1. Four teams, City, Rovers, Town and United play a competition to win a cup. Only one team can win the cup.

The table below shows the probabilities of City or Rovers or Town winning the cup.

City	Rovers	Town	United
0.38	0.27	0.15	x

Work out the value of x.

.....

(Total 2 marks)

2. The table shows information about the number of fillings the students in a class had last year.

Number of fillings	Number of students
0	10
1	5
2	4
3	2
More than 3	1

The headteacher is to choose a student at random from the class.

Find the probability that she will choose a student who had

(a) exactly 1 filling,

……

(1)

(b) 2 or more fillings,

……

(1)

(c) either 1 filling or 2 fillings.

……

(1)
(Total 3 marks)

3. The probability that a biased dice will land on a four is 0.2

Pam is going to roll the dice 200 times.

Work out an estimate for the number of times the dice will land on a four.

.....
(Total 2 marks)

4. The probability that a biased dice will land on a four is 0.2

Pam is going to roll the dice 200 times.

Work out an estimate for the number of times the dice will land on a four.

.....
(Total 2 marks)

5. Mr Brown chooses one book from the library each week.
He chooses a crime novel or a horror story or a non-fiction book.

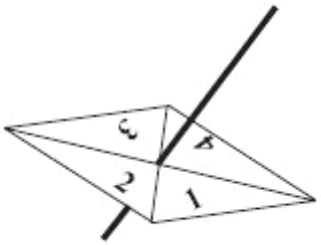
The probability that he chooses a horror story is 0.4
The probability that he chooses a non-fiction book is 0.15

Work out the probability that Mr Brown chooses a crime novel.

…….

(Total 2 marks)

6. Here is a 4-sided spinner.



The sides of the spinner are labelled 1, 2, 3 and 4.
The spinner is biased.
The probability that the spinner will land on each of the numbers 2 and 3 is given in the table.
The probability that the spinner will land on 1 is equal to the probability that it will land on 4.

Number	1	2	3	4
Probability	x	0.3	0.2	x

(a) Work out the value of x.

x = …….

(2)

Sarah is going to spin the spinner 200 times.

(b) Work out an estimate for the number of times it will land on 2

…….

(2)
(Total 4 marks)

7. A school snack bar offers a choice of four snacks.
The four snacks are burgers, pizza, pasta and salad.
Students can choose **one** of these four snacks.

The table shows the probability that a student will choose burger or pizza or salad.

Snack	burger	pizza	pasta	salad
Probability	0.35	0.15		0.2

One student is chosen at random from the students who use the snack bar.

(a) Work out the probability that the student

(i) did **not** choose salad,

.....

(ii) chose pasta.

.....

(3)

300 students used the snack bar on Tuesday.

(b) Work out an estimate for the number of students who chose pizza.

.....

(2)
(Total 5 marks)

8. A school snack bar offers a choice of four snacks.
The four snacks are burgers, pizza, pasta and salad.
Students can choose **one** of these four snacks.

The table shows the probability that a student will choose burger or pizza or salad.

Snack	burger	pizza	pasta	salad
Probability	0.35	0.15		0.2

300 students used the snack bar on Tuesday.

Work out an estimate for the number of students who chose pizza.

.....

(Total 2 marks)

9. Fred did a survey of the time, in seconds, people spent in a queue at a supermarket.
Information about the times is shown in the table.

Time (t seconds)	Frequency
$0 < t \leq 40$	8
$40 < t \leq 80$	12
$80 < t \leq 120$	14
$120 < t \leq 160$	16
$160 < t \leq 200$	10

(a) Write down the modal class interval.

……seconds

(1)

A person is selected at random from the people in Fred's survey.

(b) Work out an estimate for the probability that the person selected spent more than 120 seconds in the queue.

……

(2)

(Total 3 marks)

10. Fred did a survey of the time, in seconds, people spent in a queue at a supermarket. Information about the times is shown in the table.

Time(t seconds)	Frequency
$0 < t \leq 40$	8
$40 < t \leq 80$	12
$80 < t \leq 120$	14
$120 < t \leq 160$	16
$160 < t \leq 200$	10

A person is selected at random from the people in Fred's survey.

Work out an estimate for the probability that the person selected spent more than 120 seconds in the queue.

……

(Total 2 marks)

11. 70 students each chose one P.E. activity.
They chose one of basketball or swimming or football.
The two-way table shows some information about their choices.

	Basketball	**Swimming**	**Football**	**Total**
Female	10			37
Male		17		
Total	19		22	70

(a) Complete the two-way table.

(3)

One of these students is picked at random.

(b) Write down the probability that this student chose basketball.

.....

(2)
(Total 5 marks)

12. Mr Brown buys a garden spade.
The spade costs £20 plus 17½% VAT.

Garden spade

£20 + 17½ % VAT

(a) Calculate the total cost of the spade.

£ .....

(3)

Mr Brown makes some compost.
He mixes soil, manure and leaf mould in the ratio 3:1:1

Mr Brown makes 75 litres of compost.

(b) How many litres of soil does he use?

..... litres

(3)

Mr Brown sows 200 flower seeds.

For each flower seed the probability that it will produce a flower is 0.8

(c) Work out an estimate for the number of these flower seeds that will produce a flower.

.....

(2)
(Total 8 marks)

13. Mr Brown makes some compost.
He mixes soil, manure and leaf mould in the ratio 3:1:1

Mr Brown makes 75 litres of compost.

(a) How many litres of soil does he use?

..... litres

(3)

Mr Brown sows 200 flower seeds.

For each flower seed the probability that it will produce a flower is 0.8

(b) Work out an estimate for the number of these flower seeds that will produce a flower.

.....

(2)
(Total 5 marks)

14. A DIY store bought 1750 boxes of nails.
Barry took 25 of these boxes and counted the number of nails in each.
The table shows his results.

Number of nails	Number of boxes
14	2
15	9
16	8
17	4
18	2

The numbers of nails in the 25 boxes are typical of the numbers of nails in the 1750 boxes.

Work out an estimate for how many of the 1750 boxes contain 16 nails.

.....

(Total 3 marks)

15. A bag contains counters which are red or green or yellow or blue.

The table shows each of the probabilities that a counter taken at random from the bag will be red or green or blue.

Colour	**Red**	**Green**	**Yellow**	**Blue**
Probability	0.2	0.3		0.1

A counter is to be taken at random from the bag.

