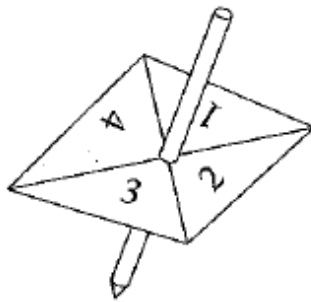1. Here is a 4-sided spinner.

The sides are labelled 1, 2, 3, 4.

The spinner is biased.

The probability that the spinner will land on each of the numbers 1 to 3 is given in the table.

Number	1	2	3	4
Probability	0.3	0.4	0.1	

Sabia spins the spinner once.

(a) Work out the probability that the spinner will land on an odd number.

....

(2)

Ben spins the spinner twice.

(b) Work out the probability that the spinner will land on the number 1 both times.

9. The probability that it will snow in London on Christmas Day in any year is 0.08

(a) Work out the probability that it will snow in London on **both** Christmas Day 2002 **and** Christmas Day 2003.
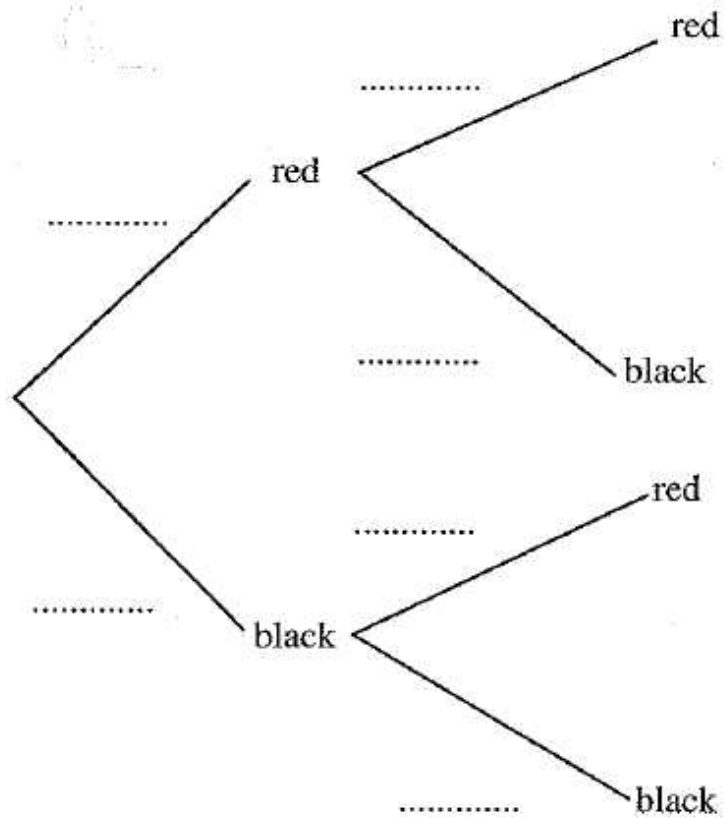
....

(2)

(b) Work out the probability that it will snow in London on **either** Christmas Day 2002 **or** Christmas Day 2003, but **not** on both.

8. A bag contains 10 coloured discs.

4 of the discs are red and 6 of the discs are black.

Asif is going to take two discs at random from the bag, **without** replacement.

(a) Complete the tree diagram.

(2)

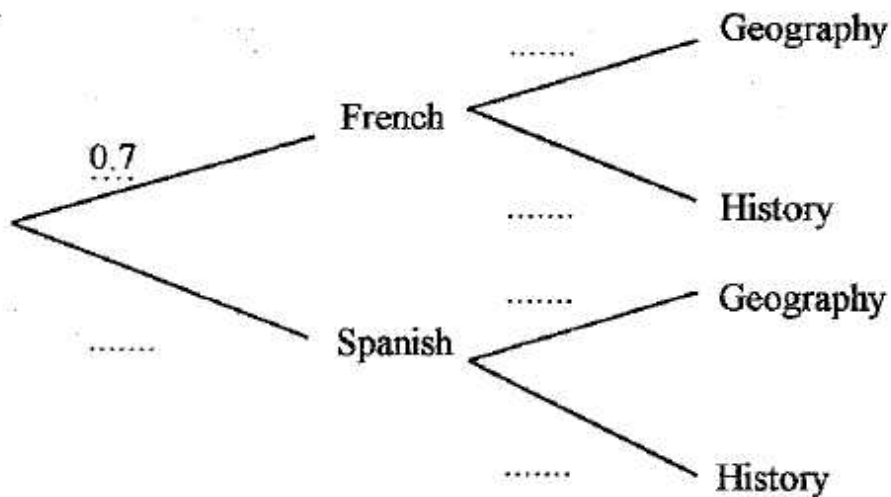(b) Work out the probability that Asif will take two black discs.

