MS121 Discrete Mathematics, Tutorial 11

1. Suppose a blue die and a red die are rolled together, and the numbers of dots that occur face up on each are added. Let A be the event that the sum is even and B be the event that the sum is less than 8. Using the probabilities derived in lecture, calculate $\mathbb{P}[A]$, $\mathbb{P}[B]$, $\mathbb{P}[A \cap B]$, and $\mathbb{P}[A \cup B]$ directly, and check that

$$\mathbb{P}[A \cup B] = \mathbb{P}[A] + \mathbb{P}[B] - \mathbb{P}[A \cap B].$$

2. In a box there are six pairs of shoes. All the pairs of shoes are different. A set of six shoes are chosen at random from the box. What is the probability that there is at least one pair of shoes in the chosen set?

3. One urn contains 12 blue balls and 7 white balls, and a second urn contains 8 blue balls and 19 white balls. An urn is selected at random, and a ball is chosen from the urn.
(a) What is the probability that the chosen ball is blue?
(b) If the chosen ball is blue, what is the probability that it came from the first urn?