(a) Work out the probability that the counter will be yellow.

.....

(2)

The bag contains 200 counters.

(b) Work out the number of red counters in the bag.

.....

(2)

(Total 4 marks)

16. The two-way table shows some information about the colours of Ford cars and of Toyota cars in a garage.

	white	blue	red	Total
Ford	5			21
Toyota		7		
Total	9	16		40

(a) Write down the total number of white cars.

.....

(1)

(b) Complete the two-way table.

(3)

(c) One of these 40 cars is to be picked at random.

Work out the probability that this car will be blue.

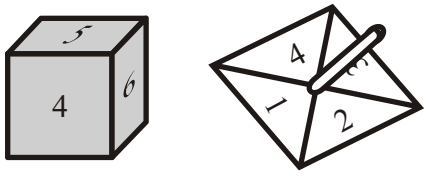
.....

(1)
(Total 5 marks)

17. Joe rolls a 6-sided dice and spins a 4-sided spinner.

The dice is labelled 1, 2, 3, 4, 5, 6

The spinner is labelled 1, 2, 3, 4



Joe adds the score on the dice and the score on the spinner to get the total score.

He records the possible total scores in a table.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3					
3	4					
4	5					

(a) Complete the table of possible total scores.

(2)

(b) Write down all the ways in which Joe can get a total score of 5
One of them has been done for you.

(1, 4), ...

(2)

(c) Write down all the ways Joe can get a total score of 8 or more.

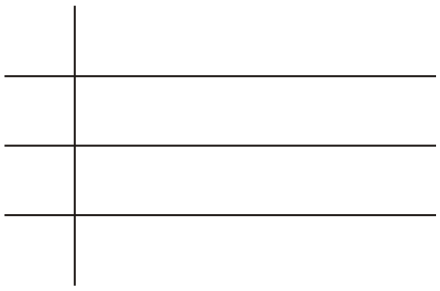
…….....

(2)
(Total 6 marks)

18. Here are the ages, in years, of 15 teachers.

35	52	42	27	36
23	31	41	50	34
44	28	45	45	53

(a) Draw an ordered stem and leaf diagram to show this information.
You must include a key.



Key:

(3)

One of these teachers is picked at random.

(b) Work out the probability that this teacher is more than 40 years old.

.....

(2)
(Total 5 marks)

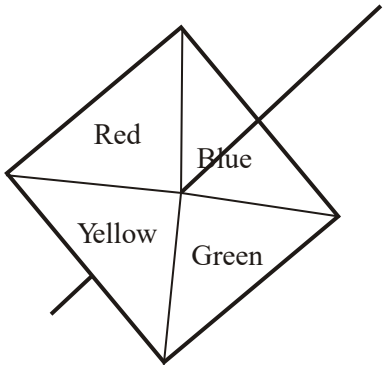
19. There are 3 red pens, 4 blue pens and 5 black pens in a box.
Sameena takes a pen, at random, from the box.

Write down the probability that she takes a black pen.

.....

(Total 2 marks)

20. Here is a 4-sided spinner.



The sides of the spinner are labelled Red, Blue, Green and Yellow.
The spinner is biased.
The table shows the probability that the spinner will land on each of the colours Red, Yellow and Green.

Colour	Red	Blue	Green	Yellow
Probability	0.2		0.3	0.1

Work out the probability the spinner will land on Blue.

.....

(Total 2 marks)

21. There are 3 red pens, 4 blue pens and 5 black pens in a box.
Sameena takes a pen, at random, from the box.

(a) Write down the probability that she takes a black pen.

.....

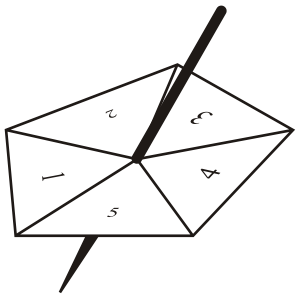
(2)

(b) Write down the probability that Sameena takes a pen that is **not** black.

.....

(1)
(Total 3 marks)

22. Here is a 5-sided spinner.



The sides of the spinner are labelled 1, 2, 3, 4 and 5
The spinner is biased.
The probability that the spinner will land on each of the numbers 1, 2, 3 and 4 is given in the table.

Number	1	2	3	4	5
Probability	0.15	0.05	0.2	0.25	x

Work out the value of x.

x = ...

(Total 2 marks)

23. The two-way table gives some information about how 100 children travelled to school one day.

	Walk	**Car**	**Other**	**Total**
Boy	15		14	54
Girl		8	16	
Total	37			100

(a) Complete the two-way table.

(3)

One of the children is picked at random.

(b) Write down the probability that this child walked to school that day.

.....

(1)

One of the girls is picked at random.

(c) Work out the probability that this girl did **not** walk to school that day.

.....

(2)
(Total 6 marks)

24. The two-way table gives some information about how 100 children travelled to school one day.

	Walk	**Car**	**Other**	**Total**
Boy	15		14	54
Girl		8	16	
Total	37			100

(a) Complete the two-way table.

(3)

One of the children is picked at random.

(b) Write down the probability that this child walked to school that day.

.....

(1)
(Total 4 marks)

25. A box contains bricks which are orange or blue or brown or yellow.
Duncan is going to choose one brick at random from the box.

The table shows each of the probabilities that Duncan will choose an orange brick or a brown brick or a yellow brick.

Colour	Orange	Blue	Brown	Yellow
Probability	0.35		0.24	0.19

Work out the probability that Duncan will choose a blue brick.

……

(Total 2 marks)

26. The probability that a biased dice will land on a six is 0.4.
Marie is going to throw the dice 400 times.

Work out an estimate for the number of times the dice will land on a six.

……

(Total 2 marks)

27. Here are the times, in minutes, taken to change some tyres.

5 10 15 12 8 7 20 35 24 15

20 33 15 25 10 8 10 20 16 10

(a) In the space below, draw a stem and leaf diagram to show these times.

(3)

The probability that a new tyre will be faulty is 0.05

(b) Work out the probability that a new tyre will **not** be faulty.

.....

(1)

(Total 4 marks)

28. A train can be on time or early or late.

The probability that the train will be on time is 0.69
The probability that the train will be early is 0.07

Work out the probability that the train will be late.

…….

