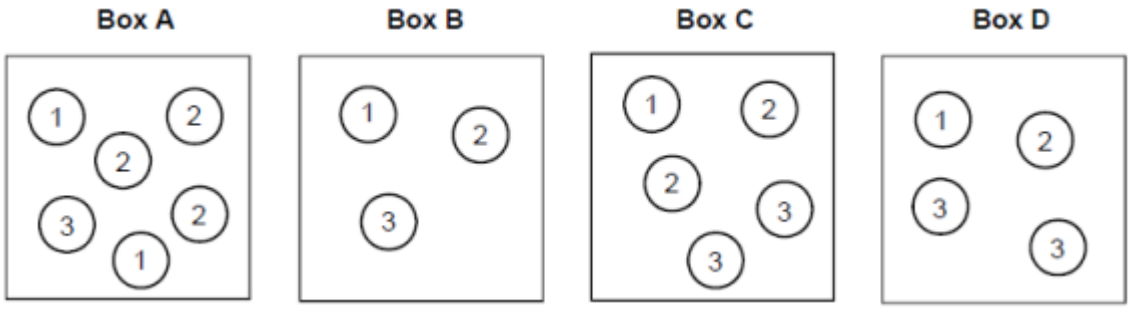
Q1.

Boxes A, B, C and D contain balls with numbers on them.



A ball is picked at random from each box.

(a) Which box gives the **greatest** chance of picking a 3?

You **must** show your working.

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Box .....

(2)

(b) Which two boxes give the **same** chance of picking a 1?

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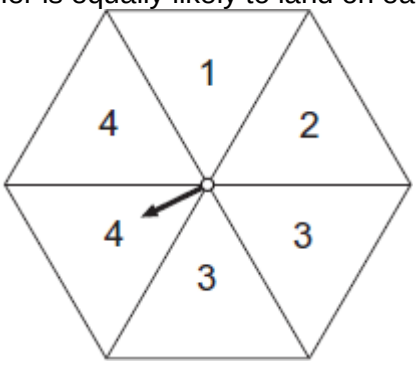
Box ..... and Box .....

(1)

(Total 3 marks)

Q2.

(a) The arrow on this spinner is equally likely to land on each section.



The arrow is spun 72 times.

How many times do you expect the arrow to land on 4?

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Answer .....

(2)

(b) An arrow on a different spinner is spun 250 times.
Some of the results are shown below.

Number shown	1	2	3	4	5
Frequency	25	53	62		

The relative frequency of landing on a 4 is the same as the relative frequency of landing on a 5

Work out the relative frequency of landing on a 4

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Answer .....

(3)
(Total 5 marks)

Q3.(a) Lucy thinks people prefer dogs to cats.

She asks dog owners,

"Do you prefer dogs or cats?"

Is the data likely to be biased?
Give a reason for your answer.

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(1)

(b) Sam asks 30 people,

"Do you prefer dogs or cats?"

One-fifth of the 30 people have no preference.
Twice as many choose cats as choose dogs.

Complete the table.

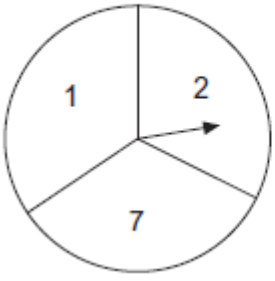
	Frequency
Dogs	
Cats	
No preference	
	Total = 30

(3)
(Total 4 marks)

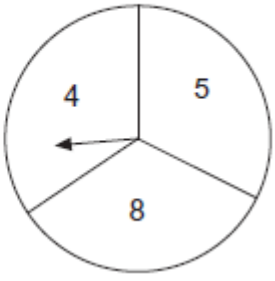
Q4.

(a) Here are two fair spinners.

Spinner A



Spinner B



In a game, both spinners are spun and the **higher** number is the final score.
For example, if 2 and 4 are spun the score is 4

Complete the table to show the possible scores when both spinners are spun.

		Spinner A		
		1	2	7
Spinner B	4		4	
	5			
	8			

(2)

(b) The same game is played with spinners C and D.

