

MATH 250 HANDOUT 7 - SUBSETS

- (1) Recall that $d\mathbb{Z} = \{n : n \in \mathbb{Z} \text{ s.t. } d \mid n\}$. Prove or disprove each of the following:
- (a) $25\mathbb{Z} \subset 5\mathbb{Z}$;
 - (b) $24\mathbb{Z} \subset 4\mathbb{Z}$;
 - (c) $5\mathbb{Z} \subset 25\mathbb{Z}$;
- (2) Prove that $(-1, 1) \subset (-2, 2)$.
- (3) Disprove: $(-1, 2) \subset (-2, 1)$.
- (4) Let $A = \{n \in \mathbb{Z} \mid 0 \text{ appears as a digit of } n\}$. Prove or disprove the following.
- (a) $A \subset 10\mathbb{Z}$.
 - (b) $10\mathbb{Z} \subset A$.
- (5) Let $B = \{n \in \mathbb{Z} \mid \log_{10} n \text{ is rational}\}$, and let $C = \{10^m : m \in \mathbb{Z}\}$.
Prove or disprove the following.
- (a) $B \subset C$.
 - (b) $C \subset B$.
- (6) Let A, B, C and D be arbitrary sets. Prove or disprove the following.
- (a) If $A \subset B$, $B \subset C$, and $C \subset D$, then $A \subset D$.
 - (b) If $A \not\subset B$ and $B \not\subset C$, then $A \not\subset C$.
 - (c) If $A \subset B$ and $B \not\subset C$, then $A \not\subset C$.