(Total 2 marks)

29. Richard has a box of toy cars.
Each car is red or blue or white.

3 of the cars are red.
4 of the cars are blue.
2 of the cars are white.

Richard chooses one car at random from the box.

Write down the probability that Richard will choose a blue car.

……

(Total 2 marks)

30. The probability that a biased dice will land on a three is 0.24
Susan is going to throw the dice 300 times.

Work out an estimate for the number of times the dice will land on a three.

……..

(Total 2 marks)

31. A box contains sweets which are red or green or yellow or orange.

The probability of taking a sweet of a particular colour at random is shown in the table.

Colour	Red	Green	Yellow	Orange
Probability	0.25	0.1	0.3	

Sarah is going to take one sweet at random from the box.

Work out the probability that Sarah will take an orange sweet.

.....

(Total 2 marks)

32. A bag contains some balls which are red or blue or green or black.
Yvonne is going to take one ball at random from the bag.

The table shows each of the probabilities that Yvonne will take a red ball or a blue ball or a black ball.

Colour	Red	Blue	Green	Black
Probability	0.3	0.17		0.24

Work out the probability that Yvonne will take a green ball.

.....

(Total 2 marks)

33. A bag contains some sweets.
The flavours of the sweets are either strawberry or chocolate or mint or orange.
Sarah is going to take one sweet at random from the bag.

The table shows the probability that Sarah will take a strawberry sweet or a mint sweet or an orange sweet.

Flavour	Strawberry	Chocolate	Mint	Orange
Probability	0.32		0.17	0.2

Work out the probability that Sarah will take a chocolate sweet.

.....

(Total 2 marks)

34. A bag contains coloured counters.
The counters are either red or green or blue.

Dean takes at random a single counter from the bag.

The probability that he takes a red counter is 0.5
The probability that he takes a green counter is 0.15

(a) What is the probability that he takes a blue counter?

.....

(2)

A box contains 50 counters.
There are 23 white counters, 19 black counters and 8 yellow counters.

Piero takes at random a single counter from the box.

(b) Work out the probability that he takes a white counter or a yellow counter.

(2)
(Total 4 marks)

35. Each day, Anthony travels to work.
He can be on time or early or late.

The probability that he will be on time is 0.02
The probability that he will be early is 0.79

Work out the probability that Anthony will be late.

.....

(Total 2 marks)

36. 20 000 adults live in Mathstown.
The probability that one of these adults, chosen at random, will vote in an election is 0.7

Work out an estimate for the number of these adults who will vote in an election.

.....

(Total 2 marks)

37. Liam rolls a fair 6-sided dice once.

Write down the probability that the dice will show a 2 or a 3

.....

(Total 2 marks)

38. Mia spins a spinner.
The spinner can land on red or green or blue or pink.

The table shows each of the probabilities that the spinner will land on red or green or blue.

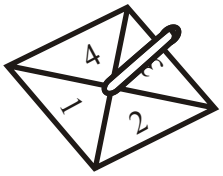
Colour	Red	Green	Blue	Pink
Probability	0.4	0.1	0.2	

Work out the probability that the spinner will land on pink.

.....

(Total 2 marks)

39. Marco has a 4-sided spinner.
The sides of the spinner are numbered 1, 2, 3 and 4
The spinner is biased.



The table shows the probability that the spinner will land on each of the numbers 1, 2 and 3

Number	1	2	3	4
Probability	0.20	0.35	0.20	

Work out the probability that the spinner will land on the number 4

.....

(Total 2 marks)

40. There are 8 pencils in a pencil case.

1 pencil is red.
4 pencils are blue.
The rest are black.

A pencil is taken at random from the pencil case.

Write down the probability that the pencil is black.

.....

(Total 2 marks)

41. A bag contains counters which are blue or red or green or yellow.
Mark takes a counter at random from the bag.

The table shows the probabilities he takes a blue counter or a red counter or a yellow counter.

Colour	blue	red	green	yellow
Probability	0.3	0.2		0.1

(a) Work out the probability that Mark takes a green counter.

.....

(2)

Mark puts the counter back into the bag.

Laura takes a counter at random from the bag.
She looks at its colour then puts the counter back into the bag.
She does this 50 times.

(b) Work out an estimate for the number of times Laura takes a red counter.

.....

(2)
(Total 4 marks)

42. A bag contains only red, green and blue counters.

The table shows the probability that a counter chosen at random from the bag will be red or will be green.

Colour	Red	Green	Blue
Probability	0.5	0.3	

Mary takes a counter at random from the bag.

(a) Work out the probability that Mary takes a blue counter.

.....

(2)

The bag contains 50 counters.

(b) Work out how many green counters there are in the bag.

.....

(2)
(Total 4 marks)

43. Michael carried out a survey of some students.
He asked them the type of TV programme they liked best.

The accurate pie chart shows some of this information.

Michael chooses one of the students at random.

(a) (i) Find the probability that this student likes Soaps best.

.....

(ii) Find the probability that this student does **not** like Soaps best.

.....

(2)

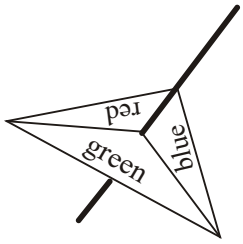
6 students said they liked the News best.

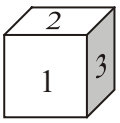
(b) How many students took part in the survey?

.....

(2)
(Total 4 marks)

44. The diagram shows a 3-sided spinner and an ordinary dice.





The spinner has 1 green side, 1 blue side and 1 red side.

Alex spins the spinner once and rolls the dice once.

Write down all the possible outcomes.
One has already been done for you.

(g, 1) .....

.....

.....

(Total 2 marks)

45. This coloured wheel spins round.
The sectors are coloured yellow, red, green and blue.

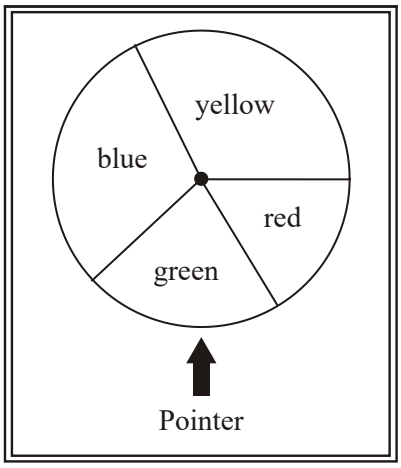


Diagram **NOT** accurately drawn

Harry spins the wheel.
When the wheel stops spinning, Harry writes down the colour shown by the pointer.

