# Test bank

1. Show the probability space for the roll of a fair die.

   $\Omega = \{1, 2, 3, 4, 5, 6\}$

   $E = \{$ all subsets of $\Omega$ $\}$

   $P(X) = \#X/6$, where $\#X$ is the number of outcomes in $X$

2. State the three axiomatic properties of a probability measure.

   (a) $P(\Omega) = 1$

   (b) $P(X) \geq 0$

   (c) $P(X \cup Y) = P(X) + P(Y)$, where $X$ and $Y$ are disjoint events

3. State the definition of conditional probability.

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

4. State the multiplication rule for probabilities.

$$P(A \text{ and } B) = P(A)P(B|A)$$

5. State the multiplication rule for probabilities of independent events.

$$P(A \text{ and } B) = P(A)P(B)$$

6. State the addition rule for probabilities.

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

7. What does it mean to say that events A and B are independent?

$$P(A|B) = P(A)$$