Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
TOTAL	

In the style of

AQA

General Certificate of Secondary Education
Higher Tier

Mathematics 43601H

Past Paper Questions by Topic

Probability H

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed
- 1 hour 15 minutes

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.

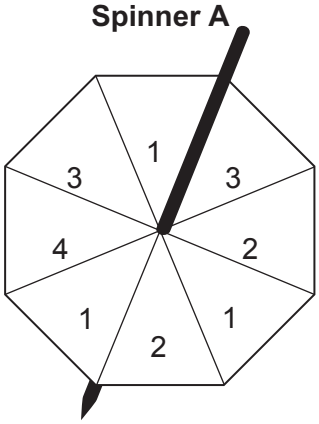
Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is.
- The quality of your written communication is specifically assessed in questions indicated with an asterisk (*)
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

Advice
- In all calculations, show clearly how you work out your answer.

By Peter Bland

1(a) Fair spinner A has eight equal sections.
The sections are either *one* (1), *two* (2), *three* (3) or *four* (4).

Spinner A



1 (a) (i) The spinner is spun.

On which number is it least likely to land?

Answer ..... *(1 mark)*

1 (a) (ii) Write down the probability that the spinner lands on *three*.
Give your answer in its simplest form.

.....

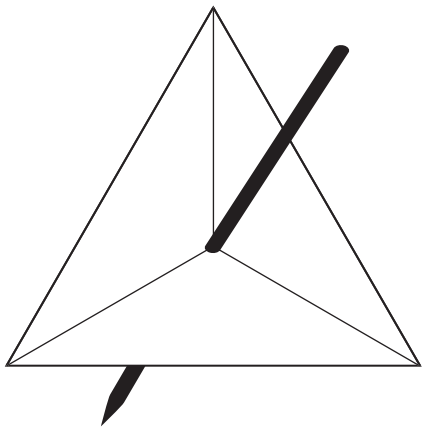
Answer ..... *(2 marks)*

1 (b) Fair spinner B has three equal sections.

It is certain to land on *one* (1).

Label spinner B.

Spinner B



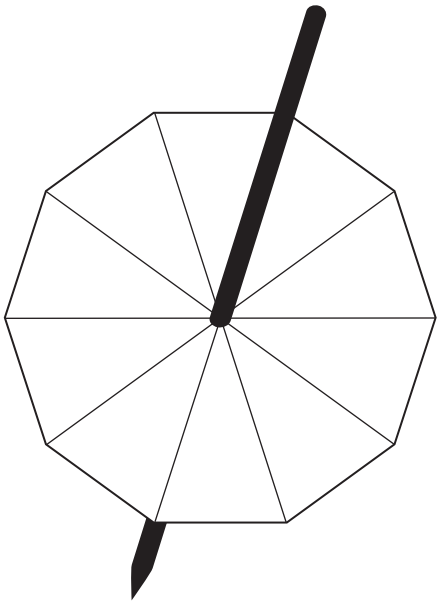
(1 mark)

1 (c) Fair spinner C has 10 equal sections.

Label spinner C so that

it has the same four numbers as spinner A
four is less likely than on spinner A
four and *three* are equally likely on spinner C
one and *two* are equally likely on spinner C.

Spinner C



.....

.....

.....

.....

(2 marks)

2 There are three drinks.

Cola	C
Orange	O
Water	W

They come in three sizes.

Small	S
Medium	M
Large	L

2 (a) List **all** possible combinations of drink and size. The first one has been done for you.

CS .....

.....

.....

.....

(3 marks)

2 (b) A drink is chosen at random.

What is the probability that a small cola is chosen?

Answer ..... *(1 mark)*

3 (a) A bag contains 3 red, 5 white and 8 blue balls.

One ball is chosen at random.

What is the probability of choosing a blue ball?

.....

.....

Answer ..... *(2 marks)*

3 (b) A different bag contains only black balls, pink balls and white balls. When one ball is chosen at random, each colour is equally likely.

Write down **two** possible values for the total number of balls in this bag.

.....

.....