The probability that the wheel will stop at yellow or red or green is given in the table.

Colour	yellow	red	green	blue
Probability	0.35	0.1	0.3	

(a) Work out the probability that the wheel will stop at blue.

.....

(2)

(b) Work out the probability that the wheel will stop at either yellow or red.

.....

(2)

Hannah is going to spin the wheel 200 times.

(c) Work out an estimate for the number of times the wheel will stop at green.

.....

(2)
(Total 6 marks)

01. 0.20 2

$0.38 + 0.27 + 0.15$

M1 1 – sum
A1 cao

[2]

02. (a) $\frac{5}{22}$ 1

B1 cao

(b) $\frac{7}{22}$ 1

B1 ft Σf used in (a) provided $\Sigma = 22 \pm 2$

(c) $\frac{9}{22}$ 1

B1 ft Σf used in (a) provided $\Sigma = 22 \pm 2$

[3]

03. 40 2

200×0.2

M1 for 200×0.2 or $\frac{40}{200}$ seen
A1 for 40

[2]

04. 40 2

200×0.2

M1 for 200×0.2 *or* $\frac{40}{200}$ *seen*

A1 for 40

[2]

05. 0.45 2

$0.4 + 0.15$
$1 - \text{“}0.55\text{”}$

M1 for 1 – sum
A1 for 0.45 o.e.
SC B1 for 0.81

[2]

06. (a) 0.25 2

$x + 0.3 + 0.2 + x = 1$

M1 for $x + 0.3 + 0.2 + x = 1$ *oe, or* $0.5 \div 2$
A1 oe

(b) 60 2

0.3×200

M1 0.3×200
A1 cao Accept 60 out of 200 (in words)
SC B1 for $\frac{60}{200}$

[4]

07. (a) (i) $1 - 0.2 = 0.8$ 3

B1 oe

(ii) $1 - (0.35 + 0.15 + 0.2) = 0.3$

M1 for $0.35 + 0.15 + 0.2$
A1 oe

(b) $0.15 \times 300 = 45$ 2

M1 for 0.15 × 300
A1 cao
NB: $\frac{45}{300}$ *M1 A0, 45 out of 300 gets M1 A1*

[5]

08. $0.15 \times 300 = 45$ 2

M1 for 0.15 × 300
A1 cao

[2]

09. (a) $120 < t \leq 160$ 1

B1 correct interval eg 120–160

(b) $\frac{26}{60}$ 2

M1 (16 + 10) ÷ '60' or 26 seen or $\frac{16}{60}$

A1 oe

[3]

10. $\frac{26}{60}$ 2

M1 (16 + 10) ÷'60' or 26 seen or $\frac{16}{60}$

A1 oe

[2]

11. (a)

10	**12**	**15**	37
9	17	**7**	**33**
19	**29**	22	70

3

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

(b) $\frac{19}{70}$ 2

B2 for $\frac{19}{70}$, accept 0.27 (....)

(B1 for $\frac{k}{70}$ with $0 < k < 10$ or for the correct probability incorrectly expressed, eg '19 out of 70')

[5]

12. (a) eg 10% + 5% + 2.5% = £2 + £1 + £0.50 3
£20 + £3.50 = 23.50

M1 for £2, £1 and £0.50 or £3.50 seen or $\frac{17.5}{100} \times 20$ oe
M1 (dep) for "£3.50"+ £20
A1 for 23.5(0)

(b) 75 ÷ (3 + 1 + 1) = 15 3
15 × 3 = 45

M1 for 75 ÷ (3 + 1 + 1)
M1 (dep) for "15" × 3
A1 cao

(c) 0.8 × 200 = 160 2

M1 for 0.8 × 200
A1 for 160, accept 160 out of 200
SC: B1 for $\frac{160}{200}$ or 160 in 200

[8]

13. (a) 75 ÷ (3 + 1 + 1) = 15 3
15 × 3
= 45

M1 for 75 ÷ (3 + 1 + 1)
M1(dep) for "15" × 3
A1 cao

(b) 0.8×200 2
$= 160$

M1 for 0.8×200
A1 for 160, accept 160 out of 200
SC: B1 for $\frac{160}{200}$ or 160 in 200

[5]

14. $\frac{8}{25} \times 1750$ or 0.32×1750 or 8×70 3
$= 560$

M1 for $\frac{8}{25}$ oe seen or $\frac{1750}{25}$ oe seen or 0.32 or 70 seen
M1 for $\frac{8}{25} \times 1750$ oe
A1 for 560

[3]

15. (a) $1 - (0.2 + 0.3 + 0.1) = 0.4$ 2

M1 for $1 - (0.2 + 0.3 + 0.1)$
A1 for 0.4 oe, accept $\frac{0.4}{1}$

(b) $0.2 \times 200 = 40$ 2

M1 for 0.2×200
A1 cao
NB $\frac{40}{200}$ is M1 A0, 40 out of 200 is M1 A1

[4]

16. (a) 9 1

B1 cao

(b) 5 **9** **7** 21 3
4 7 **8** **19**
9 16 **15** 40

B3 for all correct
(B2 for 4 or 5 correct)
(B1 for 1 or 2 or 3 correct)

(c) $\frac{16}{40}$

$= \frac{2}{5}$ 1

B1 for 2/5 oe

[5]

17. (a) 4 5 6 7 8
5 6 7 8 9
6 7 8 9 10 2

B2 if fully correct
(B1 for 1 row correct or 2 columns correct)

(b) (1, 4); (2, 3); (3, 2); (4, 1) 2

B2 if fully correct
(B1 for either (2, 3) or (3, 2))

(c) (2, 6); (3, 5); (3, 6); (4, 4); (4, 5); (4, 6) 2

B2 if fully correct (order in brackets need not be consistent)
(B1 for 3 pairs correct, ignore extras)

[6]

18. (a)

2	378
3	1456
4	12455
5	023

2 | 3 = 23 3

M1 for using 2, 3, 4 and 5 as stem
A1 for ordered stem and leaf diagram
A1 for consistent key, e.g. 2 3 = 23 (years)

OR

M1 for using 20, 30, 40 and 50 as stem
A1 for ordered stem and leaf diagram
A1 for consistent key, e.g. 20 | 3 = 23 (years)

