Math 116: Written Homework Set 8

This assignment is due on Monday, February 25ᵗʰ in class. Show all work where possible! Answers magically appearing will receive no credit.

1. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{2, 4, 6\}$, $B = \{1, 2, 5, 8\}$, $C = \{1, 3, 7\}$.
   Find each of the following.
   a. $A \cup B$
   b. $A \cap B$
   c. $A \cap (B \cup C)$
   d. $A' \cup C$
   e. $A \cap C'$
   f. $(A \cup C') \cap (B \cup A')$

2. Draw a Venn diagram to show each of the following sets.
   a. $A \cap B'$
   b. $(A \cap B)'$
   c. $A \cap (B \cup C')$
   d. $A \cap (B' \cap C)$

3. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{2, 4, 6\}$, $B = \{1, 2, 5, 8\}$, $C = \{1, 3, 7\}$.
   Find each of the following.
   a. $n(A)$
   b. $n(B)$
   c. $n(C)$
   d. $n(A \cup B)$
   e. $n(A \cap B)$
   f. $n(A) + n(B)$

4. For the sets specified in problem 3, verify that

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

5. If $n(A) = 640$, $n(B) = 280$, and $n(A \cup B) = 765$, find $n(A \cap B)$.

6. Which of the following are statements?
   a. Roses have thorns.
   b. Carnations have long stems.
   c. Daffodils or tulips?
   d. Don't eat the roses.

7. Let p = 'Trout are fish' and q = 'Fish live in trees'. Symbolize each of the following:
   a. Trout are fish or fish live in trees.
   b. Trout are fish and fish do not live in trees.
   c. If trout are not fish then fish live in trees.
   d. It is not true that either trout are fish or fish live in trees.

Selected Answers

1. a. {1, 2, 4, 5, 6, 8}
   c. {2}
   e. {2, 4, 6}

2. a. Sketch a Venn diagram with region **I** shaded.
   c. Sketch a Venn diagram with regions **I**, **II**, and **V** shaded.

3. a. 3
   c. 3
   e. 1

5. 155

6. a. Is a statement.
   c. Not a statement. Is a question.

7. a. $p \lor q$
   c. $\sim p \rightarrow q$