A Book of Abstract Algebra | (2nd Edition)

Chapter AA, Problem 4E

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Problem

Prove the following:

$A \cap B \subseteq A$ and $A \cap B \subseteq B$.

Step-by-step solution

Step 1 of 2

Objective:-

The objective is to prove $A \cap B \subseteq A \text{ and } A \cap B \subseteq B.$

Comment

Step 2 of 2

Proof:-

Let A and B are two sets. Let $x \in A \subseteq B$.

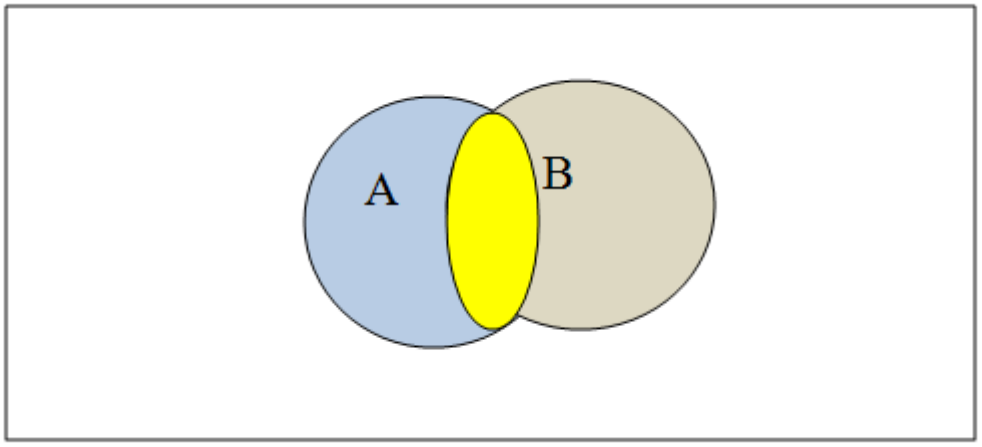
Subsets:-If sets A and B are such that every elements of A are also elements of B, then A is said to be subset of B.

$$A \subseteq B \Leftrightarrow \{x \in A \Rightarrow x \in B\}$$

The intersection of two sets A and B is:-

$$A \cap B = \{x : x \in A \text{ and } x \in B\}$$

The graphically the intersection two sets A and B is:-



The yellow color in the above figure shows the intersection of two sets. The intersection two sets is common in both sets. Every element of intersection two sets are also elements of set *A* and set *B*. Thus, $A \cap B$ is subset of set *A* and set *B*.

Hence,

$A \cap B \subseteq A$ *and* $A \cap B \subseteq B$.

Proved

Comment