(b) $\frac{8}{15}$ 2

B2 ft for $\frac{'8'}{'15'}$ *(ft from stem and leaf diagram)*

(B1 for $\frac{'8'}{a}$*, a > '8', or* $\frac{b}{'15'}$*, b < '15')*

SC: B1 for '8' : '15' or '8' out of '15'

[5]

19. $\frac{5}{12}$ 2

M1 for $\frac{n}{12}$ *or n ÷ 12 or n ÷ ("3 + 4 + 5") where n is an integer, where ≤12.*

A1 $\frac{5}{12}$ *or 0.41(6...) or 41.6%*

[2]

20. 1 – (0.1 + 0.2 + 0.3)
0.4 2

M1 for 1 – (0.1 + 0.2 + 0.3) oe or 0.6 oe seen
A1 for 0.4 oe

[2]

21. (a) $\frac{5}{12}$ 2

M1 for $\frac{n}{12}$ *or n ÷ 12 or* $\frac{n}{3+4+5}$ *or n ÷ (3 + 4 + 5) where n is an integer ≤ 12*

A1 $\frac{5}{12}$ *or 0.41(6...) or 41.6%*

(b) $1 - \text{“}\frac{5}{12}\text{”}$

$= \frac{7}{12}$ 1

B1 ft 1 – “$\frac{5}{12}$” provided the answer is positive, or $\frac{7}{12}$ or 0.58(3…)

[3]

22. $1 - (0.15 + 0.05 + 0.20 + 0.25)$

0.35 2

M1 for 1 – (0.15 + 0.05 + 0.20 + 0.25)
A1 for 0.35 oe

[2]

23. (a)

15	**25**	14	54
22	8	16	**46**
37	**33**	**30**	100

Table 3

B3 for all 5 correct
(B2 for 3 or 4 correct)
(B1 for 1 or 2 correct)

(b) $\frac{37}{100}$ 1

B1 $\frac{37}{100}$ oe

(c) $\frac{24}{46}$ 2

B2 for $\frac{\text{"'46'–'22'"}}{\text{'46'}}$ oe, ft from no of girls
(B1 16 + 8 or 24 or ‘46’ seen)

[6]

24. (a)

15	**25**	14	54
22	8	16	**46**
37	**33**	**30**	100

Table 3

B3 for all 5 correct
(B2 for 3 or 4 correct)
(B1 for 1 or 2 correct)

(b) $\frac{37}{100}$ 1

B1 $\frac{37}{100}$ *oe*

[4]

d

25. 0.22 oe 2

$1 - (0.35 + 0.24 + 0.19)$
$1 - 0.78$

M1 for $1 - (0.35 + 0.24 + 0.19)$
A1 cao

[2]

26. 160 2

400×0.4

M1 for 400×0.4
A1 cao

[2]

27. (a) See working column

0 | 5 7 8 8
1 | 0 0 0 0 2 5 5 5 6
2 | 0 0 0 4 5
3 | 3 5
Key 1 | 3 = 13 (min) 3

B1 for stem 0, 1, 2, 3 or 0, 10, 20, 30
B1 for accurate leaves (in any order) (condone one error or omission)
*B1 for key **and** ordered leaves all correct*

(b) 0.95 1

1 – 0.05

B1 cao

[4]

28. 0.24 oe 2

1 – (0.69 + 0.07)

M1 for 1 – (0.69 + 0.07)
A1

[2]

29. $\frac{4}{9}$ 2

3 + 4 + 2

M1 for denominator of 9 or 4 in 9 or 4 out of 9 (NOT 4 : 9)
A1

[2]

30. 72 2

0.24 × 300

M1 for 0.24 × 300 oe
A1 cao

[2]

31. 0.35oe 2

1 – (0.25 + 0.1 + 0.3)

M1 for 1 – (0.25 + 0.1 + 0.3)
A1 for 0.35 oe

[2]

32. 0.29 2

1 – (0.3 + 0.17 + 0.24)

M1 for 1 – (0.3 + 0.17 + 0.24)
A1 cao
(SC: B1 for 0.56 seen)

[2]

33. 0.31 2

1 − (0.32 + 0.17 + 0.2)

M1 for 1 − (0.32 + 0.17 + 0.2)
A1 for 0.31 oe
S.C. M1A0 for 0.49 or 31

[2]

34. (a) 1 – (0.5 + 0.15)
0.35 oe 2

M1 for 1 – "(0.5 + 0.15)"
A1 for 0.35 oe

(b) $\frac{31}{50}$ oe 2

M1 for $\frac{23+8}{23+8+19}$

A1 for $\frac{31}{50}$ *or 0.62 oe*

[sc B1 for 31:50 or 31 to 50]

[4]

35. $1 - (0.02 + 0.79)$
0.19 2

M1 for 1 – (0.02+0.79)
A1 cao

[2]

36. 0.7×20000
14000 2

M1 for 0.7 × 20000
A1 cao

[2]

37. $\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$ 2
$= \frac{1}{3}$ oe

M1 for $\frac{1}{6}$ oe seen 6
or identifying both the 2 and 3 sections in a sample space diagram of {1, 2, 3, 4, 5, 6}

A1 for an answer of $\frac{1}{3}$ oe

NOTE: An answer of 2 in 6, 2 out of 6, 2 : 6, oe = M1 A0

[2]

38. $1 - (0.4 + 0.1 + 0.2)$
$= 1 - 0.7$

0.3 2

M1 for 1 – (0.4 + 0.1 + 0.2) or 1 – 0.7
A1 for 0.3 oe
Watch for answer in table.

[2]

39. 1 – (0.2 + 0.35 + 0.2)
0.25 2

M1 for 1 – (0.2 + 0.35 + 0.2)
A1 for 0.25 oe
SC: B1 for "1 out of 4" or "1 in 4"
SC: B1 if 0.25 seen in the table with incorrect answer on answer line.

