Directions: You may work to solve these problems in groups, but all written work must be your own. See "Guidelines and advice" on the course webpage for more information.

1. Let $A = \{1, 2, 3\}$, $B = \{\{1, 2\}, 2, 3\}$, $C = \{\{1, 2, 3\}\}$, and $D = \{\emptyset\}$.

   (a) Determine the sizes of each of the sets A, B, C, and D.

   (b) Determine $A \cap B$, $C \bigtriangleup D$, and $B - A$.

   (c) True or False: $A \subseteq C$

   (d) True or False: $A \in \mathcal{P}(C)$.

   (e) True or False: $C \in \mathcal{P}(A)$.

   (f) True or False: $C \subseteq \mathcal{P}(A)$.

   (g) True or False: $B \cup D = B$.

   (h) True or False: $D \in \mathcal{P}(C)$.

   (i) True or False: $D \in \mathcal{P}(\mathcal{P}(C))$.

   (j) Determine the set $\mathcal{P}(B) - \mathcal{P}(A)$.