

**MATH 2610**  
**Discrete Mathematics for Computer Science**  
**Tuesday January, 25 2005**

- (1) Let  $A = \{0, 2, 4, 6, 8, 10\}$ ,  $B = \{0, 1, 2, 3, 4, 5, 6\}$ , and  $C = \{4, 5, 6, 7, 8, 9, 10\}$ . Find
- (a)  $A \cap B \cap C$
  - (b)  $A \cup B \cup C$
  - (c)  $(A \cup B) \cap C$
  - (d)  $(A \cap B) \cup C$
  - (e)  $(A \cap B) - C$
- (2) Let  $A$  and  $B$  be sets. Show that  $A \cap (A \cup B) = A$
- (a) by showing each side is a subset of the other side.
  - (b) using the set identities in table 1 on page 89.
- (3) Let  $A$  be a set. Show that  $\overline{\overline{A}} = A$ .
- (4) Show that if  $A$  and  $B$  are sets, then  $A - B = A \cap \overline{B}$ .
- (5) Draw the Venn diagrams for each of these combinations of the sets  $A$ ,  $B$ , and  $C$ .
- (a)  $A \cap (B \cup C)$
  - (b)  $\overline{A} \cap \overline{B} \cap \overline{C}$
  - (c)  $(A - B) \cup (A - C) \cup (B - C)$
- (6) Can you conclude that  $A = B$  if  $A$ ,  $B$ , and  $C$  are sets such that
- (a)  $A \cup C = B \cup C$ ?
  - (b)  $A \cap C = B \cap C$ ?