Probability

and

tree diagrams

1. The probability that any piece of buttered toast will land buttered side down when it is dropped is 0.62
Two pieces of buttered toast are to be dropped, one after the other.
Calculate the probability that exactly one piece of buttered toast will land buttered side down.

2. There are two sets of traffic lights on Georgina's route to school.
The probability that the first set of traffic lights will be red is 0.4
The probability that the second set of traffic lights will be red is 0.3
(a) Draw the probability tree diagram
(b) Work out the probability that both sets of traffic lights will be red
(c) Work out the probability that exactly one set of traffic lights will be red.

3. Mary has a drawing pin.
When the drawing pin is dropped it can land either 'point up' or 'point down'.
The probability of it landing 'point up' is 0.4
Mary drops the drawing pin twice.
(a) Draw the probability tree diagram.

(b) Work out the probability that the drawing pin will land 'point up' both times

4. Mr Brown chooses one book from the library each week.
He chooses a crime novel or a horror story or a non-fiction book.
The probability that he chooses a horror story is 0.4
The probability that he chooses a non-fiction book is 0.15
Work out the probability that Mr Brown chooses a crime novel

5. When Springton Rovers play an away match, the probability they will **not** win is 0.6.
(i) Complete the tree diagram below for the next two away matches.
The results are independent
(ii) Calculate the probability that Springton Rovers **will win** both of these away matches.

6. On any morning the probability that the school bus is late is 0.2.
(a) Complete the tree diagram below to show the probabilities of the school bus being late on two consecutive mornings
b. Use the tree diagram to work out the probability that the school bus is not late on the first morning **and** not late on the second morning

7. On any day, the probability that Elaine listens to the car radio on her way to work is 0.7.
(i) Complete the probability tree diagram to show the probabilities of Elaine listening to the car radio on two consecutive days.
(ii) Find the probability that Elaine listens to the radio on only one of the two days.
(iii) Find the probability that Elaine listens to the radio on at least one of the two days.

8. The probability that a boy is left-handed is 0.2
The probability that a girl is left-handed is 0.3
A school has 480 boys and 520 girls.
(a) Estimate the number of left-handed students in the school
(b) A student is picked at random from the whole school.
Estimate the probability that the student is left-handed.

9. A bag contains 7 green and 3 yellow balls.
A ball is taken from the bag at random and replaced.
Another ball is then taken from the bag at random.
(a) Complete the tree diagram.
(b) What is the probability that both balls are different colours?

10. A bag contains 5 red and 3 blue balls.
Two balls are taken out and **not** replaced.
What is the probability that **at least one** of them is red?

11. Ian and Simon play each other in a darts match.
The match consists of three games.
The winner of the match is the first player to win two games.
The tree diagram shows all the possible outcomes.
'I wins' means that Ian wins the game.
'S wins' means that Simon wins the game.
The probability that Ian wins the first game is 0.5
Whenever Ian wins a game the probability that he wins the next game is 0.7
Whenever Simon wins a game the probability that he wins the next game is 0.6
(a) Complete the tree diagram.
(b) Calculate the probability that Ian wins the darts match.

12. An examiner has to attend a meeting in Manchester.
The probabilities of dry weather (D), rain (R) or snow (S) are
Probability (D) =1/2,Probability (R) =1/3,Probability (S) =1/6
If it is dry the probability that he will arrive in time for the meeting is 4/5
If it rains the probability that he will arrive in time for the meeting is 2/5
If it snows the probability that he will arrive in time for the meeting is 1/10
Calculate the probability that he is **late** for the meeting.

13. A car is due to have three safety tests.
The probability that the brakes will fail is 1/4
The probability that the steering will fail is 1/10
The probability that the lights will fail is 1/5
These three events are independent.
Calculate the probability that the car fails **only one** of the three test.
14. A bag contains 7 coloured marbles. 3 of them are red, and the remainder are blue. Two marbles are removed from the bag, one at a time, replacing the first marble before the second is drawn.
(a) Complete the tree diagram for this situation.
(b) Find the probability that both balls drawn are the same colour..