1. A fair die tossed eight times. What is the probability that the eighth outcome is not a repetition?

2. Let \( \{ A_n \}_{n=1}^{\infty} \) be a sequence of events. Prove that for every event B:
   
   (a) \( B(\bigcup_{i=1}^{\infty} A_i) = \bigcup_{i=1}^{\infty} BA_i \)
   
   (b) \( B \bigcup(\bigcap_{i=1}^{\infty} A_i) = \bigcap_{i=1}^{\infty} (B \cup A_i) \)

3. Let \( \{ A_1, A_2, \ldots \} \) be a sequence of events of a sample space \( S \). Find a sequence \( \{ B_1, B_2, \ldots \} \) of mutually exclusive of event such that for all \( n \geq 1 \), \( \bigcup_{i=1}^{n} A_i = \bigcup_{i=1}^{n} B_i \)

4. 2-5

5. Let \( A_1, A_2, \ldots, A_n \) be n events show that a) if \( P(A_1) = P(A_2) = \ldots = P(A_n) = 1 \) then \( P(A_1A_2\ldots A_n) = 1 \). b) Show that the result is not true for an infinite number of events.

6. 2-10

7. 2-27

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\textsuperscript{1}Textbook: Probability, Random Variables and Stochastic Processes, Papoulis and Pillai