4 - SETS - SOLUTIONS

4.1

(i) $\frac{7}{2} \in \mathbb{Z}$ - false

(ii) $\pi \subseteq \mathbb{R}$ - false

(iii) $\{1, -1\} \subseteq \mathbb{R}$ - true

(iv) $\{\{1\}\} = \{1\}$ - false

(v) $\{3, 2, 2, 6, 9, 8\} \subseteq \{1, 2, 6, 7, 8, 3, 9, 10, 10\}$ - true

(vi) $\{0, 17, 31\} \nsubseteq \mathbb{N}$ - true

(vii) $\{\pi\} \notin \mathbb{Z}$ - true

4.4

Proof. We can proof this is true by using a truth table:

$x \in A$	$x \in B$	$x \in A \cap B$	$\neg(x \in A)$	$\neg(x \in B)$	$\neg(x \in A \cap B)$	$\neg(x \in A) \vee \neg(x \in B)$
T	T	T	F	F	F	F
T	F	F	F	T	T	T
F	T	F	T	F	T	T
F	F	F	T	T	T	T

□

4.7

$A = \{a, \{a, b\}, \emptyset\}$
$\mathcal{P}(A) = \{\emptyset, A, \{a\}, \{a, b\}, \{\emptyset\}, \{a, \emptyset\}, \{a, \{a, b\}\}, \{\{a, b\}, \emptyset\}\}$

4.8

$(\mathbb{R} \times \{0\}) \setminus (\{1\} \times \mathbb{R}) = (\mathbb{R} \setminus \{1\}) \times \{0\}$