

Math 342 — Problem solving strategies

Problem 1. Consider the random experiment of rolling a die 5 times. Find the probability of each of the following events.

- All 5 rolls land on the same value.
- All 5 rolls land on different values.
- At least 1 of the rolls lands on 4.
- At least 2 of the rolls land on 4.

Problem 2. A certain town has 3 newspapers: A , B , and C . The proportions of townspeople who read these papers are as follows:

- A : 10 percent, B : 30 percent, C : 5 percent
- A and B : 8 percent, A and C : 2 percent, B and C : 4 percent
- all 3: 1 percent

A person is chosen at random, everyone equally likely. Find the probability that they read

- at least one newspaper.
- no newspaper.
- at least two newspapers.
- exactly one newspaper.

Problem 3. Consider the experiment of rolling a die 5 times with sample space Ω . Let C be the event that at least one of the 5 rolls lands on 4. For each $k = 1, \dots, 5$, let

- A_k be the event that roll k lands on 4.
- B_k be the event that among the 5 rolls, exactly k of them land on 4.

Let B_0 be the event no rolls land on 4. State whether each of the following is true or false.

- $B_0 = C^c$
- $\Omega = B_0 \cup B_1 \cup B_2 \cup B_3 \cup B_4 \cup B_5$
- $C = A_1 \cup A_2 \cup A_3 \cup A_4 \cup A_5$
- $A_1 \cup A_2 \cup A_3 \cup A_4 \cup A_5 = B_1 \cup B_2 \cup B_3 \cup B_4 \cup B_5$
- $P(C) = P(A_1) + P(A_2) + P(A_3) + P(A_4) + P(A_5)$
- $P(C) = P(B_1) + P(B_2) + P(B_3) + P(B_4) + P(B_5)$