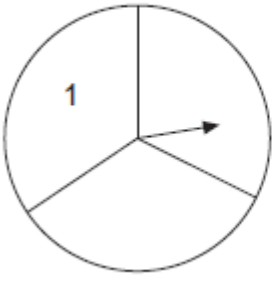
Using spinners C and D the probability of each score is shown below.

Score	1	2	3	4	5	6
Probability	0	0	$\frac{2}{9}$	$\frac{2}{9}$	$\frac{2}{9}$	$\frac{3}{9}$

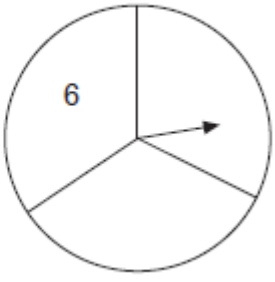
Complete the numbers on spinners C and D.

Practise on these spinners.

Spinner C

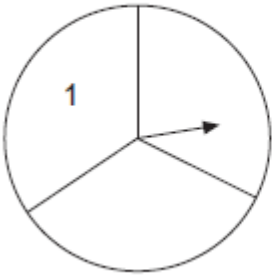


Spinner D

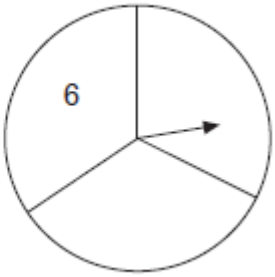


Put your final answer on these spinners.

Spinner C



Spinner D

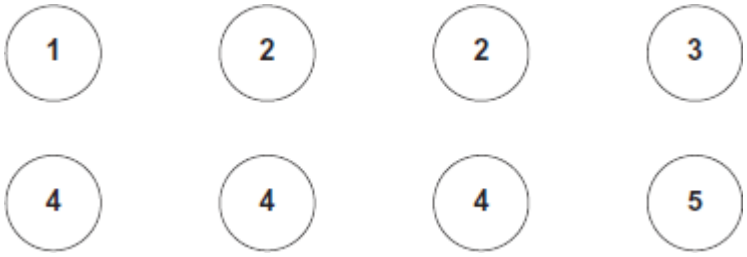


(2)
(Total 4 marks)

Q5.

Two bags, A and B, contain numbered counters.

(a) Here are the 8 counters in bag A.



A counter is chosen at random from bag A.

Write down the probability that the number on the counter is 4

Answer .....

(1)

(b) A counter is chosen at random from bag B.

The table gives the probabilities of the numbers on the counters in bag B.

Number on counter	6	7	8	9
Probability	0.2	0.1	0.4	0.3

Which bag has the greater probability of choosing an **even** number?
You **must** show your working.

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Answer .....

(2)
(Total 3 marks)

Q6.(a) A school has 400 boys and 500 girls.

The probability that a boy is vegetarian is 0.1
The probability that a girl is vegetarian is 0.2

Estimate the total number of vegetarians in the school.

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Answer .....

(3)

(b) There are ten prefects in the school.
Four of the prefects are vegetarian.

Two of the prefects are chosen at random to have lunch with a visitor.

Show that the probability that they are **both** vegetarian is $\frac{2}{15}$

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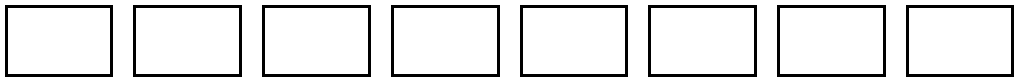
(2)
(Total 5 marks)

Q7. Put the numbers 1, 2 or 3 on each card so that when a card is picked at random

- the probability of picking a 2 is greater than $\frac{1}{2}$
- the probability of picking a 1 is twice the probability of picking a 3.



(Total 2 marks)

Q8. A bag contains only red counters and blue counters.
There are 6 **more** red than blue.

A counter is chosen at random from the bag.

The probability it is blue is $\frac{1}{4}$

How many **red** counters are in the bag?

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Answer .....

(Total 3 marks)

Q9. A play area has thousands of coloured balls.
They are white, pink or yellow.

Sam picks 10 balls at random.
The table shows some of her results.

white	pink	yellow

Frequency	4		
Relative frequency		0.1	

(a) Complete the table.

(3)

(b) Sam uses her results to estimate the proportion of white balls in the play area.

How could she make her estimate more reliable?

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(1)
(Total 4 marks)

Q10.

