

Homework 1, ISyE 2027 Spring 2006

Due on Friday, January 20

Problem 1 Let A be the event that a person is male, B that the person is under 30, and C that a person speaks French. Describe in symbols (a) a male over 30, (b) a female who is under 30 and speaks French, (c) a male who either is under 30 or speaks French.

Problem 2 Suppose we roll a red die and a green die (assume each die is both six-sided and fair). What is the probability that the number on the red die is *strictly larger* than the number on the green die? What is the complement of this event?

Problem 3 Hayter, Problem 1.2.12.

Problem 4 In Galileo's time people thought that when three dice were rolled, a sum of 9 and a sum of 10 had the same probability since each could be obtained in 6 ways:

9: 1+2+6, 1+3+5, 1+4+4, 2+2+5, 2+3+4, 3+3+3

10: 1+3+6, 1+4+5, 2+2+6, 2+3+5, 2+4+4, 3+3+4

Compute the probabilities of these sums and show that 10 is a more likely total than 9.

Problem 5 Suppose $\Omega = \{1, 2, 3, 4, 5, 6, 7\}$, and $P(\{k\}) = ck^3$ for $k \in \Omega$. Determine the value of c .

Problem 6 Suppose $\Omega = \{a, b, c\}$, $P(\{a, b\}) = 0.75$, and $P(\{b, c\}) = 0.5$. Compute the probabilities of $\{a\}$, $\{b\}$, and $\{c\}$.

Problem 7 Suppose A and B are disjoint with $P(A) = 0.3$ and $P(B) = 0.5$. What is $P(A^c \cap B^c)$?

Problem 8 Hayter, Problem 1.3.6

Problem 9 Hayter, Problem 1.3.12