Answer ..... and ..... *(2 marks)*

3 (c) Another bag contains only green balls and yellow balls. There are more than 10 balls in the bag.
When one ball is chosen at random, the probability of choosing a green ball is $\frac{3}{4}$

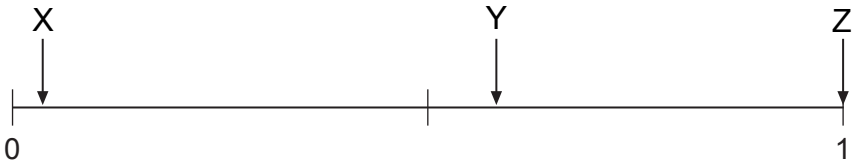
Write down **two** possible values for the total number of balls in this bag.

.....

.....

Answer ..... and ..... *(2 marks)*

4 The scale shows the probability that three events A, B and C will happen.



Choose the correct word to complete each statement.

Unlikely	Impossible	Very likely
Certain	Very unlikely	Likely

It is ..... that event X will happen.

It is ..... that event Y will happen.

It is ..... that event Z will happen.

(3 marks)

5 At the school fayre, Hamira plays a game 20 times.
Each go costs 50p.
Each time she wins she receives £1.50
The probability of winning is 0.2.

How much money does she expect to lose?

.....

.....

.....

.....

Answer £ ..... *(3 marks)*

6 Tara has a box of 1000 coloured bands.
The bands are Red, Blue, Green and Yellow.
The table shows some of the probabilities of choosing a colour.

Colour	Red	Blue	Green	Yellow
Probability	0.6	0.1		0.1

6 (a) Which coloured band is the most common?

Answer ..... *(1 mark)*

6 (b) Tara chooses a band at random from the box.

6 (b) (i) Work out the probability that she chooses a Green band.

.....

.....

Answer ..... *(2 marks)*

6 (b) (ii) Write down the probability that she chooses a White band.

Answer ..... *(1 mark)*

6 (c) Tara says: 'There must be 600 Red bands in the box.'

Is Tara correct?

Tick the correct box.

☐ Yes ☐ No

Give a reason for your answer.

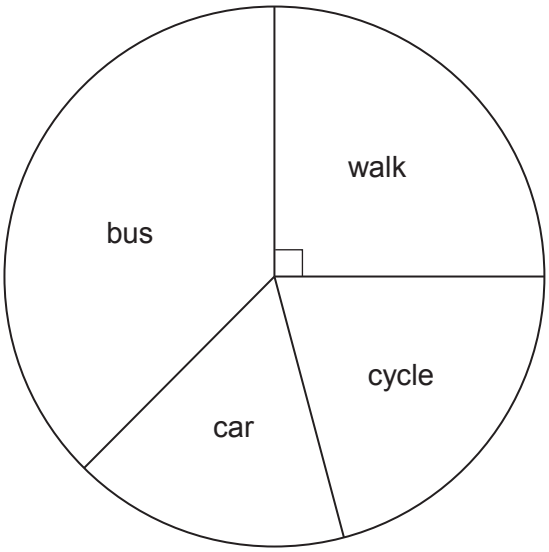
Reason .....

.....

.....

(2 marks)

7 The pie chart shows information about how workers travel to a factory.



7 (a) A worker is chosen at random.

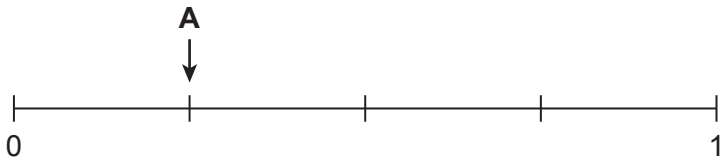
Mark, with the letter, the probabilities of each of the following on the scale below.

The first one has been done for you.

A: The worker walks to the factory.

B: The worker does **not** walk to the factory.

C: The worker travels to the factory by train.



(2 marks)

7 (b) 40 workers travel to the factory by car.

How many workers are there?

.....

.....

.....

Answer ..... *(3 marks)*

7 (c) There are 252 workers in the warehouse.

The same proportion of workers walk to the warehouse as in the factory

Work out the number of workers that walk to the warehouse.

.....

.....

.....

Answer ..... *(2 marks)*

8 A box only contains red and black balls.

It contains 24 red balls.

A ball is chosen at random from the box.

The probability of choosing a black ball is $\frac{1}{4}$.

How many balls are in the box?

Answer ..... *(3 marks)*

9 Terry throws two fair dice and adds their scores together.
The table shows some of the possible total scores.

+	1	2	3	4	5	6
1	2	3	4			
2				6	7	8
3						
4						
5	6	7	8			
6				1 0	11	12

9 (a) Complete the table.

