

(1) [6] Suppose

$$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}, \quad A = \{0, 1, 5, 7\}, \quad B = \{0, 2, 3, 5, 8\}, \quad C = \{5, 6, 8, 9\}$$

(i) Determine  $\overline{A \cap B}$

(ii) Determine  $(C \cap A) \cap (\overline{A})$

(iii) Determine  $A \cup (B \cap A)$

(2) [4] The user names for a computer network consist of four uppercase letters selected from  $\{A, B, C, \dots, Z\}$  followed by four digits selected from  $\{0, 1, 2, \dots, 9\}$ . How many user names have no repeated letters or digits?

**(3) [5]** 250 fitness club members are surveyed to determine the type of equipment they use regularly. 170 replied that they use an exercise bike regularly, 119 said they use a stair stepper machine regularly, and 67 said they use both regularly. How many of those surveyed use neither of the machines regularly?