

Worksheet §8–9

For each of the following, write the template for the proof: the first and last sentences, for instance. Then go back through and complete the proofs.

1. Prove that $\{12n : n \in \mathbb{Z}\} \subseteq \{2n : n \in \mathbb{Z}\} \cap \{3n : n \in \mathbb{Z}\}$.
2. Let A and B be sets. Prove that $A = (A \cap B) \cup (A - B)$.
3. Disprove the statement, “If $x, y \in \mathbb{R}$, then $(x + y)^2 = x^2 + y^2$.”
4. Disprove the statement, “ $\exists x \in \mathbb{Q}$ such that $x^2 = 8$.”