An ordinary six-sided dice is rolled 300 times.
It lands on five 120 times.

Do you think the dice is fair?
Give a reason for your answer.

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(Total 2 marks)

Q11. There are 24 counters in a bag.

One-third of the counters are blue.

5 red, 5 white and 5 blue counters are added to the bag.

Tom says,

"The probability of taking a blue counter from the bag is still $\frac{1}{3}$"

Is he correct?
Tick a box.

☐ Yes ☐ No ☐ Cannot tell

Give a reason for your answer.

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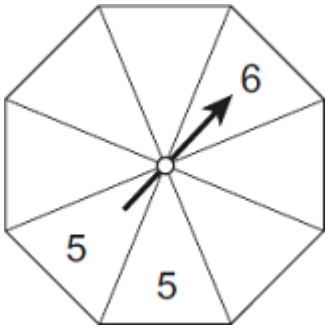
(Total 3 marks)

Q12. Here is a fair spinner with equal-sized sections.



Fill in the missing numbers on the spinner so that

the arrow is equally likely to land on 4 or 5

and the arrow is more likely to land on 3 than 6

)

and the total of all sections is 32.

(Total 3 marks)

Q13. Lee works at a leisure centre.

(a) He surveys a sample of 40 children.

	Can swim	**Cannot swim**	**Total**
Children	24	16	40

The council claims that more than 2/3 of children in the area can swim.

Do Lee's results support this claim?

You **must** show your working.

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(3)

(b) He also wants to know the proportion of **all** adults who can swim.

He surveys a sample of 50 adults at the leisure centre.

State one way that Lee can make his sample more reliable.

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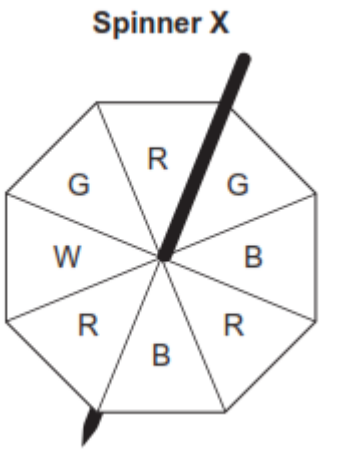
(1)
(Total 4 marks)

Q14.(a) Fair spinner X has eight equal sections.
The sections are either red (R), blue (B), green (G) or white (W).



(i) The spinner is spun.

On which colour is it least likely to land?

Answer .....

(1)

(ii) Write down the probability that the spinner lands on green.
Give your answer in its simplest form.

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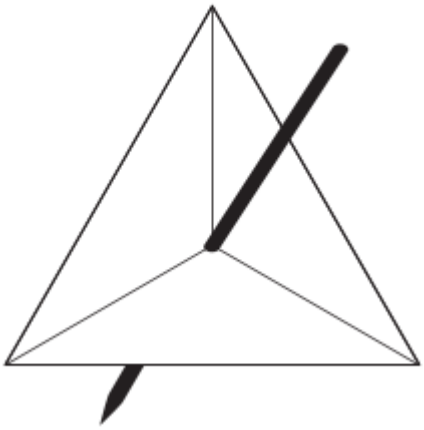
Answer .....

(2)

(b) Fair spinner Y has three equal sections.
It is certain to land on red (R).

Label spinner Y.

Spinner Y



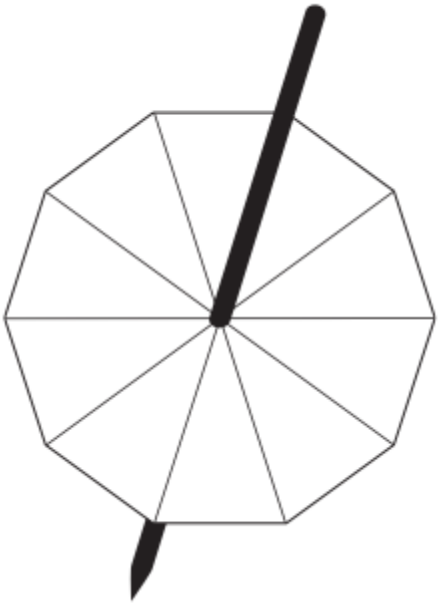
(1)

(c) Fair spinner Z has 10 equal sections.

