

Work on these with your partner(s) at the board

For problems 1–3, you can assume A , B , and C are all subsets of some universal set U . FYI, sketching a Venn diagram often helps me build some intuition for how to approach a proof.

1. Prove $A = (A \cap C) \cup (A - C)$

2. Prove $A \subseteq B$ iff $B^c \subseteq A^c$

3. Are the following statements true or false? Prove your conclusions.

(a) If $A \cap C \subseteq B \cap C$, then $A \subseteq B$

(b) If $A \cup C \subseteq B \cup C$, then $A \subseteq B$

(c) If $A \cup C = B \cup C$, then $A = B$

(d) If $A \cap C = B \cap C$, then $A = B$

Sundstrom, Exercise 5.2.13

4. If $|A| = 2$, what is $|P(A)|$? If $|A| = 3$, what is $|P(A)|$? If $|A| = 4$, what is $|P(A)|$?

If $|A| = n$, make a conjecture for $|P(A)|$