

Notation

Roster Form

$$A = \{a, e, i, o, u\}$$

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

Set Builder Form

$$A = \{x: x \text{ is a vowel of the English alphabet}\}$$

$$B = \{x: x \in \mathbb{N}, x \leq 6\}$$

Subset

$$A \subseteq B, \text{ if } x \in A \Rightarrow x \in B \forall x \in A$$

Properties

$$A \subseteq A$$

$$\phi \subseteq A$$

$$A \subseteq B \Rightarrow B^c \subseteq A^c$$

$$A \subseteq B, B \subseteq A \Leftrightarrow A = B$$

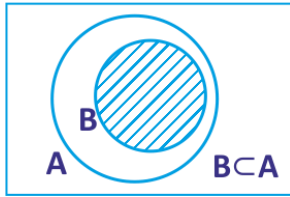
$$A \subseteq B, B \subseteq C \Rightarrow A \subseteq C$$

$$A \subseteq A \cup B$$

$$A \subseteq B, A \subseteq C \Rightarrow A \cup B \subseteq C$$

$$A \cap B \subseteq A$$

$$C \subseteq A, C \subseteq B \Rightarrow C \subseteq A \cap B$$



Complement

$$A^c = \{x: x \notin A \text{ and } x \in U\}$$

Properties

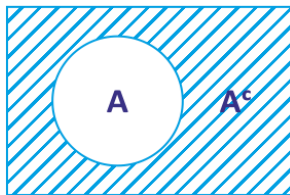
$$(A^c)^c = A$$

$$U^c = \phi$$

$$\phi^c = U$$

$$(A \cup B)^c = A^c \cap B^c$$

$$(A \cap B)^c = A^c \cup B^c$$



Union

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

Properties

$$A \cup A = A$$

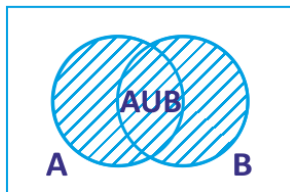
$$A \cup \phi = A$$

$$A \cup A^c = U$$

$$A \cup U = U$$

$$A \cup B = B \cup A$$

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



Intersection

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

Properties

$$A \cap A = A$$

$$A \cap \phi = \phi$$

$$A \cap A^c = \phi$$

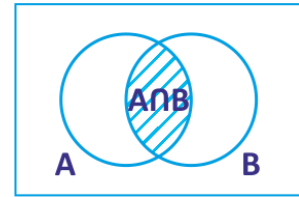
$$A \cap U = A$$

$$A \cap B = B \cap A$$

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

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

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



Difference

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

Properties

$$A - A = \phi$$

$$\phi - A = \phi$$

$$A - \phi = A$$

$$A - B = A \cap B^c$$

$$U - A = A^c$$

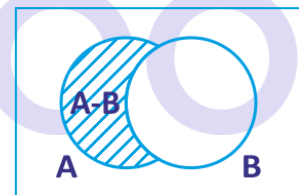
$$A - U = \phi$$

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

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

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

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



Cartesian Product

$$A \times B = \{(x, y): x \in A \text{ and } y \in B\}$$