Label spinner Z so that

it has the same four colours as spinner X
white is less likely than on spinner X
white and green are equally likely on spinner Z
red and blue are equally likely on spinner Z.

Spinner Z



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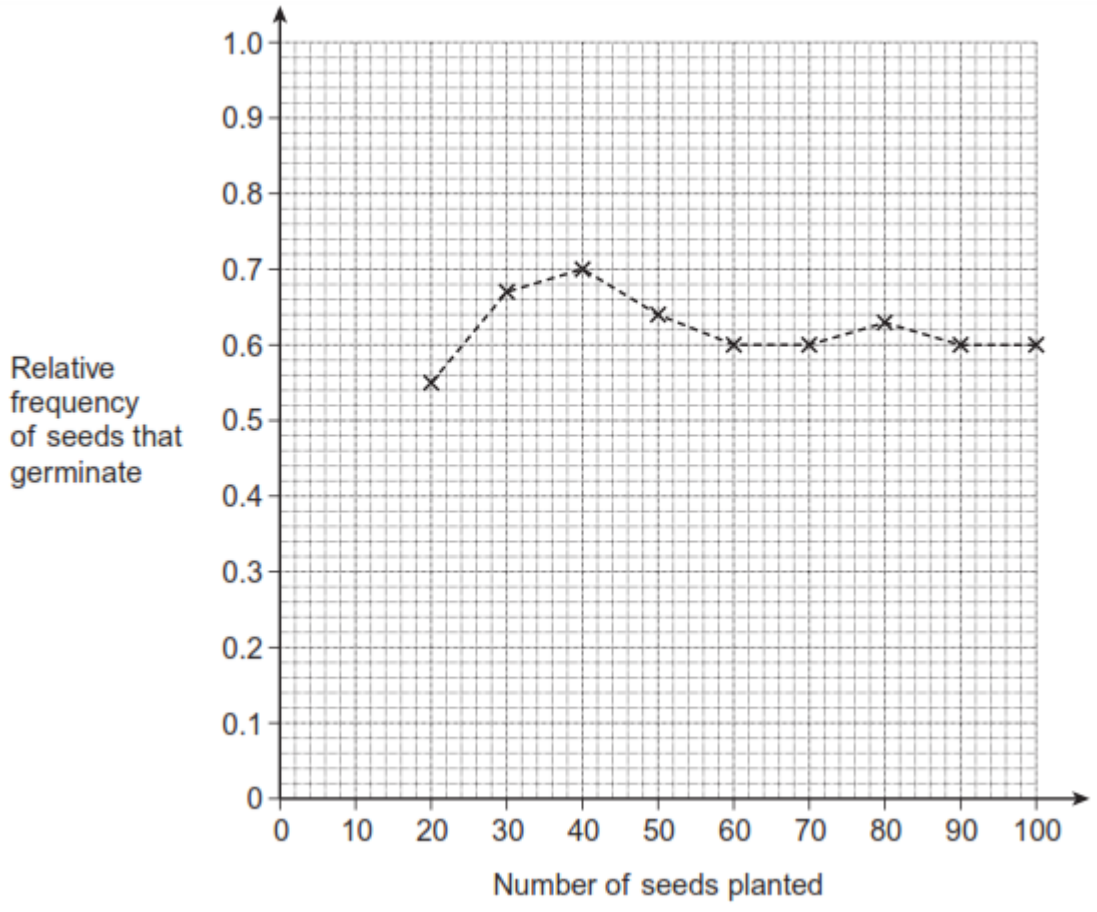
(2)
(Total 6 marks)

Q15. A gardener plants ten seeds each week from the same seed packet.
The graph shows the relative frequency of seeds that germinate.



(a) Nine seeds out of the ten planted in the first week germinate.

(i) Write down the relative frequency of seeds planted in the first week that germinate.

Answer .....

(1)

(ii) Plot your relative frequency on the graph.

(1)

(b) How many of the seeds planted in week 2 germinate?

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Answer .....

(2)

(c) There are 130 seeds in the seed packet.
The label on the packet states:

On average 80 of the seeds will germinate.

Is this statement fair?
Show how you decide.

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(2)
(Total 6 marks)