Warm Up: Claim 5

Definitions:
$a \mid b$ iff $\exists k \in \mathbb{Z} \;\; b = ka$
$a \equiv b \pmod{m}$ iff $m \mid (a - b)$

Claim 5: For integers a, b and $m > 0$, $a \equiv b \pmod{m}$ if and only if $a \,\%\, m = b \,\%\, m$.

Sets

Definition:
A set is an unordered collection of distinct objects, called elements.

- We write $x \in A$ to say that x is an element of the set A.
- We write $x \notin A$ to say that x is not an element of the set A.

Set Cardinality

The cardinality of a set is the number of elements in a set (its size). The cardinality of a set A is often denoted $|A|$.

What is the cardinality of the following sets?

- $A = \{x \in \mathbb{Z} \ : \ x \equiv 1 \pmod 4 \text{ and } -10 \leq x \leq 10\}$ $= \{-7, -3, 1, 5, 9\}$
- $B = \emptyset$
- $C = \{\emptyset\}$

$\in$ vs. $\subseteq$

$A = \{1, 2, 3\}$ $B = \{2\}$ $C = \{\emptyset, \{2\}\}$

- $\emptyset \subseteq A$?
- $\emptyset \in A$?
- $2 \subseteq B$?
- $2 \in B$?
- $B \in A$?
- $B \in C$?