

CN4004 Maths for Computing: Tutorial

Probability

1. A 5-sided spinner has sides coloured yellow, blue, green, red and black.
 - a) What is the sample space, S ?
 - b) Give the value of E , the event that the spinner lands on a colour which starts with the letter “B”.
 - c) What is the cardinality of the set S and the set E ?
 - d) Calculate the probability that E happens.
2. A small lottery consists of randomly choosing one of twelve balls, labelled 1 to 12.

The following events are defined:

A is the event of choosing a number less than 8.

B is the event of choosing an odd number.

C is the event of choosing a number divisible by 4.

- a) What is the sample space, S ?
- b) Give the value of A , B and C .
- c) Give the values of: $A \cap B$ $A \cap C$ $B \cap C$
- d) Which pairs of events are mutually exclusive?
- e) Calculate the probability of choosing an odd number or a number divisible by 4.
- f) Calculate the probability of choosing a number less than 8 or a number divisible by 4.

3. An experiment is done, and two events, A and B are defined.

The probability of A happening is 0.6.

The probability of B happening is 0.4.

The probability of both A and B happening is 0.2.

What is the probability of A or B happening?

4. An unfair 5-sided spinner with colours red, yellow, blue, green and orange is weighted as follows: The chance of the spinner landing on green is twice that of it landing on a orange. The chance of it landing on blue is 3 times that of landing on orange. It is 4 times more likely to land on yellow than it is to land on a orange. It is 10 times more likely to land on red than to land on orange.
- a) Find the probability distribution of the spinner.
- b) What is the probability of the spinner landing on blue or green?
5. Two 3-sided spinners are spun, each with colours yellow, red and blue. If they are fair spinners, what is the expected value of getting at least one yellow?
6. Consider the following reduced deck of cards consisting of just the following:

$2\clubsuit, 3\clubsuit, Q\clubsuit, A\clubsuit$

$4\diamondsuit, 10\diamondsuit, Q\diamondsuit$

$2\heartsuit, 7\heartsuit, Q\heartsuit, A\heartsuit$

$2\spadesuit, 5\spadesuit, K\spadesuit, A\spadesuit$

What is the probability of drawing a card that is black or is an ace?

7. A bag contains 4 blue balls, 5 yellow balls and 6 red balls.
- a) A ball is picked randomly from the bag, and is then returned to the bag. Another ball is then picked. What is the probability of picking a blue ball, followed by a red ball?
 - b) A ball is picked randomly from the bag, but is not returned. Another ball is then picked. What is the probability of picking a red ball, followed by another red ball?
 - c)
 - i) Represent the probabilities described in part b) on a tree diagram.
 - ii) Use this diagram to find the probability of picking a red ball followed by a yellow ball OR a yellow ball followed by a blue ball.
8. Two three sided spinners, each with sides coloured red, blue and yellow are spun. What is the probability of at least one of the spinners landing on yellow?
9. A bag contains a red ball and a white ball. A second bag contains a red ball, a white ball and a yellow ball. A ball is picked randomly from each bag.
- a) What is the sample space, S ?
 - b) Give the value of E , the event that a red ball and a white ball are picked.
 - c) Give the value of F , the event that a red ball and a yellow ball are picked.
 - d) What is the cardinality of the sets S , E and F ?
 - e) Calculate the probability that E happens.
 - f) Calculate the probability that F happens.

10. A multiple choice paper consists of 12 questions, each with 4 possible answers. Only one answer is correct.

If the questions are answered completely randomly, what is the probability of getting *exactly* 50% (6 correct answers)?

11. A dice is thrown 4 times. What is the probability of getting exactly 3 sixes if
- a) the dice is a fair dice;
 - b) the dice is weighted so that it is three times more likely to land on a 5 or a 6 than on any other number?