

§4.3 Solutions to suggested problems

2(a)  $\bigcup_{i=2}^{\infty} A_i = (0, \infty)$        $\bigcap_{i=2}^{\infty} A_i = [\frac{1}{2}, 2)$   
since  $\lim_{i \rightarrow \infty} \frac{1}{i} = 0$ ,  $0 \notin A_i$  for all  $i$ , and  $\lim_{i \rightarrow \infty} i = \infty$ .  
(Note that  $A_i \subseteq A_{i+1}$  for all  $i$ .)

3(a)  $\bigcup_{i=2}^{\infty} A_i = (0, \infty)$        $\bigcap_{i=2}^{\infty} A_i = (\frac{1}{2}, 2]$   
(Note again that  $A_i \subseteq A_{i+1}$  for all  $i$ .)

4(a)  $\bigcup_{i=1}^{\infty} A_i = [0, 1)$        $\bigcap_{i=1}^{\infty} A_i = \{0\}$   
since  $\lim_{i \rightarrow \infty} (1 - \frac{1}{i}) = 1$ ,  $1 \notin A_i$  for all  $i$ , and  $A_1 = \{0\}$ .  
(The notation  $\bigcup_{i \in \mathbb{Z}^+} A_i$  in the book means  $\bigcup_{i=1}^{\infty} A_i$ .)