A Book of Abstract Algebra | (2nd Edition)

Chapter AA, Problem 3E

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Problem

Prove the following:

$A \subseteq A \cup B$ and $B \subseteq A \cup B$.

Step-by-step solution

Step 1 of 2

Objective:-

The objective is to prove $A \subseteq A \cup B \ \ and \ \ B \subseteq A \cup B.$

Comment

Step 2 of 2

Proof:-

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

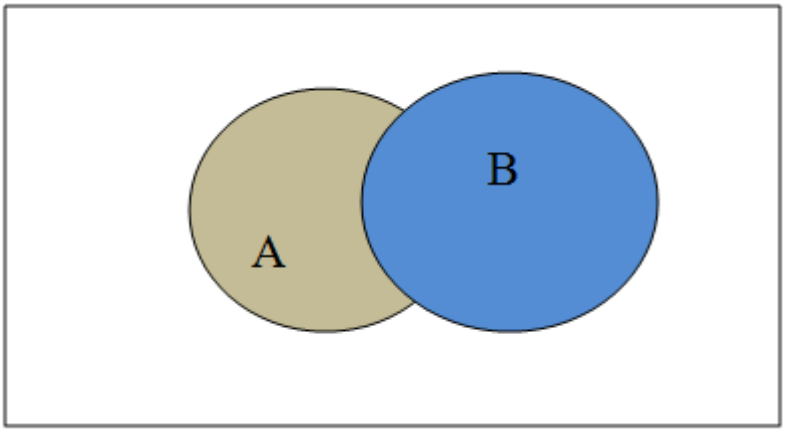
Subsets:-If sets A and B are such that every elements of A are also elements of B, then A is said to be subset of B.

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

The union of two sets A and B is:-

$$A \cup B = \{x : x \in A \ \ or \ \ x \in B\}$$

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



The colored figure is shown the union of two sets. The union two sets contain the both sets. Every elements of both set also elements of union of two sets. Thus, A and B are subsets of union of A and B.

Hence,

$$A \subseteq A \cup B \text{ and } B \subseteq A \cup B.$$

Proved

Comment