1. 60 British students each visited one foreign country last week.
The two-way table shows some information about these students.

	France	**Germany**	**Spain**	**Total**
Female			9	34
Male	15			
Total		25	18	60

(a) Complete the two-way table.

(3)

One of these students is picked at random.

(b) Write down the probability that the student visited Germany last week.

.....

(1)
(Total 4 marks)

2. Mark throws a fair coin.
He gets a Head.

Mark's sister then throws the same coin.

(a) What is the probability that she will get a Head?

.....

(1)

Mark throws the coin 30 times.

(b) Explain why he may not get exactly 15 Heads and 15 Tails.

.....

.....

(1)
(Total 2 marks)

3. Some bulbs were planted in October.

The ticks in the table show the months in which each type of bulb grows into flowers.

		Month					
		Jan	Feb	March	April	May	June
Type of bulb	Allium					✓	✓
	Crocus	✓	✓				
	Daffodil		✓	✓	✓		
	Iris	✓	✓				
	Tulip				✓	✓	

(a) In which months do tulips flower?

……

(1)

(b) Which type of bulb flowers in March?

……..

(1)

(c) In which month do most types of bulb flower?

……..

(1)

(d) Which type of bulb flowers in the same months as the iris?

……..

(1)

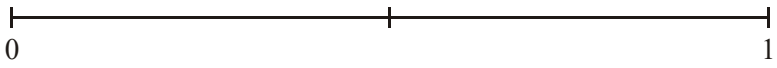
Ben puts one of each type of these bulbs in a bag.

He takes a bulb from the bag without looking.

(e) (i) Write down the probability that he will take a crocus bulb.

……..

(ii) On the probability scale, mark with a cross (×) the probability that he will take a bulb which flowers in February.



(2)
(Total 6 marks)

4. 80 students each study one of three languages.

The two-way table shows some information about these students.

	French	**German**	**Spanish**	**Total**
Female	15			39
Male		17		41
Total	31	28		80

(a) Complete the two-way table.

(2)

One of these students is to be picked at random.

(b) Write down the probability that the student picked studies French.

…….

(1)
(Total 3 marks)

5. 56 students were asked if they watched tennis yesterday.
20 of the students are boys.
17 girls watched tennis.
13 boys did not watch tennis.

(a) Use this information to complete the two way table.

	Boys	**Girls**	**Total**
Watched tennis			
Did not watch tennis			
Total			

(3)

One of these students is to be chosen at random.

(b) Write down the probability that the student chosen is a boy.

.....

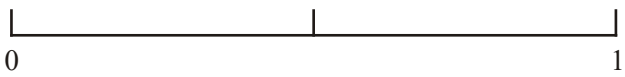
(2)
(Total 5 marks)

6. On the probability scale below, mark

(i) with the letter S, the probability that it will snow in London in June,

(ii) with the letter H, the probability that when a fair coin is thrown once it comes down heads,

(iii) with the letter M, the probability that it will rain in Manchester next year.



(Total 3 marks)

7. Joshua rolls an ordinary dice once.
It has faces marked 1, 2, 3, 4, 5 and 6.

(a) Write down the probability that he gets

(i) a 6,

……

(ii) an odd number,

……

(iii) a number less than 3,

……

(iv) an 8.

……

(4)

Ken rolls a different dice 60 times. This dice also has six faces.

The table gives information about Ken's scores.

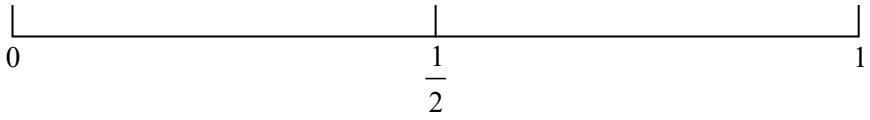
Score on dice	Frequency
1	9
2	11
3	20
4	2
5	8
6	10

(b) Explain what you think is different about Ken's dice.

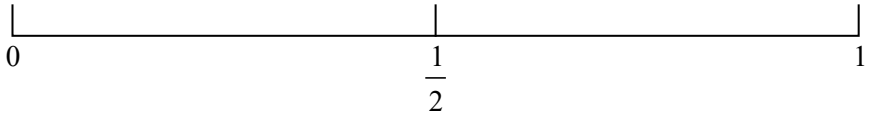
.....

(1)
(Total 5 marks)

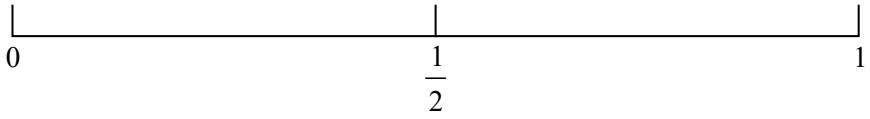
8. (i) On the probability scale, mark with a letter **S** the probability that the sun will rise tomorrow.



(ii) On the probability scale, mark with a letter **P** the probability that when you roll a fair 6-sided dice you will score a 7



(iii) On the probability scale, mark with a letter **Q** the probability that when you roll a fair 6-sided dice you will get a number less than 3



(Total 3 marks)

9. Emily has a bag of 20 fruit flavour sweets.

7 of the sweets are strawberry flavour,
11 are lime flavour,
2 are lemon flavour.

Emily takes at random a sweet from the bag.

Write down the probability that Emily

(a) takes a strawberry flavour sweet,

.....

(1)

(b) does **not** take a lime flavour sweet,

.....

(1)

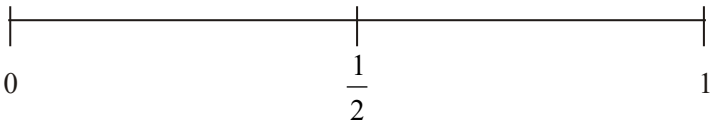
(c) takes an orange flavour sweet.

.....

(1)

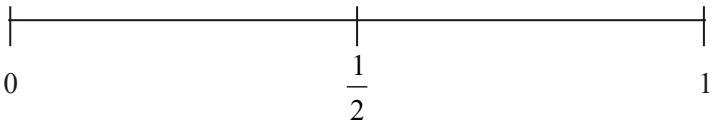
(Total 3 marks)

10. (a) On the probability scale below, mark with a cross (×)
the probability that it will rain on at least one day in London in 2008.



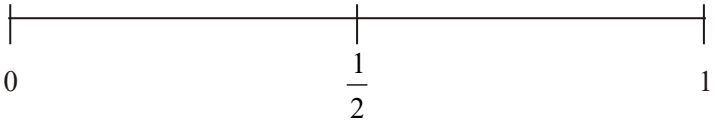
(1)

(b) On the probability scale below, mark with a cross (×)
the probability that you will get a 10 when you roll an ordinary 6-sided dice.



(1)

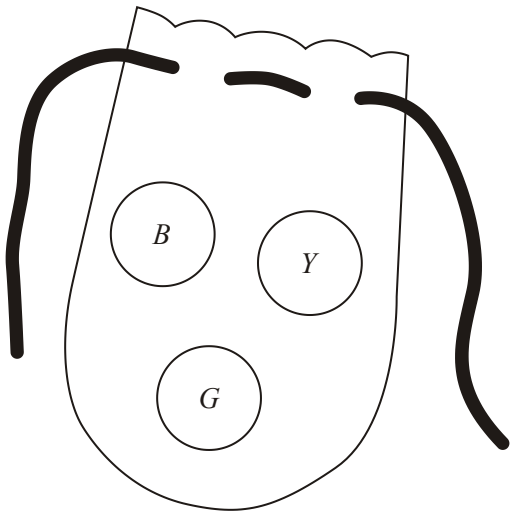
(c) On the probability scale below, mark with a cross (×)
the probability that you will get a head when you throw a coin.



(1)

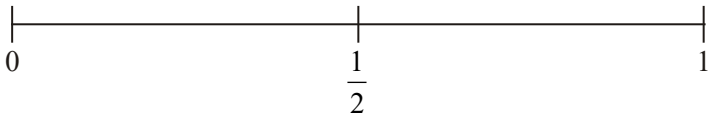
(Total 3 marks)

11. There are three beads in a bag.
One bead is blue, one bead is yellow and one bead is green.



Zoe takes a bead at random from the bag.

(a) On the probability scale, mark with the letter *B* the probability that she takes a blue bead.



(1)

Zoe now throws a coin.
One possible outcome for the bead and the coin is (green, heads).

(b) List all the possible outcomes for the bead and the coin.
One has already been done for you.

(green, heads) .....

.....

.....

(2)
(Total 3 marks)

12.

Impossible	Unlikely	Even	Likely	Certain

Which word from the box best describes the likelihood of each of these events?

(a) You throw an ordinary dice and get an eight.

.....

(1)

(b) You throw a coin and get a Heads.

.....

(1)

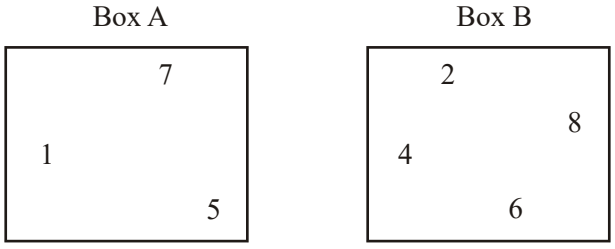
(c) December 6th 2008 is the day after December 5th 2008

.....

(1)

(Total 3 marks)

13. Michael picks one number from Box A.
He then picks one number from Box B.



List **all** the pairs of numbers he could pick.
One pair (1, 2) is shown.

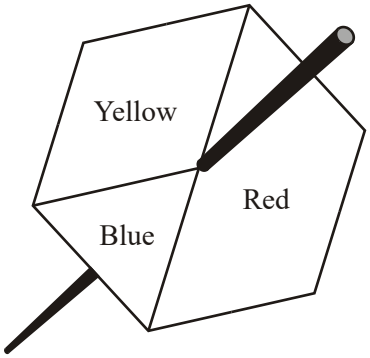
(1, 2) ...……...

……...

……...

(Total 2 marks)

14.



Here is a 6-sided spinner.
It has 3 sections.
Each section is a different colour.
The spinner will land on one of the colours.

On which colour is the spinner **most** likely to land?

…….

(Total 1 mark)

15. Kevin buys one raffle ticket.
A total of 350 raffle tickets are sold.
One of these tickets will win the raffle.
Each ticket has an equal chance of winning the raffle.

Write down the probability that Kevin's ticket will win the raffle.

……..

(Total 1 mark)

16. A company makes hearing aids.

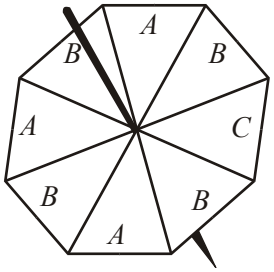
A hearing aid is chosen at random.
The probability that is has a fault is 0.09

Work out the probability that a hearing aid, chosen at random, will **not** have a fault.

……

(Total 1 mark)

17.



The diagram shows a fair spinner in the shape of a rectangular octagon.
The spinner can land on A or B or C.
Marc spins the spinner.

Write down the probability that the spinner will land on A.

.....

(Total 2 marks)

18. Natasha says the probability that she will be late for school next Monday is 1.5

Natasha is wrong.
Explain why.

.....

.....

(Total 1 mark)

19. Natasha says the probability that she will be late for school next Monday is 1.5

Natasha is wrong.

(a) Explain why.

.....

.....

(1)

Bryan plays a game.
The probability that he will win the game is 0.7

(b) Write down the probability that Bryan will **not** win the game.

.....

(1)
(Total 2 marks)

20. A bag contains some beads which are red or green or blue or yellow.

The table shows the number of beads of each colour.

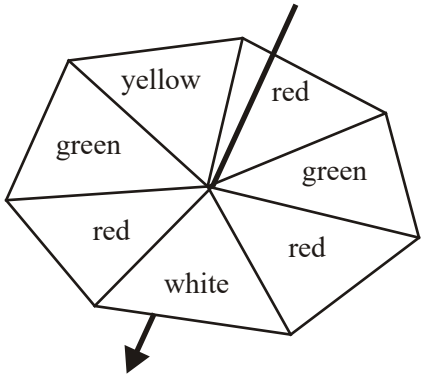
Colour	Red	Green	Blue	Yellow
Number of beads	3	2	5	2

Samire takes a bead at random from the bag.
Write down the probability that she takes a blue bead.

.....

(Total 2 marks)

21.



Here is a fair 7-sided spinner.
The spinner is to be spun once.
The spinner will land on one of the colours.

(a) On which colour is the spinner most likely to land?

.....

(1)

(b) Write down the probability that the spinner will land on green.

.....

(1)
(Total 2 marks)

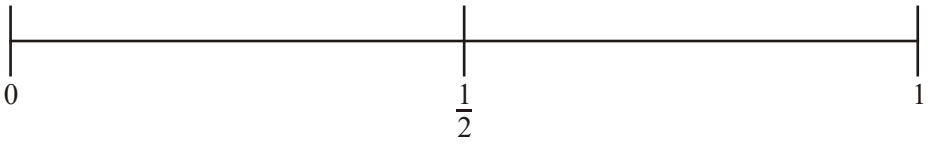
22. There are three beads in a bag.
One bead is red, one bead is white and one bead is yellow.

Sarah takes, at random, a bead from the bag.
She looks at its colour and then puts the bead back in the bag.

(a) On the probability line,

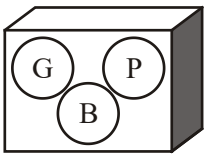
(i) mark with the letter R the probability that Sarah takes a red bead.

(ii) mark with the letter B the probability that Sarah takes a black bead.



(2)

There are also three beads in a box.
One bead is green, one bead is pink and one bead is blue.



Without looking, Saskia takes, at random, one bead from the bag and one bead from the box.
One possible outcome for the two beads she takes is (red, green).

(b) List all the possible outcomes.
One has already been done for you.

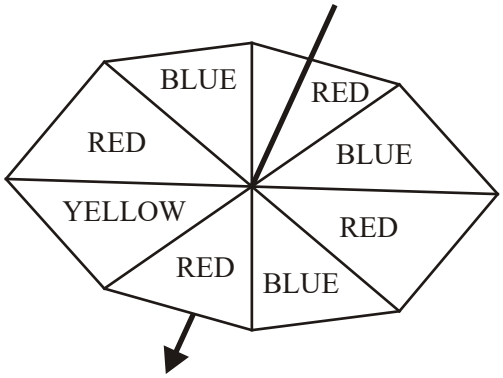
(red, green) .....

.....

.....

(2)
(Total 4 marks)

23.



Here is a fair 8-sided spinner.
The spinner is to be spun once.
The spinner will land on one of the colours.

(a) On which of the colours is the spinner **least** likely to land?

.....

(1)

(b) On which of the colours is the spinner **most** likely to land?

.....

(1)
(Total 2 marks)

24. Joshua rolls an ordinary dice once.
It has faces marked 1, 2, 3, 4, 5 and 6.

(a) Write down the probability that he gets

(i) a 6,

…….

(ii) an odd number.

…….

(2)

Ken rolls a different dice 60 times.
This dice also has six faces.

The table gives information about Ken's scores.

Score on dice	Frequency
1	9
2	11
3	20
4	2
5	8
6	10

(b) Explain what you think is different about Ken's dice.

.....

(1)
(Total 3 marks)

25. The probability that a spinner will land on red is 0.3
Sam is going to spin the spinner 150 times.

Work out an estimate for the number of times the spinner will land on red.

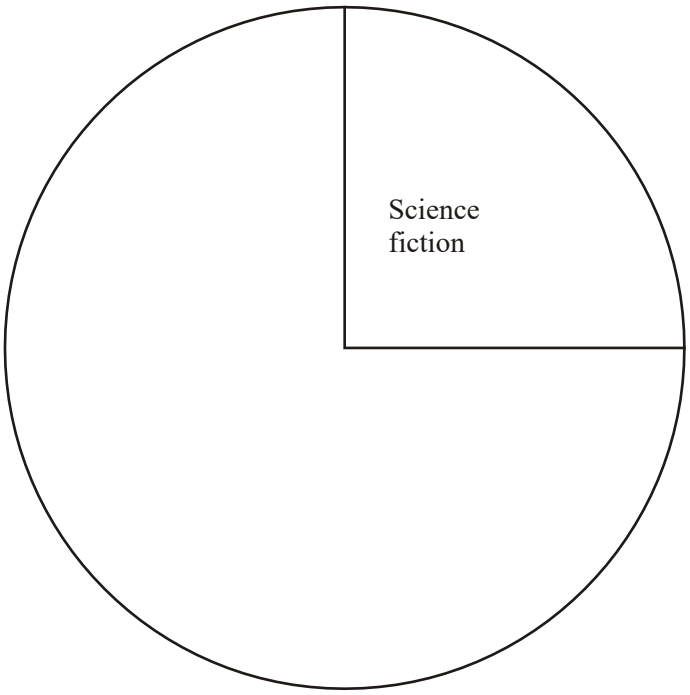
.....

(Total 2 marks)

26. The table shows information about 60 DVDs.

Type of DVD	Number of DVDs	Angle
Science fiction	15	90°
Comedy	20	
Musical	12	
Thriller	13	

(a) Complete the pie chart.



(3)

Paul takes a DVD at random.

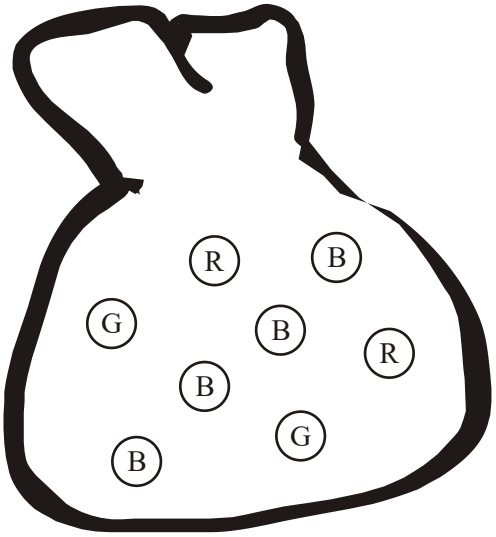
(b) Write down the probability that he takes a Science fiction DVD.

.....

(1)
(Total 4 marks)

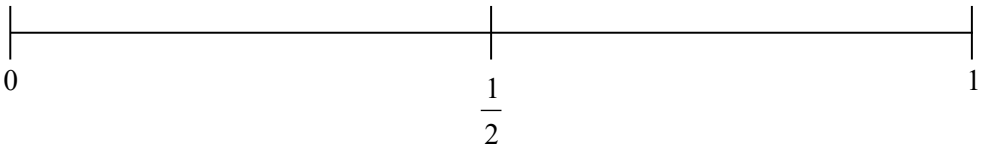
27. There are eight marbles in a bag.

Four marbles are blue (B),
two marbles are red (R)
and two marbles are green (G).



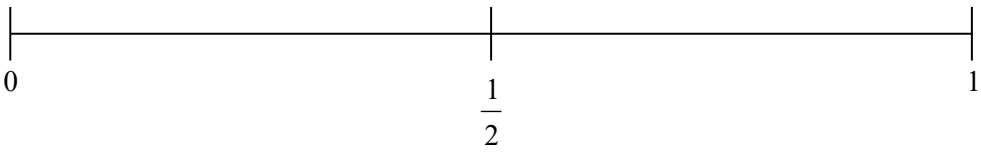
Steve takes a marble at random from the bag.

(a) On the probability scale, mark with the letter B, the probability that Steve will take a blue marble.



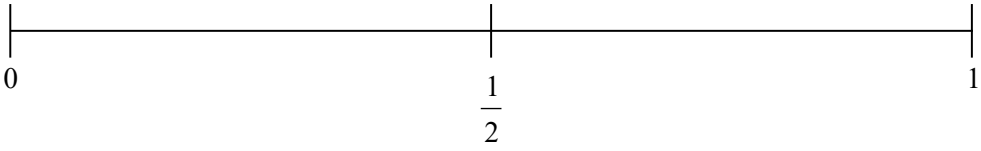
(1)

(b) On the probability scale, mark with the letter G, the probability that Steve will take a green marble.



(1)

(c) On the probability scale, mark with the letter Y, the probability that Steve will take a yellow marble.



(1)
(Total 3 marks)

28. Draw a circle around the word, or words, which best describe the following possibilities.

(a) It will rain in Manchester next September.

impossible	unlikely	even chance	likely	certain

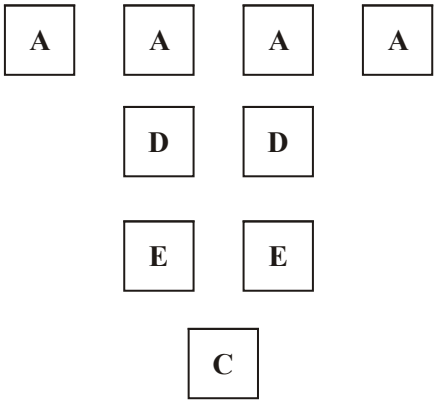
(1)

(b) The next baby to be born in London will be a girl.

impossible	unlikely	even chance	likely	certain

(1)
(Total 2 marks)

29. The diagram shows some letters on cards.



Tamara takes a card at random.

(a) Which letter is **most** likely to be on the card?

.....

(1)

(b) Which letter is **least** likely to be on the card?

.....

(1)
(Total 2 marks)

30. Iqbal eats in a cafe.
He can choose **one** main course and **one** piece of fruit.

Main Course	**Fruit**
Fish Lamb Salad	Apple Banana Pear

One possible combination is (Fish, Pear).

Write down all the possible combinations that Iqbal can choose.
The first one has been done for you.

...(F , P).....

.....

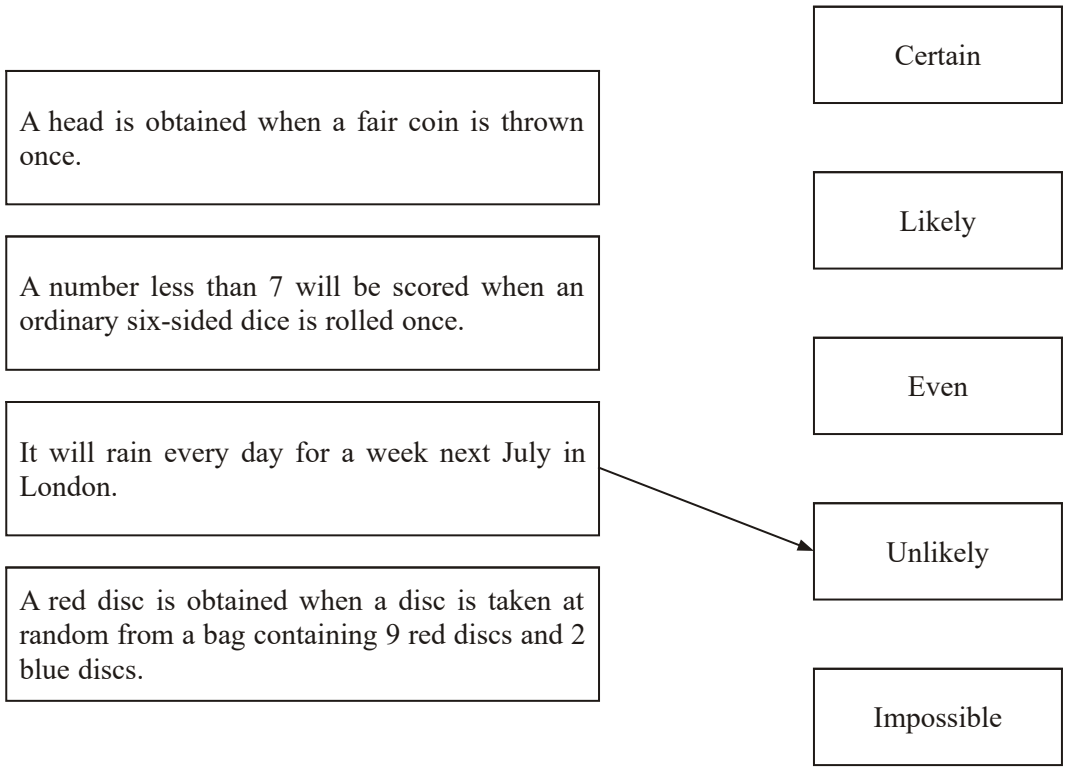
.....

(Total 2 marks)

31. Here are some statements.

Draw an arrow from each statement to the word which best describes its likelihood.

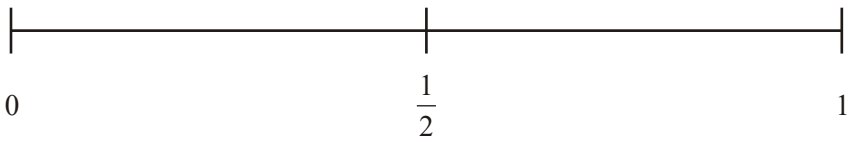
One has been done for you.



(Total 3 marks)

32. Tom throws an ordinary coin once.

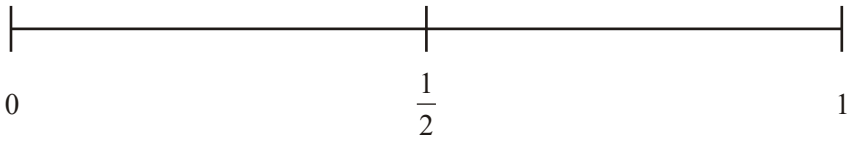
(a) On the probability scale, mark with a cross (×) the probability that the coin will show tails.



(1)

Tom rolls an ordinary dice once.

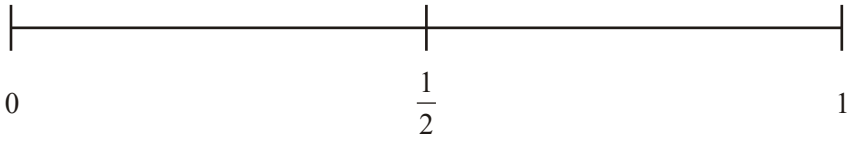
(b) On the probability scale, mark with a cross (×) the probability that he will score a number less than 6.



(1)

Tom takes a Maths test.

(c) On the probability scale, mark with a cross (×) the probability that he will score more than full marks.



(1)
(Total 3 marks)

33. Lucy uses some letter cards to spell the word "NOVEMBER".

N	O	V	E	M	B	E	R

Lucy takes one of these cards at random.

Write down the probability that Lucy takes a card with a letter E.

.....

(Total 2 marks)

34. Ishah spins a fair 5-sided spinner.
She then throws a fair coin.

(a) List all the possible outcomes she could get.
The first one has been done for you.

(1, head) .....

.....

(2)

Ishah spins the spinner once and throws the coin once.

(b) Work out the probability that she will get a 1 and a head.

.....

(1)
(Total 3 marks)

35. The table shows some information about 4 cars for sale.

Type of car	Number of doors	Number of previous owners	Cost in £
Saloon	4	0	17 200
Coupé	3	2	12 500
Sports	2	3	14 950
Estate	5	2	11 300

(a) How many doors does the Coupé have?

.....

(1)

(b) Which type of car costs less than £12 000?

.....

(1)

Simon picks a car at random.

(c) Write down the probability that Simon will pick a car with exactly two previous owners.

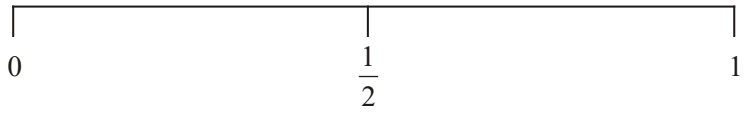
.....

(2)
(Total 4 marks)

36. In a box, there are 11 coloured bricks.
5 bricks are red, 2 bricks are blue, 3 bricks are orange and 1 brick is green.

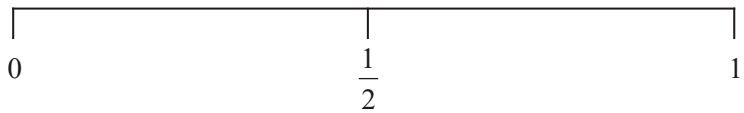
Sally takes one of these bricks at random.

(a) On the probability scale, mark with a letter R, the probability that Sally will take a red brick.



(1)

(b) On the probability scale, mark with a letter W, the probability that Sally will take a white brick.



(1)
(Total 2 marks)

01. (a)

2	23	9	34
15	2	9	26
17	25	18	60

3

B3 for all correct
(B2 for 4 or 5 entries correct)
(B1 for 2 or 3 entries correct)

(b) $\frac{25}{60}$ 1

B1 for $\frac{25}{60}$ *or* $\frac{5}{12}$ *oe*

$\frac{25}{60}$ *wrongly cancelled gets B1 ISW*

[4]

02. (a) $\frac{1}{2}$ 1

B1 for $\frac{1}{2}$ *oe*

(b) reason 1

B1 for reason e.g could get 30 heads

[2]

03. (a) April & May 1

B1 for both

(b) Daffodil 1

B1

(c) Feb 1

B1

(d) Crocus 1

B1

(e) (i) $\frac{1}{5}$ 2

B1 for $\frac{1}{5}$ *oe*

(ii) × from 56 mm to 64 mm from 0

B1 A single mark on the line, between 56 mm and 64 mm measured from end 0

[6]

04. (a)

	11	13
16		8
		21

2

B2 all correct
(B1 for 2 correct) sign

(b) $\frac{31}{80}$ 1

B1 oe

[3]

05. (a)

7	17	24
13	19	32
20	36	56

3

B3 all correct
(B2 for either 2 rows or 2 columns correct)
(B1 for either 1 row or 1 column correct)

(b) $\frac{20}{56}$ 2

B2 ft for $\frac{"20"}{"56"}$ *oe*
(B1 for k/ "56" with 0 < k < "56")

[5]

06. (i) S extreme left 3

B1 cao

(ii) H middle
B1

(iii) M extreme right
B1

[3]

(a)

11		13
16	8	
	21	2

B2 all correct
(B1 for 2 correct) sign

(b) $\frac{31}{80}$

07. (a) (i) $\frac{1}{6}$ 4
B1 accept equivalent fractions, decimals, or percentages
Accept 0.16 or better, 16 % or better

(ii) $\frac{1}{2}$
B1 accept equivalent fractions, decimals or percentages

(iii) $\frac{1}{3}$
B1 accept equivalent fractions, decimals or percentages
Accept 0.33 or better, 33% or better

(iv) 0
B1 accept 0/6, zero, nought

(b) Ken's dice is biased 1
B1 for dice is biased, unfair, weighted oe

[5]

08. (i) S marked at 1

B1 for S within 1/2 cm of 1

(ii) P marked at 0

B1 for P marked at 0 cao

(iii) Q marked at "1/3" 3

B1 for Q marked at 1/3 ± 1 cm use overlay

[3]

09. (a) $\frac{7}{20}$ 1

B1 for $\frac{7}{20}$ *oe*

(b) 7 + 2 (or 20 – 11) are not lime flavour

$\frac{9}{20}$ 1

B1 for $\frac{9}{20}$

(c) 0 1

B1 for 0, zero or nought ($\frac{0}{20}$ *gets B0)*

[3]

10. (a) 1 marked 1

B1 1 marked on line ± 1 cm

(b) 0 marked 1

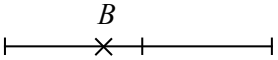
B1 0 marked on line ± 1 cm

(c) ½ marked 1

B1 ½ marked on line ± 1 cm

[3]

11. (a) B



1

B1 for B marked on line 0.25 ≤ B < 0.5

(b) (g, t), (y, h), (y, t) (b, h), (b, t) 2

B2 for 5 correct pairs (order within brackets need not be consistent, ignore pairs repeated) and no incorrect pairs
(B1 for 2 or more correct pairs, ignore any incorrect pairs)

[3]

12. (a) Impossible 1

B1 cao

(b) Even 1

B1 cao

(c) Certain 1

B1 cao

[3]

13. (1,2) (1,4) (1,6) (1,8)
(5,2) (5,4) (5,6) (5,8)
(7,2) (7,4) (7,6) (7,8) 2

B1 for 8 correct pairs (i.e. 7 extra)
B2 for all 12 pairs, or all 24 pairs

[2]

14. Red 1

B1

[1]

15. $\frac{1}{350}$ 1

B1 oe eg. 0.0028 OR 0.0029 OR 0.28% OR 0.29%

[1]

16. 0.91 1

1 – 0.09

B1 for 0.91 oe

[1]

17. 3/8 2

B2 for 3/8 oe
(B1 for n/8 oe where n is an integer less than 8 or 3 : 8 or 3 in 8 or 3 out of 8)

[2]

18. explanation 1

B1 for probability cannot be more than 1

[1]

19. (a) explanation 1

B1 for probability cannot be 1 or probability scale from 0 to 1

(b) 0.3 1

B1

[2]

20. 5/12 2

M1 for $\frac{p}{3+2+5+2}$ *where* $p \leq 12$ *[accept 0.42 and 42% or better]*
A1 for 5/12 œ
[SC: B1 for 5 out of 12 or 5 in 12 or 5:12]

[2]

21. (a) red 1

B1

(b) $\frac{2}{7}$ 1

B1 for $\frac{2}{7}$ or 0.28 or 0.29 or 28% or 29%
(0.2857142...)

[2]

22. (a) (i) R at $\frac{1}{3}$ 2

B1

(ii) B at 0

B1

(b) (r, g) (r, p) (r, b)
(w, g) (w, p) (w, b)
(y, g) (y, p) (y, b) 2

B2 all correct
(B1 for 4 extra or more)

[4]

23. (a) Yellow 1

B1 cao

(b) Red 1

B1 cao

[2]

24. (a) (i) $\frac{1}{6}$

B1

(ii) $\frac{1}{2}$ 2

B1 accept equivalent fractions, decimals or percentages

(b) Ken's dice is biased 1

B1 for dice is biased, unfair, weighted oe

[3]

25. 0.3 × 150 2
45 or "45 out of 150"

M1 for 0.3 × 150, 45/150 or 45:150 or digits 45 seen.
A1 45 or "45 out of 150"

[2]

26. (a) Overlay of pie chart; 3
angles of 120°,72°, 78°

B3 for a correct fully labelled pie chart
(B2 for 4 sectors labelled, 1-2 drawn inaccurately with labels, OR 4 sectors drawn accurately, no labels.)
(B1 for 4 sectors, 1-2 drawn inaccurately, no labels OR for correctly completed table if no other marks awarded)
Give bod unless sectors are clearly outside the tramlines given on the overlay. Lines need not be ruled, but must be within tolerance.
Note: in using the overlay for "musical" the two outer tramlines may be used to give a maximum of B2.

(b) $\frac{1}{4}$ 1

B1 for $\frac{90}{360}$ *or better*
Accept as a fraction, an equivalent fraction, as a decimal (0.25) or a percentage (25%).
Anything else (eg ratio, in words, etc) award 0 marks.

[4]

27. (a) B 1

B1 for B at ½

(b) G 1

B1 for G at ¼

(c) Y 1

B1 for Y at 0

[3]

28. (a) Likely 1

B1 for certain or likely or both

(b) Even chance 1

B1 cao

[2]

29. (a) A 1

B1

(b) C 1

B1

[2]

30. (FP), FA, FB, LA, LB, LP, SA, SB, SP 2

B2 for all 9 correct allow no duplicates or extras
(B1 for 4 correct pairs i.e. (FP) and 3 more, allow duplicates as long as there are 4 correct pairs)

[2]

31. Even, certain, likely 3

B3 for all 3 additional lines correct
(B1 for each additional line correct)

[3]

32. (a) 1

B1 for cross at ½ (allow ±2 mm tolerance)

(b) 1

B1 for cross between 3/4 and 1

(c) 1

B1 for cross at 0 (allow ±2 mm tolerance)

[3]

33. $\frac{2}{8}$ 2

M1 for $\frac{x}{8}$ *(x < 8) or* $\frac{2}{x}$ *(x > 2)*

A1 for $\frac{2}{8}$ *o.e.*

[2]

34. (a) (1,H), (2,H), (3,H), (4,H), (5,H), (1,T), (2,T), (3,T), (4,T), (5,T) 2

B2 for listing 10 outcomes with no extras

(B1 for listing 4 additional outcomes, ignore repeats or extras)

(b) $\frac{1}{10}$ 1

B1ft for $\frac{1}{10}$ *o.e. or 1/their total*

Accept decimals or percentages

[3]

35. (a) 3 1

B1 cao

(b) Estate 1

B1 cao

(c) $\frac{2}{4}$ oe 2

M1 for a fraction with a denominator of 4 or numerator of 2

A1 for $\frac{2}{4}$ *oe (accept 0.5 or 50%)*

SC B1 for 2 out of 4 or 1 out of 2

B0 for 1 : 2 or 2 : 4 or 4 : 2 etc

[4]

36. (a) Between ¼ and ½ but nearer to ½ 1

B1 for a mark between ¼ and ½ but nearer to ½ than ¼

(b) At 0 1

B1 for a clear mark at 0 within ± 2 mm

[2]

01. Mathematics A

Paper 1

(a) This question was answered totally correctly by 51% of candidates. The main error was in the calculation of the numbers for Germany. Only 24% of candidates scored no marks.

(b) Only 25% of candidates answered this question correctly. Many candidates wrote the probability incorrectly as a ratio or a description e.g. 25 out of 60 and some even made it 25%.

Paper 3

Most candidates were able to gain full marks in part (a) by completing the two-way table correctly. Any errors tended to be made finding the two missing totals. In part (b) about three quarters of the candidates gave the correct probability. It was disappointing that some candidates did not express the probability in a correct form, i.e. as a fraction, a decimal or a percentage.

Mathematics B Paper 14

Although candidates must have had practice at two-way tables presented in this form by working the various modular past papers, only 47% completed part (a) correctly.
However most candidates were able to fill in at least two or three values correctly, thereby scoring at least one mark.
Only 26% of the candidates were able to successfully answer part (b) correctly.

02. Most scored the mark in the first part with $\frac{1}{2}$; 50% also appeared regularly and 0.5 occasionally.

All three answers were, of course, accepted but 50-50, 1 : 2, 1 in 2 and evens were not.
The simplest explanations in part (b) stated other possible combinations e.g. *He could get 30 tails.* Explanations involving the unpredictability or independence of the thirty throws were also accepted but reference to a single throw e.g. *It could land on either side.* received no credit. A common misconception was that the probability of getting 15 heads and 15 tails was 0.5.

03. Errors were rare in the first four parts but the final part proved considerably more demanding. In part (e)(i), $\frac{2}{11}$ was the most popular wrong answer while, in part (e)(ii), crosses could appear anywhere on the probability scale, particularly at $\frac{1}{2}$. Whether this was because of unfamiliarity with probability scales or an error in finding the probability itself is impossible to say.

04. The two way table was well attempted, with most candidates gaining full marks. Part (b) was also well answered, with most candidates using correct probability notation. The most common incorrect answer seen was 1/3 or 1/31.

05. This question was answered well and provided most candidates with a successful start to the paper. Almost all candidates demonstrated that they knew how to complete a two way table but some lost marks unnecessarily by not taking sufficient care when entering the numbers provided into the table. Even those who made errors in the table often gained both marks in part (b). Common incorrect answers were $\frac{1}{20}$ and $\frac{20}{36}$. Few candidates expressed the probability in an unacceptable form.

06. 'H' or its equivalent was positioned correctly in over 85% of the scripts. In many cases 'S' and 'M' were also within tolerance ('S' = nearly 60% and 'M' = nearly 70%). Many did not mark a specific point on the number line but this did not generally affect them scoring the marks.

07. Candidates clearly understood the concept of dice rolling and the probability of scoring different combinations of numbers. 57% of candidates could cope with $\frac{1}{6}$, 60% could cope with an odd number, but only 49% could cope with less than 3, whilst a probability of 0 was coped with by 65% of candidates. When it came to explaining a skewed set of data caused by a biased dice only 8% scored the mark for weighted or biased. There were still many candidates who fail to write probability correctly as a decimal, fraction or a percentage. These candidates still use '3 out of 6', '3 in 6', 3:6 etc.

08. Marking a probability on a probability scale is a well understood concept by Foundation candidates. Parts (i) and (ii) were usually always correct but only a small minority of candidates were able to correctly place a third on the scale for part (iii).

09. **Foundation Tier**

Candidates found this question quite difficult. Part (a) was often correct but in part (b) candidates frequently wrote 11/ 20, the probability of getting a lime flavoured sweet rather than the 9/20 that is the probability of not getting a lime flavoured sweet. The least successful part was part (c) where the answer of 0, zero or nought was expected. Many candidates did not score any marks because they wrote 0/20.

Intermediate Tier

The first two parts were answered very well and only a relatively small number of candidates gave probabilities that were incorrectly expressed. Candidates were less successful in part (c). The common error was to write the answer as $\frac{0}{20}$ instead of just '0' or 'zero'.

10. This was another question where candidates were usually very successful and often scored full marks.

11. In part (a) it was rather surprising that only half of the candidates could mark the probability correctly on the scale. Part (b) was generally answered well. Many candidates knew what was expected and weaker candidates were often able to gain one mark by identifying two correct pairs. Some used red as a colour and some did didn't appear to know that tails is on the opposite side of a coin to heads.

12. Whilst parts (b) and (c) were usually correct, in part (a) many candidates gave "unlikely" as their answer. Perhaps some candidates were unaware of the meaning of an 'ordinary' dice.

13. This was well done with most candidates scoring two marks. Those that did not tended to only give four or five extra pairs scoring no marks.

14. There were only a handful of incorrect responses with most candidates indicating *red* as their choice of colour.

15. Candidates produced 1 in 350, 1 out of 350, etc without noting that a fraction, decimal or percentage is required. The words *unlikely*, *not much*, etc were seen fairly often. A significant number had the idea that one must be subtracted from the total of 350 giving the answer as $\frac{1}{349}$.
In general this was not well answered by many candidates.

16. This question was well done but 40% failed to score the 1 mark giving incorrect answers of 0.9, 9/100, 0.1, 0.99 and 0.09

17. Most candidates gained full marks in this question, however answers of 3 in 8, 3:8 and 3 out of 8 were not uncommon.

18. Fewer than 5% of the candidates were able to explain why the statement about the probability was wrong. They failed to recognise that the key part was the fact that the probability was 1.5 and that the probability scale goes from zero to one. Far too many candidates got very involved in why she might not be late for school or suggested various reasons for possible lateness including changing her alarm clock! Some wanted probability to be expressed an percentages or fractions whilst others suggested terms such as 'likely' or 'certain' should be used.

19. Part (a) of this question was not very well done with under 50% only being awarded the mark. Many unsuccessful answers were from weaker candidates who referred to days of the week or the good attendance record of Natasha.
Many candidates could not express themselves clearly enough, often referring to decimals or implying that the probability needed to be a whole number, without mentioning "1". 0.5 was a common, incorrect idea, assuming that late and not late were equally likely.
The best answers indicated that the maximum a probability could be was 1, or that probabilities range from 0 to 1.
Part (b) was done much better with only 1 in 5 candidates failing to gain the mark.

20. This question was answered well by the majority of candidates, with only 12.5% failing to score a mark. Common mistakes were the misreading of the required colour giving answers of 3/12 or 2/12 or an answer of 1/4, showing a lack of understanding of the question.

21. Nearly all candidates were able to determine that there were more coloured 'red' on the spinner than any other colour.
Stating the probability in part (b) gave rise to about 60% being able to come up with the result as '$\frac{2}{7}$'. It was encouraging to note that there were considerably fewer than in previous years who wrote the probability incorrectly as '2 out of 7' or '2 in 7'. The most common incorrect answer was $\frac{2}{5}$.

22. Marking the letter 'B' on the probability line at '0' scored a mark in over 60% of cases but this was not matched by trying to indicate the position of 'one-third' for the probability of the red bead. There were some attempts to place the R at 'one-third' of the way between '0' and '½' or at '½' rather than between '0' and '1'. The majority appeared to place it at around '¼'. Part (b) asked for the listing of possible outcomes taking one bead from one bag and another bead from the other bag. A significant number appeared to have difficulty in dealing with the problem in terms of understanding what was required. Combinations from the same bag were incorrectly quoted. However, in contrast, there were many well structured solutions in which one coloured bead from one bag was linked with, in turn, the three from the second bag. A logical approach certainly brought its rewards to nearly 40% of the candidates on this question.

23. Nearly all candidates were able to provide the correct colour in both parts of the question, which was encouraging.

24. Around two thirds of the candidates scored a mark in each of the two parts in (a). Sadly, however, it is still common to see answers given in an incorrect format such as 1 in 6, 1 out of 6, and at its worst, 1:6 The simple answer to part (b) was that the dice was biased or weighted and there were indications along these lines. However, the majority concentrated, not on the dice, but on the figures in the frequency table. The 'score of 3 came up 20 times' was correctly observed but not accounted for. Other lines of thought focussed upon the number of throws of the dice, the way in which the dice was rolled and the size of the dice. The more unusual reasons given included 'Kens dice is yellow' and the indigestible 'after 60 times she eat dice'. The success rate was low, with only just over 5% of the candidates scoring the available mark.

25. There were a significant number of candidates who wrote their answer as a probability rather than as a quantity, usually giving it as a fraction of 150. Those who failed to understand the question performed a division rather than a multiplication. Many candidates wrote the correct answer, gaining full marks.

26. Only those with protractors gained significant marks in this question. It was rare to see the correct angles written in the table. Indeed, this was not well answered. Few used the detail already in the table to identify the scale factor of 6. Angles shown were almost chosen at random. A significant number of candidates attempted to draw their chosen angles, found they could not fit, and left a fifth sector as a result. Many drew angles which were almost approximate, and sometimes did not match the angles given in the table. Most candidates wrote correct labels on their sectors, but without a reasonable diagram, no marks could be given.

In part (b) many gained full marks by some equivalent fraction to 90/360. The fraction 15/60 being the answer most seen. A small number still had a complete lack of understanding on how to write their answer for probability giving words or ratio. Many tried to cancel their fraction unsuccessfully or felt they had to give it as a decimal and percentage as well.

27. The vast majority of candidates gained some credit for their answers to this question and many gained all three marks available. A small but significant proportion of candidates marked "1" and "½" as their answers in the first two parts to the question. The third part was successfully answered by nearly all candidates.

28. The vast majority of candidates who scored a mark on this question tended to score it in part (b). Many circled two words in part (a) with 'even chance' being the most popular incorrect answer. There was a 51% success rate for part (a) whereas over 84% of the candidates were successful in part (b).

29. This question was well understood and 99% of candidates scored full marks.

30. This question too was well answered with 80% of candidates writing down the 8 missing combinations. A few wrote all the combinations but with the order reversed and an even smaller minority wrote only two other combinations mainly L,A and S,B and one or two wrote some combinations that weren't allowed A,B or L,S etc. Even more occasionally about half a dozen in total consisted of advise on appropriate menu combinations, suggestions about which were the healthiest meals – or even the cost of each item! Only 11% of candidates scored no marks.

31. Over 60% of the candidates scored all 3 marks available for this question. Whilst the vast majority could match up the first statement with the correct word, a large number of candidates thought it "impossible" for a number less than 7 to be scored when an ordinary six-sided die is rolled once. This may have been due to the candidate's lack of care in reading the statement given. This question proved to be a good discriminator.

32. Part (a) was done well by the vast majority of the candidates.

Part (b) was not done well. Common incorrect answers here include putting the cross at 1 or at 3/4 or between 0 and 1/2.

Part (c) was done well by most candidates. Common incorrect answers here include putting the cross at 1 or at 1/4 or between 1/2 and 1.

33. This question was answered well by the majority of the candidates. Most candidates knew that they were expected to write their answer as a fraction. Common incorrect answers here were 1/8, 2/6, 1/7, 2 out of 8, 2:8 and likely.

34. There was a variety of responses to listing all the outcomes from spinning the spinner and throwing a coin. A large number of candidates had no idea (around 18%) and many others did not realise that there were two options for the coin, namely Heads and Tails.

Many only took note of the Heads on the coin and so only added 4 more possible outcomes. Others were so used to working with dice that they added the extra (6, Head), (6, Tail). Several candidates wrote the outcomes as if they were just from spinners e.g. (1, 1) (2, 1).

Around 60% of the candidates were able to list the 10 outcomes correctly and over 28% were able to score all 3 marks. The most common error in part (b), very frequently seen, was to see an answer of 2/7 or 1/7 obtained by attempting to add the fractions 1/5 and 1/2. It was also quite common to see both the fractions 1/5 and ½ on the answer line separated by a comma. Others wrote 1/9 as they failed to include the given (1, head).

35. This question was well understood with 98% of candidates obtaining the correct answer for part (a) and 97% of candidates for part (b). In part (c) candidates were rewarded with 1 mark for probabilities with a denominator of 4 or a numerator of 2 or for writing the probability as 2 out of 4 or 1 out 2. 66% of candidates gained 2 marks and 13% gained 1 mark. Common incorrect answers included ¼, ¾, 4/7 and 2/5. A small number of candidates appeared to not understand the question and gave answers such as “coupe” or “saloon”.

36. This question too was well understood but only 35% of candidates obtained 2 marks for marking both probabilities on the probability scale correctly. One mark was obtained in part (a) for marking the probability scale between a quarter and a half and nearer to a half then a quarter. Many candidates thought that 5/11 was actually ½ and marked it on the halfway point or marked the point between a half and one so did not score the mark. Many candidates placed their 5/11 mark at or beyond the ½ mark on the scale. In part (b) the success rate was much higher with 58% gaining the mark for marking the probability near zero.