Let U = {1, 2, 3, 4, 5, 6, 7, 8}, A = {1, 2, 3, 4}, B = {3, 4, 5, 6}, and C = {2, 3, 7, 8}. Find the following sets:

1. A^c {5, 6, 7, 8}

2. $A \cup B$ {1, 2, 3, 4, 5, 6}

3. $A \cap C$ {2, 3}

{1, 2, 3, 4, 5, 6}

4. $(A \cup B) \cap C$ {2, 3}

5. $(A \cap B) \cup C$ {2, 3, 4, 7, 8}

6. $B^c \cap (A \cup C)^c$
{1, 2, 7, 8} ∩ {5, 6} = ∅

Let U denote the set of all members of the House of Representatives. Let

R = {x ∈ U | x is a Republican}
M = {x ∈ U | x is a male}
L = {x ∈ U | x is a lawyer}

Describe each of the following sets in words.

7. $M \cup L$ Members of the HoR who are male or a lawyer

8. $R \cap M \cap L^c$ Members of the HoR who are republican males but not lawyers.

9. $(R \cup M)^c$
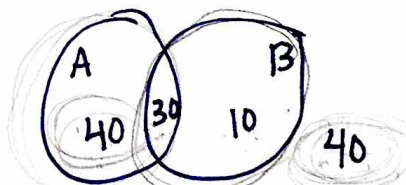Members of the HoR who are neither republican nor male.

10. $R \cap L$ Members of the HoR who are republican and a lawyer.

Let A and B be subsets of a universal set U and suppose n(U) = 120, n(A) = 70, n(B) = 40, and n(A ∩ B) = 30.

11. Draw a Venn Diagram representing these sets and fill it in with the correct numbers.

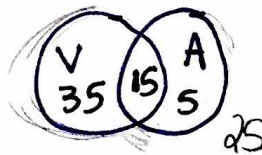12. Find $n(A \cup B)^c$. 40

13. Find $n(A \cap B^c)$. 40

There are 80 homes in a subdivision. A realtor tells you that 50 of the homes have vinyl siding, 20 of the homes have automatic sprinkler systems, and 25 of the homes have neither.

80 − 25 = 55

14. How many of the homes have both vinyl siding and an automatic sprinkler system?

55 = 50 + 20 − n(V ∩ A) (15)

15. How many of the homes have vinyl siding, but no automatic sprinkler system?
50 − 15 = (35)

To determine which restaurants are liked in Plattsburgh, a survey of 100 inhabitants is taken with the following results. Sixty-two liked Burger World, 47 liked Steak Palace, 32 liked Chicken Castle, 17 liked Chicken Castle and Burger World, 20 liked Burger World and Steak Palace, 12 liked Steak Palace and Chicken Castle, and 5 liked all three restaurants.

16. How many liked Burger World and neither of the other two restaurants?
30

17. How many did not like Chicken Castle? 68
100 − 32 →

18. How many liked none of the three restaurants? 3