and recognize relationships between concepts.

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Previous knowledge:

$A = (5, 6, 7, 8, 9)$

$B = (4, 5, 6, 7)$

$C = (1, 2, 3, 4, 5)$

(i) $A \cup B = (4, 5, 6, 7, 8, 9)$

$(A \cup B) \cup C = (1, 2, 3, 4, 5, 6, 7, 8, 9)$

(ii) $B \cup C$ $(1, 2, 3, 4, 5, 6, 7)$

$A \cup (B \cup C) = (1, 2, 3, 4, 5, 6, 7, 8, 9)$

(iii) $A \cap B = (5, 6, 7)$

$(A \cap B) \cap C = (5)$

(iv) $B \cap C = (4, 5)$

$A \cap (B \cap C) = (5)$

(v) $(A \cup B) \cup C = (1, 2, 3, 4, 5, 6, 7, 8, 9)$

$A \cup (B \cup C) = (1, 2, 3, 4, 5, 6, 7, 8, 9)$

Yes, these are equal.

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

$\{5\} = \{5\}$

Yes, these are equal.

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Exercise 6E

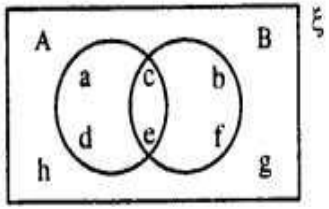
1)

From the given diagram find :

(*i*) $A \cup B$ (*ii*) $A' \cap B$

(*iii*) $A - B$ (*iv*) $B - A$

(*v*) $(A \cup B)'$



Sol:

(i) $A \cup B = \{a,c,d,e\} \cup \{b,c,e,f\}$

$\Rightarrow$ $A \cup B = \{a,b,c,d,e,f\}$

(ii) $A' = \{b,f,g,h\}$

$A' \cap B = \{b,f,g,h\} \cap \{b,c,e,f\}$

$\Rightarrow$ $A' \cap B = \{b,f\}$

(iii) $A - B = \{a,c,d,e\} - \{b,c,e,f\}$

$\Rightarrow$ $A - B = \{a,d\}$

(iv) $B - A = \{b,c,e,f\} - \{a,c,d,e\}$

$= \{b,f\}$

(v) $A \cup B = \{a,b,c,d,e,f\}$

$\therefore$ $(A \cup B)' = \{h,g\}$

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Exercise 6E

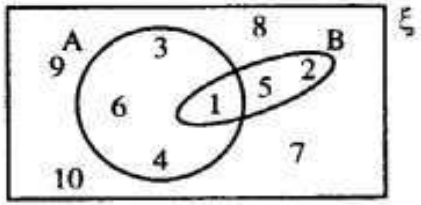
2) From the given diagram, find :

(i) A’

(ii) B’

(*iii*) $A' \cup B'$

(*iv*) $(A \cap B)'$



Is $A' \cup B' = (A \cap B)'$?

Also, verify if $A' \cap B' = (A \cup B)'$.

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2) Sol:

$$(i) \quad A = \{1,3,4,6\}$$

$$\therefore \quad A' = \{2,5,7,8,9,10\}$$

$$(ii) \quad B = \{1,2,5\}$$

$$\therefore \quad B' = \{3,4,6,7,8,9,10\}$$

$$(iii) \quad A' \cup B' = \{2,5,7,8,9,10\} \cup \{3,4,6,7,8,9,10\}$$

$$= \{2,3,4,5,6,7,8,9,10\}$$

$$(iv) \quad A \cap B = \{1,3,4,6\} \cap \{1,2,5\}$$

$$= \{1\}$$

$$\therefore \quad (A \cap B)' = \{2,3,4,5,6,7,8,9,10\}$$

From Part (*iii*) and Part (*iv*) we conclude

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

Now $A \cap B = \{2,5,7,8,9,10\} \cap \{3,4,6,7,8,9,10\}$

$$\Rightarrow \quad A' \cap B' = \{7,8,9,10\} \qquad \ldots I$$

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

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

$$\therefore \quad (A \cup B') = \{7,8,9,10\} \qquad \ldots II$$

From I and II we conclude

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

3)

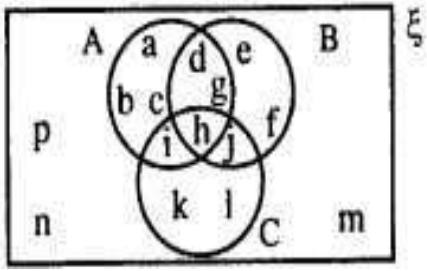
Use the given diagram to find :

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

(*ii*) $B - (A - C)$

(*iii*) $A - B$. (*iv*) $A \cap B'$

Is $A \cap B' = A - B$?



3) Sol:

$$(i)\ B \cap C = \{d,e,f,g,h,j\} \cap \{h,i,j,k,l\}$$
$$= \{h,j\}$$

$$\therefore A \cup (B \cap C) = \{a,b,c,d,g,h,i\} \cup \{h,j\}$$
$$= \{a,b,c,d,g,h,i,j\}$$

$$(ii)\quad A - C = \{a,b,c,d,g,h,i\} - \{h,i,j,k,l\}$$
$$= \{a,b,c,d,g\}$$

$$\therefore\quad B-(A - C) = \{d,e,f,g,h,j\} - \{a,b,c,d,g\}$$
$$= \{e,f,h,j\}$$

$$(iii)\quad A - B = \{a,b,c,d,g,h,i\}$$
$$- \{d,e,f,g,h,i\}$$

$$\Rightarrow\quad A - B = \{a,b,c,i\}$$

$$(iv)\quad B' = \{a,b,c,i,k,l,m,n,p\}$$

$$A \cap B' = \{a,b,c,d,g,h,i\}$$
$$\cap \{a,b,c,i,k,l,m,n,p\}$$

$$\Rightarrow\quad A \cap B' = \{a,b,c,i\} \qquad \ldots II$$

From I and II we can conclude $A \cap B' = A - B$

Home assignment

Exercise 6(E) -1 to 6

THANKING YOU

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