

Question 1

	Year 10 Group	Year 11 Group
Boys	100	50
Girls	90	60

The table shows the number of boys and the number of girls in Year 10 and Year 11 of a school. The headteacher wants to find out what pupils think about a new Year 11 common room. A stratified sample of size 50 is to be taken from Year 10 and Year 11.

(a) Calculate the number of pupils to be sampled from Year 10. **(2 marks)**

Two pupils are to be chosen at random to speak to the headteacher.

One pupil is to be chosen from Year 10.

One pupil is to be chosen from Year 11.

(b) Calculate the probability that both pupils will be boys. **(2 marks)**

However, the headteacher decides to choose two pupils at random from Years 10 and 11 together.

(c) i) Calculate the probability that both pupils will be boys.

ii) Calculate the probability that both pupils will be from different Year Groups. **(5 marks)**

Question 2

Peter and Asif are both taking their driving test for a motor cycle for the first time.

The table below gives the probabilities that they will pass the test at the first attempt or, if they fail the first time, the probability that they will pass at the next attempt.

	Probability of passing at first attempt	Probability of passing at next attempt if they fail the first attempt
Peter	0.6	0.8
Asif	0.7	0.7

On a particular day 1000 people will take the test for the first time.

For each person the probability that they will pass the test at the first attempt is the same as the probability that Asif will pass the test at the first attempt.

(a) Work out an estimate for how many of these 1000 people are likely to pass the test at the first attempt.

(b) Calculate the probability that both Peter and Asif will pass the test at the first attempt.

(c) Calculate the probability that Peter will pass the test at the first attempt and Asif will fail the test at the first attempt.

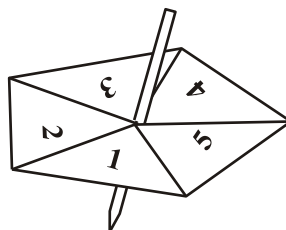
(d) Calculate the probability that Asif will pass the test within the first two attempts.

Question 3

Alan throws a fair coin 600 times.

(a) How many times would you expect him to get Heads? **(1 mark)**

Here is a 5-sided spinner.



Its sides are labelled 1, 2, 3, 4, 5. Alan spins the spinner and throws a coin.

One possible outcome is (3, Heads).

(b) List all the possible outcomes.

(2 marks)

The spinner is biased.

The probability that the spinner will land on each of the numbers 1 to 4 is given in the table.

Number	1	2	3	4	5
Probability	0.36	0.1	0.25	0.15	

Alan

spins the spinner once.

(c) i) Work out the probability that the spinner will land on 5.

(2 marks)

ii) Write down the probability that the spinner will land on 6.

(1 mark)

iii) Write down the number that the spinner is most likely to land on.

(1 mark)

Question 4

Helen tries to win a coconut at the fair.

She throws a ball at a coconut.

If she knocks a coconut off its stand, she wins the coconut.

Helen has two throws.

The probability that she will win a coconut with her first throw is 0.2.

The probability that she will win a coconut with her second throw is 0.3.

Work out the probability that, with her two throws, Helen will win

i) 2 coconuts,

ii) exactly 1 coconut.

(5 marks)

Question 5

The probability of a person having brown eyes is $\frac{1}{4}$.

The probability of a person having blue eyes is $\frac{1}{3}$.

Two people are chosen at random.

Work out the probability that

i) both people will have brown eyes

ii) one person will have blue eyes and the other person will have brown eyes.

(5 marks)

Question 6

A lorry contains 232 boxes of crisps.

Each box has either plain crisps or cheese and onion flavour crisps.

The probability that a box selected at random holds plain crisps is $\frac{1}{3}$ of the probability that the box holds cheese and onion crisps.

(a) Calculate the number of boxes of plain crisps.

(3 marks)

Each box holds 48 packets of crisps.

One in every 8 packets of plain crisps has a prize init. One in every 16 packets of cheese and onion crisps has a prize in it.

A packet is to be selected at random from the lorry.

(b) Calculate the probability that the packet will have a prize in it.

(3 marks)

Question 7

The probability that a washing machine will break down in the first 5 years of use is 0.27.

The probability that a television will break down in the first 5 years of use is 0.17.

Mr Khan buys a washing machine and a television on the same day.

By using a tree diagram or otherwise, calculate the probability that, in the five years after that day

(a) both the washing machine and the television will break down. (2 marks)

(b) at least one of them will break down. (4 marks)

Question 8

A packet contains stamps from three different countries.

The packet contains 4 Spanish stamps, 10 French stamps and 6 German stamps.

Two stamps are to be removed at random without replacement.

Calculate the probability that both stamps will be from the same country. (3 marks)

Question 9

The probability that a team will win a game is always 0.8.

The team plays n games.

The probability that the team will win every game is less than $\frac{1}{4}$.

Calculate the smallest possible value of n .

