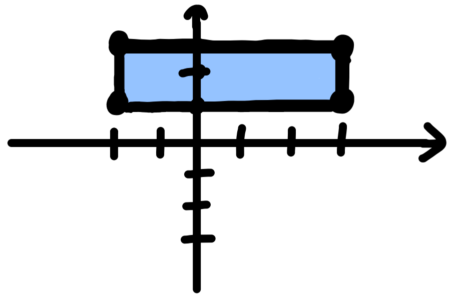
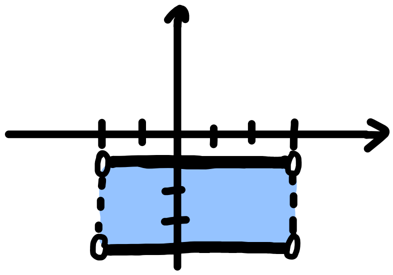
2: <u>Proof.</u> Let A, B, and C be sets.

- Suppose $A \subseteq B$ and $B \subseteq C$
- To show that $A \subseteq C$, we need to show that every element of A is also an element of C.
- Suppose $a \in A$, then by the definition of subset, $a \in B$.
- Since $a \in B$, then by the definition of subset, $a \in C$.
- Since we now know $a \in C$, this demonstrates $A \subseteq C$ by the definition of subset.
- Therefore, it is now proven that if $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$. $\blacksquare$

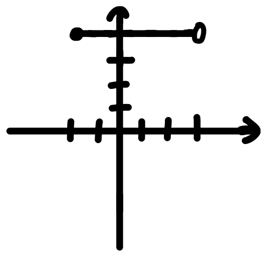
3: (a): $[-2, 3] \times [1, 3]$



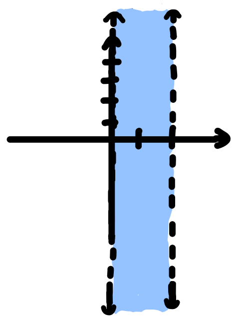
(b) $(-2, 3) \times [-4, -1]$



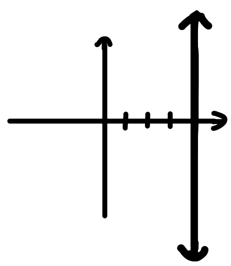
(c) $[-2, 3) \times \{4\}$



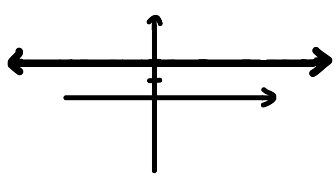
(d) $(0, 2) \times \mathbb{R}$



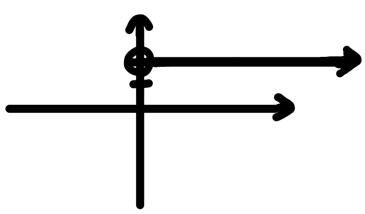
(e) $\{4\} \times \mathbb{R}$



(f) $\mathbb{R} \times \{2\}$



(g) $(0, \infty) \times \{2\}$



(h) $\{2\} \times (-\infty, 0)$