(2 marks)

9 (b) What is the probability of scoring a total of 8?

Answer ..... *(1 mark)*

9 (c) What is the probability of scoring a total of 10 or more?

.....

Answer ..... *(2 marks)*

10 Alex is x years old.
David is 3 years younger than Alex.
Will is twice as old as Alex.
The total of their ages is 25

10 (a) Write an expression for David's age in terms of x.

Answer ..... *(1 mark)*

10 (b) Write an expression for Will's age in terms of x.

Answer ..... *(1 mark)*

10 (c) Form an equation in x and use it to work out Alex's age.

.....

.....

.....

Answer ..... *(2 marks)*

11 Justin has 3 red counters and 7 blue counters.
Terry has 10 red counters.
Chris has only blue counters.

11 (a) Justin puts his counters into a bag.

What is the probability of choosing a red counter from the bag?

Answer ..... *(1 mark)*

11 (b) Terry adds his counters to the bag.

What is the probability of choosing a red counter now?

.....

Answer ..... *(2 marks)*

11 (c) Chris adds her counters to the bag.
The probability of choosing a red counter now is $\frac{1}{2}$

How many blue counters did Chris have?

.....

.....

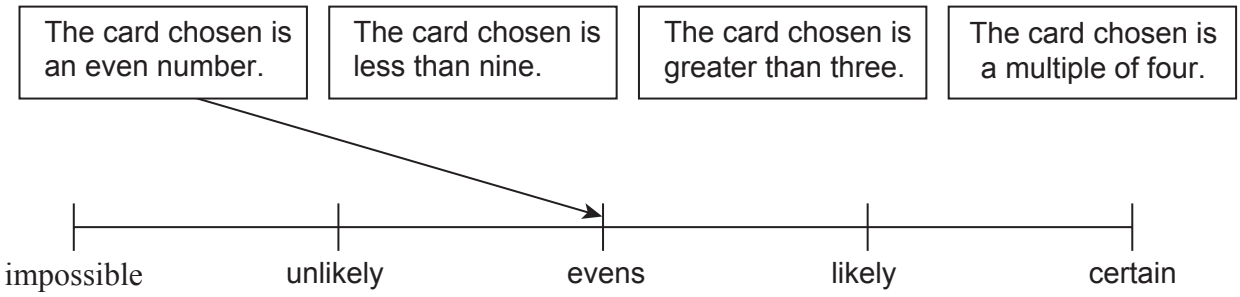
Answer ..... *(2 marks)*

12 Here are some number cards.

1	2	3	4	5	6	7	8

A card is chosen at random.

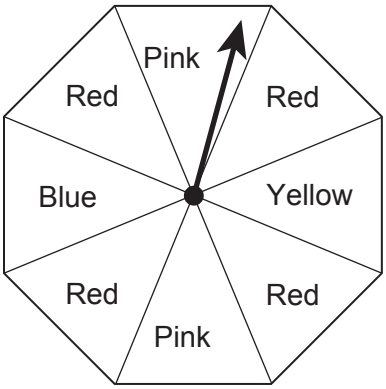
Match each statement to the correct position on the probability scale. The first one has been done for you.



(3 marks)

13 (a) Ron has a spinner with eight sections.
Four of the sections are Red, two are Pink, one is Blue and one is Yellow. He spins the spinner 200 times.
His results are shown in the table.

Colour	Red	Pink	Blue	Yellow
Frequency	105	48	22	25



13 (a) (i) Explain why the relative frequency of Pink is 0.24

.....

.....

(1 mark)

13 (a) (ii) Do the results suggest that the spinner is fair?
Explain your answer.

.....

.....

.....

(2 marks)

13 (b) Sheila has a spinner with six sections.
Three of the sections are Green, two are White and one is Black. She spins the spinner 10 times.
Her results are shown in a table.

Colour	Green	White	Black
Frequency	2	5	3

She says her spinner is **not** fair.

Explain why Sheila could be wrong.

.....

.....

.....

(1 mark)

14 A box only contains black balls and red balls. A ball is chosen from the box at random and replaced. Another ball is then chosen from the box at random. The probability of choosing two black balls is 0.36

14 (a) Show that the probability of choosing a black ball each time is 0.6

(1 mark)

14 (b) Work out the probability of choosing two red balls.