[2]

40. $\frac{3}{8}$ 2

M1 for $\frac{x}{8}$ $(x < 8)$ *or* $\frac{3}{x}$ $(x > 3)$
A1 for $\frac{3}{8}$ *o.e.*
(SC B1 for '3 in 8' or '3 out of 8')

[2]

41. (a) 1 – (0.3 + 0.2 + 0.1)
0.4 2

M1 for 1 – "(0.3 + 0.2 + 0.1)"
A1 for 0.4 oe
(watch out for answers given only in table)

(b) 0.2 × 50
10 2

M1 for 0.2 × 50
A1 for cao
SC B1 for 10/50

[4]

42. (a) 0.2 2

M1 for 1 – (0.5 + 0.3)
A1 for 0.2 oe
***SC** Award M1A0 for an answer of 0.92*

(b) 0.3×50
15 2

M1 for 0.3 × 50 oe
A1 cao

SC *Award B1 for* $\frac{15}{50}$ *on the answer line if M0 scored*

[4]

43. (a) (i) $\frac{90}{360}$ oe 1

B1 for $\frac{90}{360}$ *oe (accept 25% or 0.25 or ¼)*
Condone any incorrect cancelling if correct answer is seen
Do not accept 1:4 or 4:1 or 1 out of 4 or 3 in 4 etc

(ii) $\frac{270}{360}$ oe 1

B1 for oe (accept 75% or 0.75 or ¾)
Condone any incorrect cancelling if correct answer is seen
Do not accept 3:4 or 4:3 or 3 out of 4 or 3 in 4 etc
SC: B1 for 1 – (a)(i)
SC: B0 in (i) and B1 in (ii) for correct answers but consistent writing of probabilities incorrectly in BOTH parts (a)(i) and (a)(ii) e.g. 1 out of 4 and 3 out of 4

(b) $(360 \div 30) \times 6$
72 2

M1 for 360÷30 o.e. e.g.30° is a twelfth or 6÷30 or 30÷6 or 1 person is 5° o.e. or sight of 12×6 or 360 ÷ 5 or attempt add 5 frequencies 3 of which are correct or any partial equivalent method
A1 cao

[4]

44. (g,1) (g,2) (g,3) (g,4) (g,5) (g,6) (b,1) (b,2)(b,3) (b,4) (b,5) (b,6)
(r,1) (r,2) (r,3) (r,4) (r,5) (r,6) 2

B2 for a fully correct list
[B1 for at least 6 correct additional outcomes]
Ignore duplicates e.g. (g,1) (1, g)

[2]

45. (a) $1 - (0.35 + 0.1 + 0.3)$
0.25 2

M1 for 1 – (0.35 + 0.1 + 0.3) oe
A1 for 0.25 oe (accept 25%)
Note:- Look for answer in the table if it's not on answer line
[SC: B1 for 1 – 0.39 = 0.61, if M0 scored;
0.61 with no working gets no marks]

(b) $0.35 + 0.1$
0.45 2

M1 for 0.35 + 0.1 oe
A1 for 0.45 oe
[SC:B1 for an answer of 0.36 or for 0.45 seen in working followed by subtraction from 1]

(c) 0.3×200
60 2

M1 for 0.3 × 200
A1 cao
SC: B2 for 60 out of 200
SC: B1 for 60 in 200 or 60/200 or 0.3 × 200/4

[6]

01. This question was nearly always correct.

02. This question was answered well and many candidates gained full marks. In part (b) some candidates gave an answer of 4/22, presumably from reading '2 or more fillings' as '2 fillings'.

03. This question was answered quite well but it was disappointing that almost one third of those candidates with a correct method could not work out 200 × 0.2 correctly. This was often evaluated as 20.

04. **Mathematics A Paper 5**

In this probability question the method was usually well understood but arithmetical errors were not uncommon.

Mathematics B Paper 18

The majority of candidates were able to supply correct solutions to this question. Candidates should be advised to read questions carefully as those who went on to give their answer as a fraction $\frac{40}{200}$ did not gain the final mark as the question asked for 'the number of times' that the dice would land on a 4, not the probability. Having identified the correct calculation of 200 × 0.2, a few candidates were unable to carry this out correctly.

05. Specification A

Foundation Tier

Correct answers were only given by 13% of candidates. A further 12% of candidates gained one mark. The incorrect response 0.81 suggested some candidates did not have access to or had not used a calculator to answer this question. The incorrect answer 0.55 was also often seen.

Intermediate Tier

This question was answered well with almost three quarters of candidates gaining full marks. A significant number, though, wrote 0.4 + 0.15 = 0.19 and gave a final answer of 0.81. A few added 0.4 and 0.15 but did not subtract the result from 1.

Specification B

There were many correct answers to this question, though 0.81 (1 – 0.19) was the most common error. Pleasingly only a very few worked in percentages, however of those that did many showed 55 or 45 without a percentage sign. A significant number of errors were a result of poor arithmetic.

06. Specification A

Higher Tier

Part (a) was answered well by nearly all the candidates. There were few solutions using algebra- most candidates simply wrote the answer. A small number thought that 0.5 ÷ 2 was 2.5.
Part (b) was also done well. Some candidates thought that multiplying 200 by 0.3 was the same as dividing 200 by 3. Some chose to multiply by 0.2 instead of 0.3.

Intermediate Tier

This question was quite well answered by the majority of candidates. In part (a) sometimes the candidate failed to divide by 2, giving the answer as 0.5, but most gave the correct answer. There were some errors caused by an inability to divide 0.5 by 2, evidenced by answers such as 0.2.5 or 0.2½. In part (b) the majority of candidates recognised they needed to perform the calculation 0.3 × 200, and most did so correctly, though a minority could not perform this calculation without a calculator.

Specification B

Higher Tier

Part (a) was almost always answered correctly. Occasionally candidates forgot to divide by 2 and left the answer as 0.5 or were careless in division and evaluated 0.5 ÷ 2 as 2.5. In part (b), over 80% of candidates scored full marks. There were, however, a significant number of candidates who used $\frac{1}{3}$ as the fraction equivalent of 0.3 and therefore failed to gain any credit. Candidates who gave the final answer as $\frac{60}{200}$ lost the available accuracy mark.

Intermediate Tier

Part (a) was well answered with most candidates gaining at least one mark. 0.2 (from 0.3 + 0.2 = 0.6) was a common mistake. A small number of candidates made arithmetic errors such as 0.5 ÷ 2 = 2.5
In part (b) the usual error was to divide 200 by 0.3 instead of multiplying.

07. Part (a) was well answered, but in the second part many candidates incorrectly added 0.15 + 0.35 + 0.2 = 0.52. In part (b) many candidates knew that they had to calculate 0.15 × 300, but were unable to do so correctly.