(3 marks)

Question 10

The probability of a car chosen at random having defective:

tyres is 0.065

brakes is 0.032

steering is 0.044

Work out the probability that a vehicle chosen at random will have:

- i) defective tyres, brakes and steering
- ii) has defective tyres but no other defects
- iii) has no defects.

Question 11

Nikki and Ramana both try to score a goal in netball.

The probability that Nikki will score a goal on her first try is 0.65.

The probability that Ramana will score a goal on her first try is 0.8.

- i) Work out the probability that Nikki and Ramana will both score a goal on their first tries.
- ii) Work out the probability that neither Nikki nor Ramana will score a goal on their first tries.

Question 12

Two dice with faces numbered 1 to 6 are rolled and the sum of the scores on upwardfacing faces noted. The score on these dice is $1 + 4 = 5$

- a) Complete the table of probabilities for the chance of scoring all the totals available.

Score	Possibilities	Probability
2	1 + 1	
3	1 + 2, 2 + 1	
4	1 + 3, 3 + 1, 2 + 2	
5	1 + 4, 4 + 1, 2 + 3, 3 + 2	
6		
7		
8		
9		
10		
11		
12		

- (b) Work out the probability that the score will be
- more than 9
 - less than 5
 - more than 6 and less than 10.

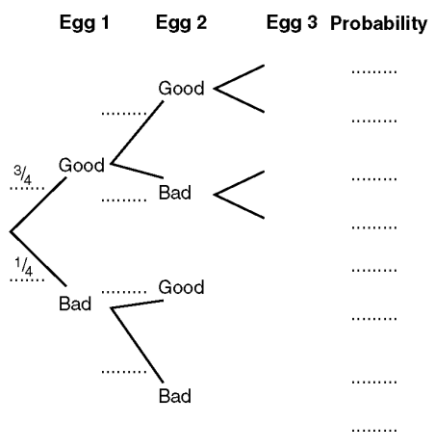
Question 13

Susan has 8 eggs in her fridge.

Two of the eggs have passed their sell by date and are "bad".

She selects 3 eggs at random to bake a cake.

- (a) Complete the probability tree diagram.



- (b) Work out the probability that Susan will select 3 "good" eggs.
 (c) Work out the probability that Susan will select at least one "bad" egg.

Question 14

Sharon has 12 computer discs.

Five of the discs are red.

Seven of the discs are black.

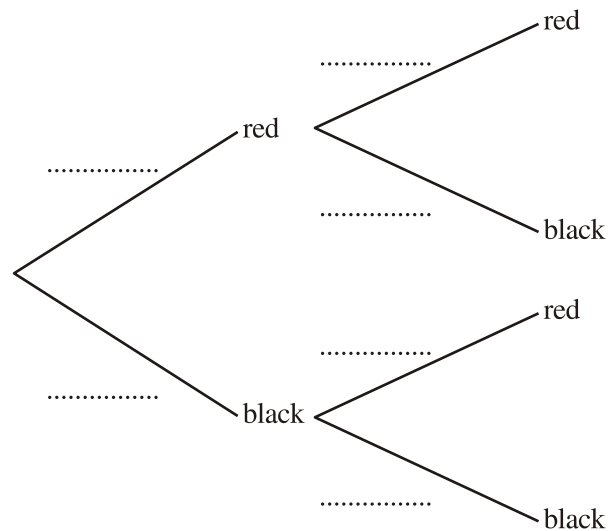
She keeps all the discs in a box.

Sharon removes one disc at random. She records its colour and replaces it in the box.

Sharon removes a second disc at random, and again records its colour.

(a) Complete the tree diagram.

(2 marks)



(b) Calculate the probability that the two discs removed

i) will both be red,

(2 marks)

ii) will be different colours.

(3 marks)

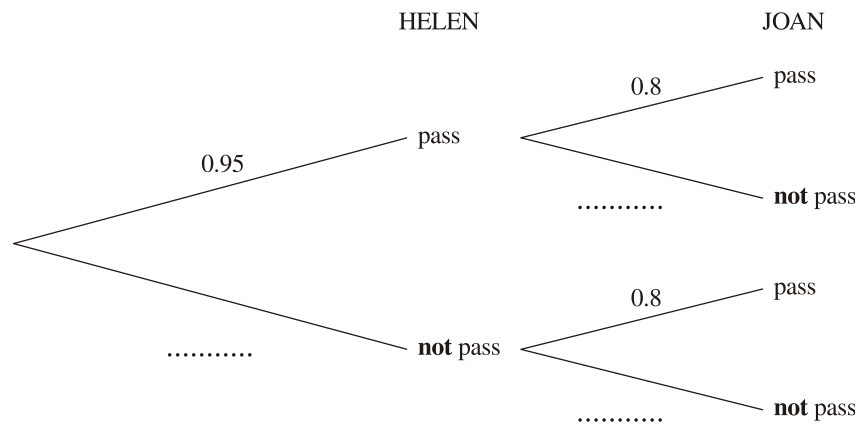
Question 15

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.



(a) Complete the probability tree diagram.

(2 marks)

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

(2 marks)

(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 marks)