Hello world!

A First Proof

Definition (*Set equality*)

Let A and B be sets, then $A = B$ if A and B contain exactly the same elements.

$$\text{sets are equal} \qquad \Leftrightarrow \qquad \text{elements are the same}$$

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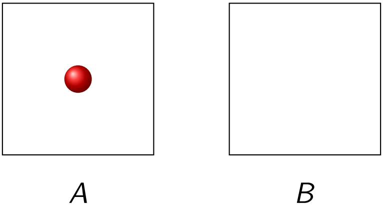

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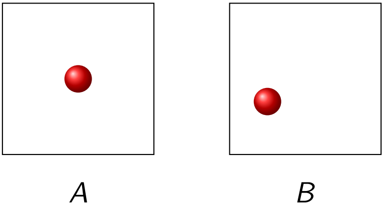

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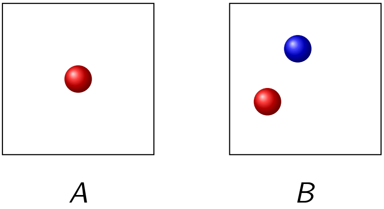

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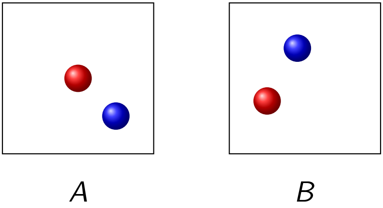

Definition (*Set equality*)

Let A and B be sets, then $A = B$ if A and B contain exactly the same elements.

Know: Given that $A = B$, we *know* that

- if $x \in A$, then $x \in B$, and
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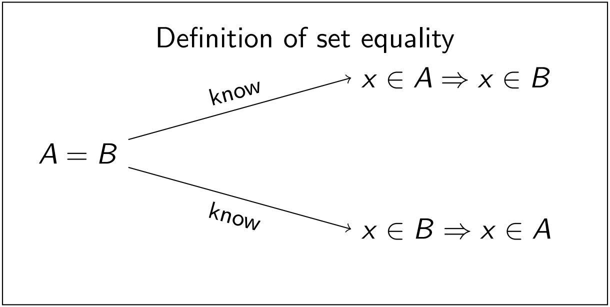

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Knowing

- if $x \in A$, then $x \in B$, and
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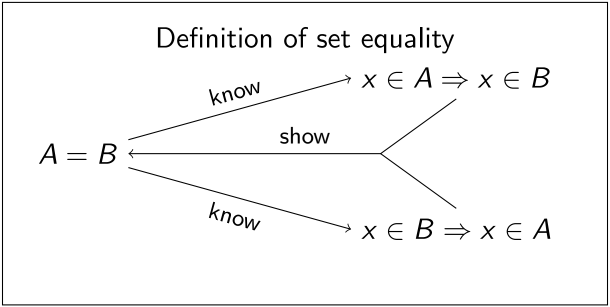
would *show* that $A = B$.

Definition

Let A and B be sets, then $A = B$ if $x \in A \Rightarrow x \in B$ and $x \in B \Rightarrow x \in A$.



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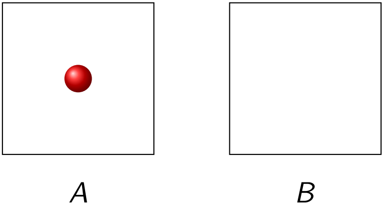

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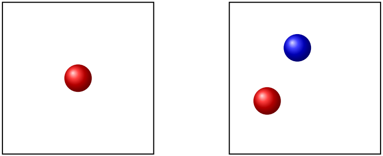

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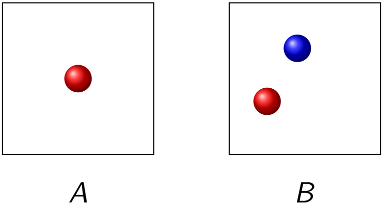

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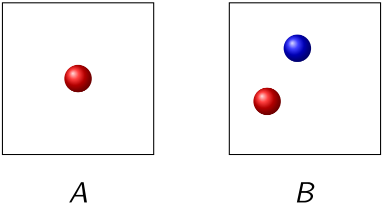

Know: Given that $A \subseteq B$, we *know* that if $x \in A$, then $x \in B$.
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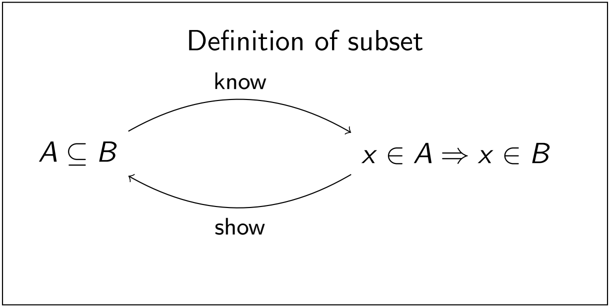

Prove the following.