.....

.....

.....

.....

Answer ..... *(2 marks)*

14 (c) Work out the probability of choosing at least one red ball.

.....

.....

.....

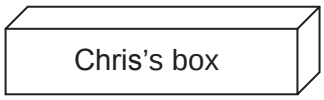
.....

Answer ..... *(2 marks)*

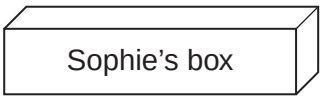
15 Chris picks a sweet at random from a box.
All the sweets in the box are identically wrapped.
The probability that she picks a caramel is $\frac{5}{8}$

Sophie picks a sweet at random from a different box. All the chocolates in Sophie's box are identically wrapped.
The probability that she picks a caramel is denoted by p.

The probability that **both** Chris and Sophie pick a caramel is $\frac{1}{4}$



P (Chris picks a caramel) = $\frac{5}{8}$



P (Sophie picks a caramel) = p

15 (a) Work out the value of p.

.....

.....

.....

Answer ..... *(2 marks)*

15 (b) Calculate the probability that **neither** Chris **nor** Sophie picks a caramel.

.....

.....

.....

Answer ..... *(2 marks)*

16 Tom and Harry go fishing together.

The probability that Tom catches a fish is 0.7
The probability that Harry catches a fish is 0.4

They go fishing again.

What is the probability that **exactly one** of them catches a fish? You **must** show your working.

.....

.....

.....

.....

.....

.....

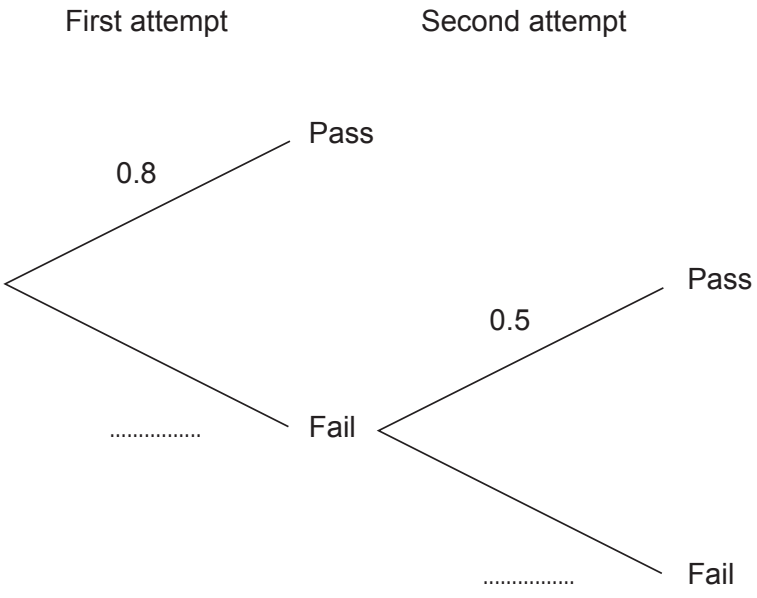
.....

.....

Answer ..... *(4 marks)*

17 After a course of driving lessons candidates must take a test to get a driving licence.
The probability of passing the test at the first attempt is 0.8
Those who fail can re take the test.
The probability of passing the re sit is 0.5

17(a) (i) Complete the tree diagram, which shows all the possible outcomes.



(1 mark)

17 (a) (ii) What is the probability that a candidate fails both attempts?

.....

.....

Answer ..... *(2 marks)*

17 (b) What is the probability that a candidate passes the course?

.....

Answer ..... *(1 mark)*

17 (c) Hassan and Shagufta both take the driving lessons course.
What is the probability that one of them passes and one of them fails?

.....

.....

.....

.....

Answer ..... *(3 marks)*

18 Nikki buys a pack of ten eggs.

Seven of the eggs are brown, three are white. An egg is taken at random.
A second egg is taken at random.

Calculate the probability that the two eggs will be **at least one** white egg.

.....

.....

.....

.....

.....

.....

Answer ..... *(3 marks)*

19* In a game, players try to win a coloured card. There are six possible colours.
The table shows the probability of winning each colour.

Colour of Card	Probability
Yellow	0.04
Green	0.07
Brown	0.09
Blue	0.10
Pink	0.13
Black	0.14

19 (a) Which colour is twice as likely to be won as green?