....

(2)

(c) Work out the probability that Asif takes two discs of the same colour.

....

(3)

12. Year 9 students can choose some subjects to take in Year 10.
They must choose **either** French **or** Spanish.
They must also choose **either** Geography **or** History.

In 2002 70% of the students chose French
and 60% of the students chose Geography.

(a) Complete this tree diagram.

```
                                    ........        Geography
                          French  <
                0.7                 ........        History
              /
            <
              \         ........        Geography
                Spanish <
              ........            ........        History
```

(2)

(b) Work out the probability that a student picked at random chose

(i) French and Geography,

....

(ii) French and Geography **or** Spanish and History.
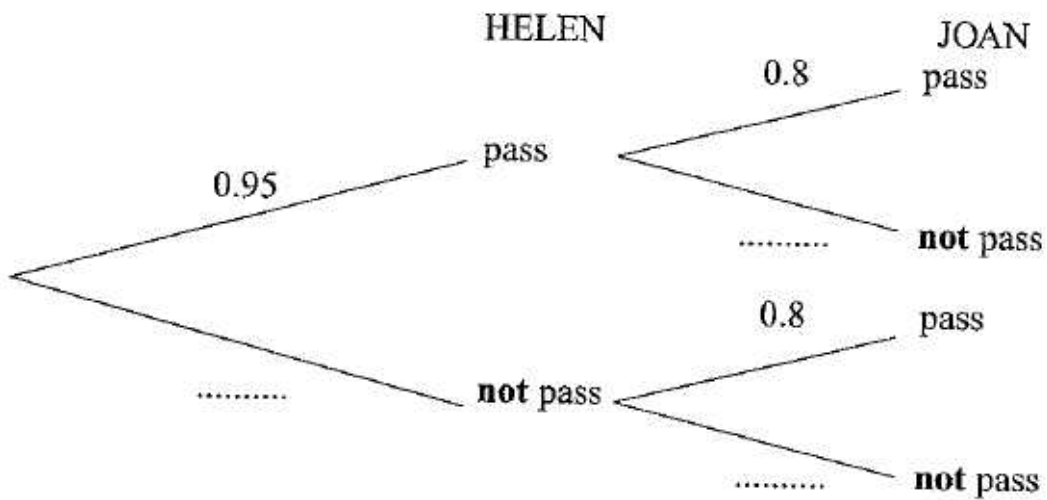
....

(5)

In 2003 there will be 200 Year 9 students.

(c) Use the information for 2002 to work out an estimate for the number of Year 9 students who will **not** choose French and Geography in 2003.

....

(3)

11. Helen and Joan are going to take a swimming test.
The probability that Helen will pass the swimming test is 0.95
The probability that Joan will pass the swimming test is 0.8
The two events are independent.

```
                HELEN                              JOAN
                                      0.8
                                            pass
                              pass
              0.95                    .........
                                            not pass

                                      0.8
                                            pass
              .........       not pass
                                      .........
                                            not pass
```

(a) Complete the probability tree diagram.

(2)

(b) Work out the probability that both Helen and Joan will pass the swimming test.

....

(2)

(c) Work out the probability that one of them will pass the swimming test and the other one will **not** pass the swimming test.

....

(3)

18. In a bag there are 10 counters.
4 of the counters are red and 6 of the counters are blue.
Ann and Betty are going to play a game.
Ann is going to remove 2 counters at random from the bag. She will not put them back.

If both counters are the same colour, Ann will win the game.

(a) Calculate the probability that Ann will win the game.

....

(3)

If the counters are different colours, it will be Betty's turn.

Betty will remove **one** counter at random from the 8 counters still in the bag.
If the counter is red, Betty will win the game.

If the counter is blue, the result will be a draw.

(b) Calculate the probability that the result will be a draw.

....

(5)

19. Joan has two boxes of chocolates.
The boxes are labelled **A** and **B**.

Box **A** contains 15 chocolates. There are 6 plain, 4 milk and 5 white chocolates.
Box **B** contains 12 chocolates. There are 4 plain, 3 milk and 5 white chocolates.

Joan takes one chocolate at random from each box.
Work out the probability that the two chocolates Joan takes are not of the same type.

....

(4)

20. There are n beads in a bag.
6 of the beads are black and all the rest are white.
Heather picks one bead at random from the bag and does not replace it.
She picks a second bead at random from the bag.
The probability that she will pick 2 white beads is $\frac{1}{2}$

Show that $n^2 - 25n + 84 = 0$