Theorem

Let A and B be sets. If $A = B$, then $A \subseteq B$.

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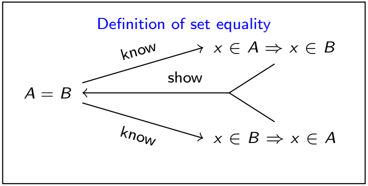

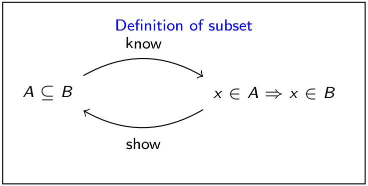

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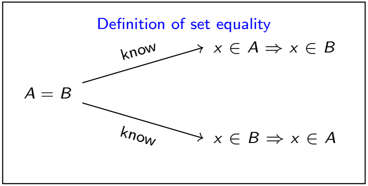

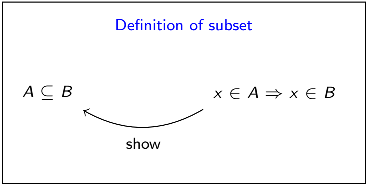

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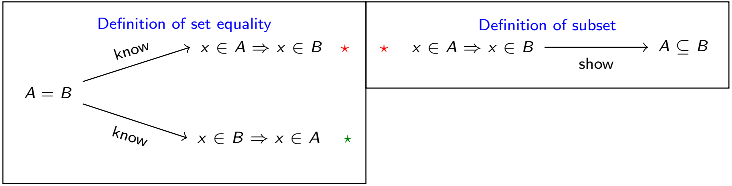

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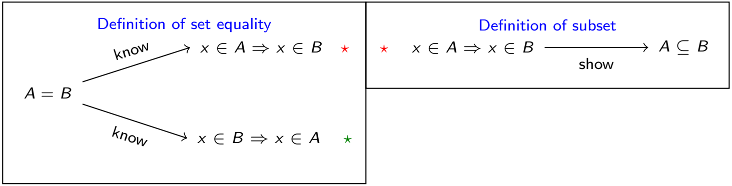

Proof.

Suppose that A and B are sets, and $A = B$. □

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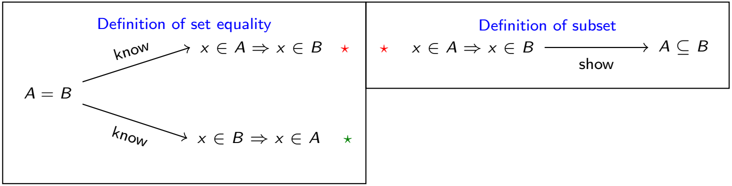

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Suppose that A and B are sets, and $A = B$. Then $x \in A \Rightarrow x \in B$ by the definition of set equality. □

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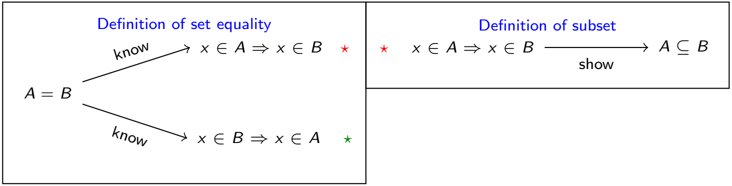


Proof.

Suppose that A and B are sets, and $A = B$. Then $x \in A \Rightarrow x \in B$ by the definition of set equality. Thus by the definition of subset, we conclude that $A \subseteq B$. □

Prove the following.

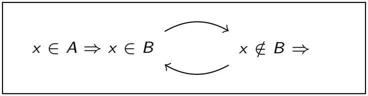
Theorem

Let A and B be sets. If $A = B$, then $A \subseteq B$ and $B \subseteq A$.

Theorem

Let A and B be sets. If $A \subseteq B$ and $B \subseteq A$, then $A = B$.

Once you've written these proofs, complete the following card:



Prove the following.

Theorem

Let A, B, and C be sets where $\overline{A} = B$ and $\overline{B} = C$. Then $A = C$.