6: Suppose an experiment consists of tossing a 10-sided die 8 times. How many outcomes/points are in the sample space?

10^8

7: Let $\{A_1, A_2, \ldots, A_n\}$ be an independent set of events with $P(A_k) = p_k$, $1 \leq k \leq n$. Derive an expression giving the probability at least one of the events $A_1, A_2, \ldots, A_n$ occurs in terms of the p_k.

$P(A_1 \cup A_2 \cdots \cup A_n) = 1 - P(A_1^c A_2^c \cdots A_n^c)$

$= 1 - P(A_1^c) \cdot P(A_2^c) \cdots P(A_n^c)$

$= 1 - (1-p_1)(1-p_2)\cdots(1-p_n)$

$P(\text{at least one}) \quad (1)$

$= P(A_1 \cup A_2 \cup \cdots \cup A_n) = 1 - P(A_1^c A_2^c \cdots A_n^c) \quad (2)$

$= 1 - P(A_1^c) \cdot P(A_2^c) \cdots P(A_n^c) \quad (3)$

$= 1 - (1-p_1)(1-p_2)\cdots(1-p_n) \quad (5)$