Required Part:

1. Exercise 1.9.6 on page 21
2. Exercise 1.9.19 on page 23
3. Exercise 1.9.43 (a) (c) (e) on page 27
4. Let $A_1, A_2, \ldots$ and $B_1, B_2, \ldots$ be subsets of $\Omega$.
   (1) Show that
   $$(\liminf_{n \to \infty} A_n) \cup (\liminf_{n \to \infty} B_n) \subset \liminf_{n \to \infty} (A_n \cup B_n)$$
   (2) Show by example that the inclusion “$\subset$” in part (1) can be strict.

Optional Part (no need to hand in):

5. Exercise 1.9.3 on page 20
6. Exercise 1.9.4 on page 21
7. Exercise 1.9.5 on page 21
8. Exercise 1.9.7 on page 21