

1. Two fair 6-sided dice are thrown.
 - (a) What is the conditional probability that at least one die lands on 6 given that the dice land on different numbers?
 - (b) What is the conditional probability that the first die lands on 6 given that the sum of the dice is x ? Compute for all values of $x \in \{2, \dots, 12\}$.

2. In a certain city, 46 percent of the voters classify themselves as Liberal supporters, whereas 30 percent support Conservatives, and 24 percent support the NDP. In a recent election, 35 percent of the Liberal, 62 percent of the Conservative, and 58 percent of the NDP supporters came out to vote. A voter is chosen at random.
 - (a) Given that this person did vote what is the probability that they support
 - i. Liberal,
 - ii. Conservative,
 - iii. NPD?
 - (b) What percentage of voters participated in the election?

3. Two cards are randomly chosen without replacement from regular 52-card deck. Let A be the event that at least one ace is chosen, A_S the event that the aces of spades is chosen, and B the event that both cards are aces. Find
 - (a) $P(B|A_S)$
 - (b) $P(B|A)$

4. Show that if events A and B are independent, then events A' and B are independent. Hint: $A' \cap B = B \setminus A$.

5. An explosion at a construction site could have occurred as the result of static electricity, malfunctioning equipment, carelessness, or sabotage. Research estimates that such an explosion would occur with probability of 0.25 as a result of static electricity, 0.20 as a result of malfunctioning equipment, 0.40 as a result of carelessness, and 0.75 as a result of sabotage. The four causes for explosion occur with probabilities 0.20, 0.40, 0.25 and 0.15 respectively.
 - (a) What is the most likely cause of the explosion?
 - (b) What is the least likely cause of the explosion?

6. There are 90 applicants for a job with a local television station. Some of them are university graduates and some are not. Some of them have at least 3 years of experience and some don't. This information is summarized in the table below.

	Univ. Grad.	Not a Univ. Grad.
≥ 3 years exp.	18	9
< 3 years exp.	36	27

Let G be the event that an applicant is a university graduate, and T the event that an applicant has at least 3 years of experience. Find:

- (a) $P(G)$
- (b) $P(T')$
- (c) $P(G \cap T)$
- (d) $P(G' \cap T')$
- (e) $P(T|G)$
- (f) $P(G'|T')$
- (g) Verify that $P(T|G) = \frac{P(G \cap T)}{P(G)}$