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# कक्षा - 11

## गणित

### अध्याय – 1

### समुच्चय

भाग – 15

विविध प्रश्नावली (5 से 6)

हर्ष गोयल

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# विविध प्रश्नावली

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5. दिखाइए कि यदि $A \subset B$, तो $C - B \subset C - A$.

$x \in C - B$

$x \in C - A$

$C - B \subset C - A$

दिया है : $A \subset B$ — (1)

सिद्ध करना है : $C - B \subset C - A$

उपपत्ति,

माना $x \in C - B$

$\Rightarrow$ $x \in C$ परंतु $x \notin B$

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→ $x \in C$ परंतु $x \notin B$

→ अतः ① से $A \subset B$

→ $x \in C$ परंतु $x \notin A$

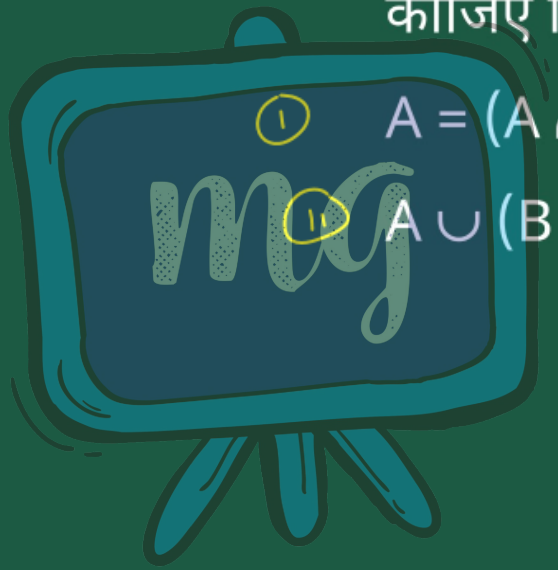
→ $x \in C - A$

अतः $C - B \subset C - A$

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6. किन्हीं दो समुच्चयों A तथा B के लिए सिद्ध कीजिए कि,



(i) $A = (A \cap B) \cup (A - B)$ और

(ii) $A \cup (B - A) = (A \cup B)$

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① $A = (A \cap B) \cup (A - B)$

② $A \subset (A \cap B) \cup (A - B)$

$x \in A$

$x \in$



③ $(A \cap B) \cup (A - B) \subset A$

④ $A \subset (A \cap B) \cup (A - B)$

माना $x \in A$

$\Rightarrow$ $x \in B$ या $x \notin B$

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माना $x \in A$ और $x \in B$

$\Rightarrow x \in A \cap B$

या

माना $x \in A$ और $x \notin B$

$\Rightarrow x \in A - B$




$x \in (A \cap B) \cup (A - B)$

$A \subset (A \cap B) \cup (A - B)$ — (1)

सिद्ध करना है

$(A \cap B) \cup (A - B) \subset A$

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माना $x \in (A \cap B) \cup (A - B)$

$\Rightarrow$ $x \in (A \cap B)$ या $x \in A - B$

$\Rightarrow$ $x \in A$ और $x \in B$

या

$\Rightarrow$ $x \in A$ परंतु $x \notin B$




$\Rightarrow$ $x \in A$

$(A \cap B) \cup (A - B) \subset A$ ——— (1)

साथ ही (1) व (2) से

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

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(11) $A \cup (B - A) = A \cup B$

सिद्ध करना है

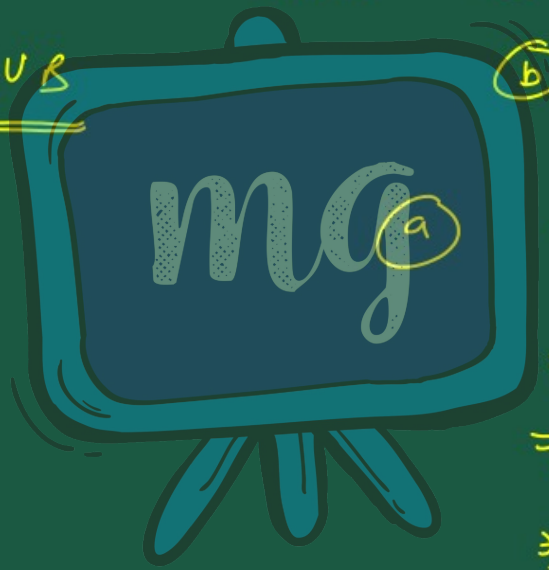
(a) $A \cup (B - A) \subset A \cup B$

(b) $A \cup B \subset A \cup (B - A)$

$x \in A$

$x \in B$

$x \in A \cup B$




माना $x \in A \cup (B - A)$

$\Rightarrow x \in A$ या $x \in B - A$

$\Rightarrow x \in A$ या $x \in B$ परंतु $x \notin A$

$\Rightarrow x \in A \cup B$ या $x \in A \cup B$

$\Rightarrow x \in (A \cup B)$

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$A \cup (B-A) \subset A \cup B$ ... (1)

$x \in A \cup B$

$\Rightarrow x \in A$ या $x \in B$

$\Rightarrow x \in A$ या $x \in B, x \notin A$

(b) फिर करना है: $A \cup B \subset A \cup (B-A)$

माना $x \in A \cup B$

$\Rightarrow x \in A$ या $x \in B$

$\Rightarrow x \in A$ या $x \in B$ परंतु $x \notin A$

$\Rightarrow x \in A$ या $x \in B-A$

$\Rightarrow x \in A \cup (B-A)$

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अतः $(A \cup B) \subset A \cup (B - A)$ ... (2)

सभी (1) व (2) से

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



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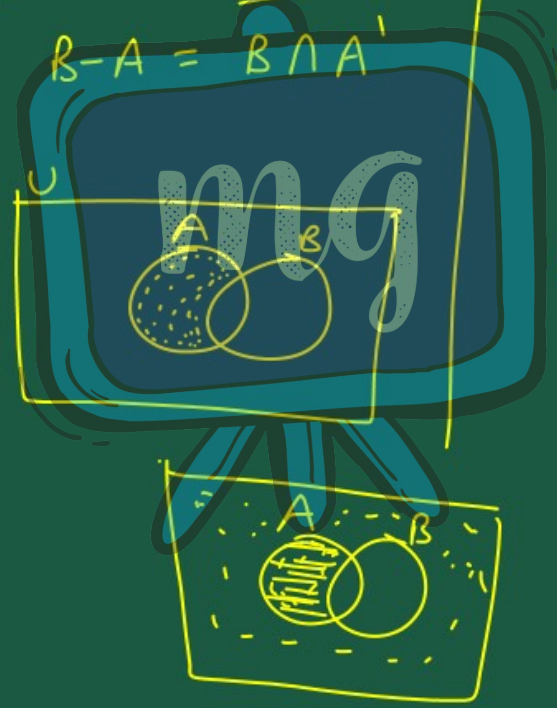
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# दूसरा तरीका

$A - B = A \cap B'$

$B - A = B \cap A'$

$A - B$ =




(I) $A = (A \cap B) \cup (A - B)$

(II) $A \cup B = A \cup (B - A)$

(I) R.H.S

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

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

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

$A \cap U$

$= A =$ LHS

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(11) $A \cup B = A \cup (B - A)$

$B - A$

$= B \cap A'$

RHS.

$A \cup (B - A)$

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

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

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

$= A \cup B$

$= LHS$

$LHS = RHS$