08. This was a relatively straightforward question. There were a few candidates would could not calculate 300 × 0.15. Some candidates were attracted by the gap and thought that they had to work out 300 × 0.3.

09. **Specification A**

Surprisingly only about 1/3 of candidates answered part (a) correctly. Many demonstrated their confusion with the median (or mean) by choosing the interval from 80. Some chose the correct interval but then spoilt their answer by giving the midpoint or the frequency as their answer.
Part (b) was well answered. Most used fractions and there were few cases of incorrect notation. The most common errors included incorrect totalling of the frequencies, picking out the 16 only (to give $\frac{16}{60}$) or stating the 26, but not as a probability.

Specification B

Part (a) was not answered well, many candidates showing a clear misunderstanding of the requirements of the question, often giving values 120, 140 or 160 only as their answer. In part (b) most candidates gained at least 1 mark and usually 2. Common wrong answers were $\frac{16}{60}$ or $\frac{26}{50}$; these gained one mark only.

10. This question was done well by many candidates. Most appreciated the need to add the frequencies for both intervals to gain at least one mark for 26. The most common incorrect answers were $\frac{16}{60}$ and $\frac{26}{50}$; and, less commonly, $\frac{1}{26}, \frac{34}{60}$, and $\frac{16}{60} \times \frac{26}{50}$.

11. This question was answered well. In part (a), more than 80% of candidates completed the two-way table correctly and almost three quarters of candidates gave the correct probability in part (b).

12. About half of the candidates calculated the total cost correctly in part (a). Those who were successful in finding 17½% of £20 had usually calculated 10%, 5% and 2½%. Those who tried to use 1% and ½% often made errors. Some failed to add on the VAT. A similar proportion of candidates answered part (b) correctly. A common error was to divide 75 by 3. Some who did divide by 5 then forgot to multiply by 3 and gave 15 as the final answer. In part (c), 50% of candidates appreciated the need to multiply 0.8 by 200 but many could not complete the calculation correctly.

13. This question was done very well. In part (a), most candidates were able to obtain the correct answer. If an error was made it was usually from dividing 75 by 3 (the compost component of the ratio) instead of 5. A small number of candidates worked out 3 + 1 + 1 as 4 or 6. In part (b), some candidates were unable to cope with the multiplication 0.8 × 200, ending up with an incorrect number of zeros in their answer, typically 1600 or 16.0. A few candidates give their final answer as $\frac{160}{200}$, thus scoring only one of the two marks available.

14. Paper 5524

Candidates were sometimes confused as to how to approach this question. Those who realised it was a probability question usually moved on to obtain the correct answer, whilst those who thought it was a frequency distribution did not. Others stopped after dividing 1750 by 25 using an alternative approach or proceeded to process figures with little reason. Only a minority of candidates obtained full marks.

Paper 5526

This was a more unusual question which aimed to test candidates understanding of the relationship between a sample proportion and a population proportion. Some candidates did not recognise it as such and so tried, for example, to calculate the mean. Other candidates clearly did not understand the meaning of the table, itself and used the number of nails in the box (16) as a way of answering the question.

15. Higher Tier

The virtually all of the candidates found part (a) a very straightforward introduction to the paper. Most knew what was required and very few errors came from arithmetical slips.

In part (b), the majority of candidates used the expected method 0.2×200 or its equivalent, but $200/5$, $200 \times 1/5$, $200 \times 2/10$ and 20% of 200 were also seen. A few candidates worked out how many there were for each of the other colours and then subtracted from 200.

The most common errors here were to use the answer 0.4 from part (a); to divide 200 by 0.2; or to give the probability that the counter will be red (20%).

Intermediate Tier

Part (a) was answered very well. Errors sometimes resulted from incorrect addition or incorrect subtraction from 1. Some candidates made a mistake when attempting to write 0.4 as a fraction and some wrote the correct probability in the table but then gave a different one on the answer line. Part (b) was also answered well. Some of the candidates who knew that they needed to multiply 200 by 0.2 were unable to perform the calculation correctly.

16. Foundation Tier

This question was well understood and candidates were usually able to score some marks on this question, although the inability in some cases to fill in any of the numbers correctly in the two-way table was surprising. Incorrect notation for probability such as 16 out of 40 and 16:40 were often seen. Other errors on this part of the question were words such as likely or unlikely.

Intermediate Tier

Part (a) was answered extremely well. Some candidates gave the number of white Toyota cars rather than the total number of white cars. Only a handful of candidates failed to score any marks in part (b) with most completing the two-way table correctly. More than 80% of candidates gave the correct probability in part (c). Very few wrote a probability using incorrect notation.

17. **Foundation Tier**

This question was well understood and candidates usually obtained full marks in part (a) though in parts (b) and (c) candidates usually only wrote down partial solutions.

Intermediate Tier

Part (a) was answered very well indeed. Almost three quarters of the candidates were successful in part (b). Some candidates only gave either (2, 3) or (3, 2) for the answer, not appreciating that (dice 2, spinner 3) is different from (dice 3, spinner 2). Almost all candidates were able to list at least three correct pairs in part (c). Some repeated pairs in reverse order, e.g. (2, 6) and (6, 2), despite 4 being the highest number on the spinner, and some failed to list all the pairs. Some candidates ignored "or more" and only listed the three pairs that give a score of 8. It was common to see pairs such as (1, 7) that included impossible values.

18. Those candidates who were familiar with stem and leaf diagrams usually answered part (a) quite well although many did not understand how to complete the key. Some candidates made no attempt to order the leaves but many who did were careless and made one error in the ordering or omitted one or two leaves. A significant number of candidates did not know what was meant by a stem and leaf diagram and many tally charts and pictograms were seen. The probability in part (b) was often correct even when the diagram in part (a) was incorrect or not attempted and it was pleasing that most candidates expressed the probability in a correct form. Many candidates did not understand that to find the number of teachers over 40 years old they must include those over 50 as well so $\frac{5}{15}$ was a common incorrect answer. Some showed $\frac{5}{15}$ in their working, gaining one mark, and then simplified it to $\frac{1}{3}$ but those who gave an answer of $\frac{1}{3}$ with no working got no mark.

19. This was a well answered question with most candidates gaining full marks. A significant minority gained only 1 mark since they gave their answer using incorrect probability notation, for example giving their answer as a ratio, or using words "5 out of 12". Centres are reminded that probability can only be accepted when written as a fraction, a decimal or a percentage. Some weaker candidates incorrectly added the 3, 4 and 5. The most common incorrect answer was $\frac{5}{7}$.

