Proving Set Equality

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Learning Objective

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- Prove a set equality by proving inclusion in both directions.

Set Equality as Two-way Bounding

Definition

Given sets A and B in a universe U, we say A and B are equal ($A = B$) if (and only if) $A \subseteq B$ and $B \subseteq A$.

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- Can view as two-way bounding: A is no larger than B, and B is no larger than A

Example 1

Let $A = \{2m + 5 : m \in \mathbb{Z}\}$ and $B = \{2n - 3 : n \in \mathbb{Z}\}$. Prove $A = B$.

Example 2

Let $S = \{x \in \mathbb{Z} : x \text{ is an odd multiple of } 3\}$ and $T = [3]_6$.
Prove $S = T$.

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