MATH 131 - Dr. Miller - Supplement to HW #15 - Fall 2024

1. For this entire problem, let $U = \{6, 7, 8, 9, 10, 11, 12\}$ be the universal set. Let $A = \{7, 9, 10, 11\}$, $B = \{6, 9, 11\}$, $C = \{8, 10\}$, and $D = \{9, 11, 12\}$. Find the following sets, *using correct notation* (that includes curly braces).

Work on your own paper - there's no room below.

   (a) $\overline{A}$ or A^c
   (b) $\overline{B}$ or B^c
   (c) $A \cup B$
   (d) $A \cap B$
   (e) $B \cup C$
   (f) $B \cap C$
   (g) $\overline{B} \cap \overline{C}$
   (h) $\overline{(B \cup C)}$
   (i) $(A \cup C) \cap D$ (Remember to evaluate what's inside parentheses first.)
   (j) $A \cup (C \cap D)$
   (k) $\overline{A} \cup (B \cap D)$
   (l) $A - B$
   (m) $B - A$
   (n) $C - D$
   (o) $B \times C$
   (p) $C \times B$
   (q) $A \times C$
   (r) $\mathcal{P}(C)$
   (s) $\mathcal{P}(D)$
   (t) four subsets of A that all have different cardinalities
   (u) three subsets of B that all have the same cardinality

2. If possible, make up sets satisfying each separate set of conditions below, and show set operation work to confirm that your creations succeed. If any are NOT possible, explain why not.

   (a) Sets G and H with $5 \in G$ and $G \cap H = \{2\}$
   (b) Sets L and M that are NOT disjoint and where $(4, \triangle) \in L \times M$, $(4, \heartsuit) \in L \times M$, and $n(L \times M) = 4$
   (c) Sets S and T where $n(S) = 3$, $n(T) = 4$, and $n(S \cup T) = 5$
   (d) Sets U and V where $n(U) = 2$, $n(V) = 5$, and $n(U \setminus V) = 1$