.....

Answer ..... *(1 mark)*

19 (b) Work out the probability of winning yellow or brown.

.....

Answer ..... *(2 marks)*

19 (c) Haziq plays the game 160 times.

Estimate the number of times that he does **not** win.

.....

.....

.....

.....

.....

Answer ..... *(4 marks)*

20 The town of Knutsford had an election.
The probability a vote was given to a particular party is shown.
One value is missing.

Party	Probability
Conservative	0.41
Labour	0.24
Liberals	0.22
UKIP	
BNP	0.04

20 (a) Complete the table.

.....

.....

(2 marks)

20 (b) Write Labour votes to Liberals votes as a ratio. Give your answer in its simplest form.

.....

.....

Answer ..... : ..... *(2 marks)*

20 (c) There are 15 000 people in the town.
8000 voted.

How many people in the town did **not** vote Conservative?

.....

.....

.....

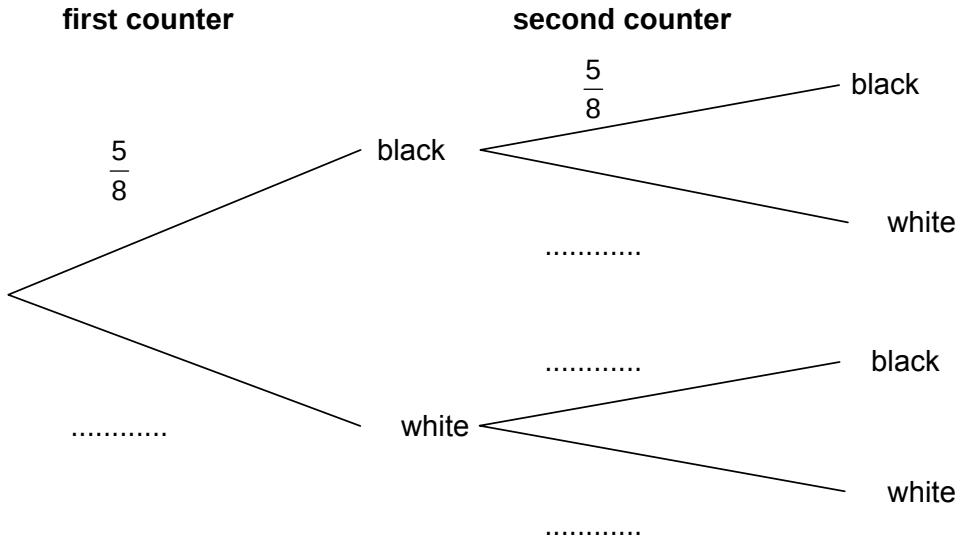
Answer ..... *(3 marks)*

21 A bag contains 5 black and 3 white counters.

A counter is taken from the bag at random and replaced.

Another counter is then taken from the bag at random.

21 (a) Complete the tree diagram.



(1 mark)

21 (b) What is the probability that both counters are white?

.....

.....

Answer ..... *(2 marks)*

21 (c) Some more black counters are added to the 5 black and 3 white counters in the bag.

A counter is taken from the bag at random and replaced.

Another counter is then taken from the bag at random.

The probability that both counters are white is now $\frac{1}{25}$.

How many black balls were added to the bag?

.....

.....

.....

.....

Answer ..... *(3 marks)*

22 Altrincham has the same number of people as Bury.

In Altrincham there are 95 males for every 100 females.
In Bury there are 105 males for every 100 females.

22 (a) Work out the ratio of males in Altrincham to females in Altrincham.
Give your answer in its simplest form.

.....

.....

Answer ..... *(2 marks)*

22 (b) Which town has more females?
Show how you decide.

.....

.....

(1 mark)

23 Mizba tossed a coin 100 times.
Heads appears 61 times.

23 (a) The same coin is tossed once more.

23 (a) (i) If the coin is fair, write down the probability that it lands on heads.

Answer ..... *(1 mark)*

23 (a) (ii) If the coin is biased, estimate the probability that the coin lands on heads.

Answer ..... *(1 mark)*

23 (b) Do you think the coin is fair?
Tick a box.

☐ Yes ☐ Don't know ☐ No

Give a reason for your answer.

.....

.....

.....

(2 marks)

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED