Topic 1: SETS AND SUBSETS

1.1 Which of these sets are equal: $\{x, y, z\}$, $\{z, y, z, x\}$, $\{y, x, y, z\}$, $\{y, z, x, y\}$?

order and repetition doesn't matter!

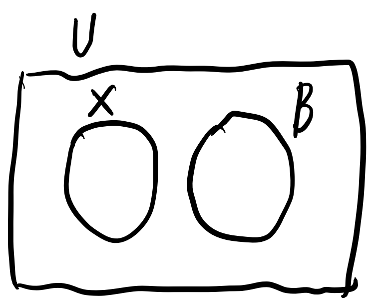
Therefore, all 4 sets are equal.

1.28 Let $A = \{1, 2, \ldots, 8, 9\}$, $B = \{2, 4, 6, 8\}$, $C = \{1, 3, 5, 7, 9\}$, $D = \{3, 4, 5\}$, $E = \{3, 5\}$. Which of the these sets can equal a set X under each of the following conditions?

(a) X and B are disjoint. (c) $X \subseteq A$ but $X \not\subseteq C$.

(b) $X \subseteq D$ but $X \not\subseteq B$. (d) $X \subseteq C$ but $X \not\subseteq A$.

(a) $X \cap B = \emptyset$



C ✓ E ✓

(c) $X \not\subseteq C \Rightarrow$ X isn't a subset of C

$\Rightarrow X \cap C \neq X$ A ✓ B ✓

can be $C \subseteq X$ D ✓

or $X \cap C = \emptyset$ or $X \cap C \neq \emptyset$

etc.

Topic 2: SET OPERATIONS

1.6 Show that we can have: (*a*) $A \cap B = A \cap C$ without $B = C$; (*b*) $A \cup B = A \cup C$ without $B = C$.

Illustrate ...

$A = \{1, 2\}$ $A \cap B = \{1, 2\}$

$B = \{1, 2, 3\}$ $A \cap C = \{1, 2\}$

$C = \{1, 2, 4\}$ $B \neq C$

Example: Prove $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
namely Distributive Law (4b).

Topic 3: VENN DIAGRAMS

1.13 Determine the validity of the following argument:

S_1: All my friends are musicians.

S_2: John is my friend.

S_3: None of my neighbors are musicians.

S : John is not my neighbor.

1.35 Use the Venn diagram in Fig. 1-5(b) to write each set as the (disjoint) union of fundamental products:

(a) $A \cap (B \cup C)$; (b) $A^{C} \cap (B \cup C)$; (c) $A \cup (B \backslash C)$.

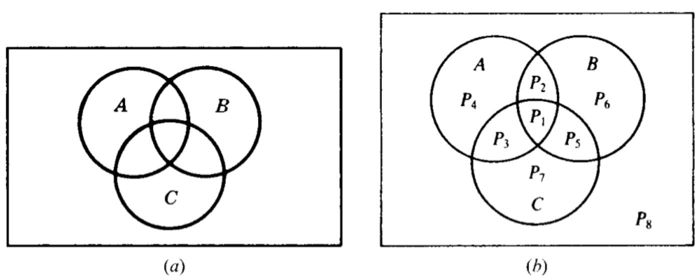


Fig. 1-5