

Math 55 Discussion problems 2 Feb

- Find two sets A and B such that $A \in B$ and $A \subseteq B$.
- Show that $A \times B \neq B \times A$, when A and B are nonempty, unless $A = B$.
- Let $A = \{a, b, c, d, e\}$ and $B = \{a, b, c, d, e, f, g, h\}$. Find
 - $A \cup B$
 - $A \cap B$
 - $A - B$
 - $B - A$
- Prove or disprove that for all sets A , B , and C , we have
 - $A \times (B \cup C) = (A \times B) \cup (A \times C)$
 - $A \times (B \cap C) = (A \times B) \cap (A \times C)$
- Give an example of a function from \mathbb{N} to \mathbb{N} that is
 - one-to-one but not onto.
 - onto but not one-to-one.
 - both onto and one-to-one (but different from the identity function).
 - neither one-to-one nor onto.
- Suppose that g is a function from A to B and f is a function from B to C . Prove each of these statements.
 - If $f \circ g$ is onto, then f must also be onto.
 - If $f \circ g$ is one-to-one, then g must also be one-to-one.
 - If $f \circ g$ is a bijection, then g is onto if and only if f is one-to-one.