Homework 1 — Chapter 1

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1.10 (a) A = { 1, 2, 3 }, B = { 1, 2, 3 }, C = { 1, 2, 3, cat }
$A \subseteq B \subset C$

(b) A = { }, B = { { } }, C = { { { } } }
$A \in B$, $B \in C$, and $A \notin C$

(c) A = { tom }, B = { { tom } }, C = { { tom }, tom }
$A \in B$ and $A \subset C$

1.30 (a) $A = \big[-1, 3\big], B = (-\infty, -1\big] u \big[1, \infty)$ $C = \big[-5, -1\big]$

(b) $A \cup B = (-\infty, \infty)$
$A \cap B = \big[-1\big] u \big[1, 3\big]$
$B \cap C = \big[-5, -1\big] u \big[1\big]$
$B - C = (\infty, -5) u (1, \infty)$

1.46 (a) $\bigcup_{i=1}^{\infty} \left(\frac{-1}{i}, \frac{1}{i}\right) = (-1, 1)$

$\bigcap_{i=1}^{\infty} \left(\frac{-1}{i}, \frac{1}{i}\right) = \{\}$

(b) $\bigcup_{i=1}^{\infty} \left[\frac{-1}{i}, \frac{1}{i}\right] = [0, 2]$

$\bigcap_{i=1}^{\infty} \left[\frac{i-1}{i}, \frac{i+1}{i}\right] = [1]$

1.56 $A = \{1, 2, 3, ..., 12\}$
$S = \{\{1, 2, 3, 4\}, \{5\}, \{6, 7, 8, 9\}, \{10\}, \{11, 12\}\}$
$T = \{\{1, 2, 3, 4\}, \{5\}, \{6, 7, 8, 9\}, \{10\}\}$