20. This question was done well by the vast majority of the candidates. Most knew that the sum of the probabilities in the table should equal 1 and were able to work out the missing value 0.4. Answers of 4/10 or 2/5 were not uncommon.

21. Overwhelmingly correct although there were some careless answers involving 3 + 4 + 5 = 11 or 13. A few candidates gave answers as ratios so could not score full marks and a few lost marks in premature approximation when they converted their fraction to a decimal or to a percentage.

22. **Foundation**

Just over half the candidates gave correct answers, often given without any evidence of method. The most common error was to use 0.02 instead of 0.2. Unfortunately many of these candidates did not show their working and so scored no marks. A few worked in percentages but gave an answer of 35 instead of 35%. Several simply divided 1 by 5 to give an answer of 0.2 and a few seemed to treat the probabilities as a number sequence giving an answer of 0.3 from 0.2, 0.25 …….

Higher

Disappointingly, just over 14% of candidates were unable to gain any marks in this straightforward question. Over 82% of candidates gained full marks. The most common error was to make a mistake in the addition of the given probabilities.

23. **Foundation**

The two-way table in part (a) was usually completed accurately, although a number of arithmetic errors were in evidence. In the table, the car column caused the most problems for candidates.

In part (b), the correct answer of $\frac{37}{100}$ (or 0.37 or 37%) was the most common response.
Answers of 37 and 1/37 were also seen. There were also several who did not realise a numerical answer was required, responding with "unlikely"

In part (c), most candidates scored at least one mark for using either 46 or 24 in their working. Many failed to score full marks with answers of 1/46 and 24/100 being common errors. Some failed to see "not", giving an answer of 22/46. Following the correct answer in (b), many candidates gave $\frac{63}{100}$ as their answer in (c), having not fully read the question correctly.

There were less candidates giving unacceptable notation but ratio and 'out of' were still seen on several occasions.

Higher

Points were usually plotted correctly although a few candidates clearly missed this part of the question. A number initially misread the table horizontally and so plotted (65, 80) but then realised and rectified their mistake when unable to plot (100, 110) on the axes provided. In part (b) the majority of candidates chose to describe a dynamic relationship along the lines of "the taller the sheep, the longer it is" rather than just stating positive correlation. Incorrect answers most commonly seen involved "direct proportion" or an expression of the difference between the variables. A number referred to weight of sheep rather than height. In part (c) neither a line of best fit nor vertical line at 76cm was usually seen. Instead candidates judged the value by eye and in most cases gained full marks by being within the acceptable range of answers. Errors that did occur were due to the 2 axes being confused or misreading of the vertical scale.

24. This question was answered well by the vast majority of candidates.

The most common errors in part (a) were due to the failure to carry out simple additions and subtractions accurately with incorrect entries seen most often in the 'Car' column. Some candidates failed to notice the empty space in the 'Total' column and left this blank. In these cases it was apparent that candidates had not carried out a horizontal check as well as a vertical one. The probability in part (b) was usually correct.

25. This question was very well done and a correct answer of 0.22 was seen with or without working. However a significant number of candidates, making slight arithmetic errors, failed to score at all because of the absence of a clear method.
Candidates electing to use percentages often lost a mark by failing to write the % sign.

26. Generally well answered although some candidates were confused by the (correct) use of the word 'estimate' and worked out 400×0.5. Some candidates thought that they had to give the answer in the form $\frac{160}{400}$ this does not make sense when read with the demand of the question. A number of candidates then went further and simplified their expression to $\frac{2}{5}$.

27. Part (a) of this question was very centre dependant, many centres showing evidence of not having taught this topic at all. Those candidates who understood stem and leaf diagrams usually gained 2 marks only, failing to give a key to their diagrams or leaving the leaves unordered. Very many candidates were successful in part (b) although a significant number worked out $100 - 0.05$ or $10 - 0.05$. A few candidates read 0.05 as a half and offered the same as their answer.

28. Very well done with few errors; most candidates gaining full marks. Only a small minority failed to subtract "0.76" from 1.

29. Some candidates still continue to fail to write probability in a mathematical form opting instead for a description, which usually incorporates various degrees of 'likely'. Answers of '4 in 9' or '4 out of 9' gained only one mark. Writing probability as the ratio 4 : 9 scored no marks. The most common incorrect answer was $\frac{4}{5}$.

30. Candidates should be made aware that, in the context of probability, 'estimate' does not mean 'approximate'. A very common error was to use 0.25 or 0.2 instead of 0.24 sometimes without any earlier reference to 0.24. It was disappointing to see answers greater than 300.

31. Another successfully answered question with only a quarter failing to score. The most common error was to give 0.29 as the sum of the probabilities, followed by an answer of 0.71. This gained one mark provided that the full working was shown. A few wrote 0.45 as the difference between 1 and 0.65. 0.3 + 0.1 + 0.25 = 0.425 was often seen.

32. The majority of candidates (71%) gained full marks here and a further 13% gained one mark usually for an answer of 0.56 (1 – 0.03 – 0.17 – 0.24) found without the use of a calculator. Failure to score any marks was either through a lack of understanding or going no further than to add the probabilities giving an answer of 0.71 or 0.44

33. Many candidates realised they had to subtract the given numbers from 1 but as they did not show their working or because they did not use a calculator, only a quarter of the candidates scored both marks. 20% of the candidates scored one mark, mostly by writing 0.49 (a special case mark for those candidates who added the 0.2 as 0.02) or writing the digits 31.

34. Part (a) was generally well done, however 0.8 (using 5. 0 + 15. 0 = 2.0) was the most common error.
Many candidates scored full marks in part (b) but misunderstanding often led to an answer of "$\frac{23}{50}$ or $\frac{8}{50}$" appearing on the answer line. 31, 31% and $\frac{31}{100}$ were common incorrect answers.

35. No report available.

36. This question was answered correctly by the vast majority of candidates. A very small minority of candidates misread the question and gave an estimate for the number of adults who did not vote in an election. Some candidates misinterpreted the word 'estimate' to mean that they had calculate an estimate to 0.7 × 20000 and so evaluated with 0.5 × 20000 or 0.75 × 20000 such an approach did not gain any credit. The other common error was to attempt to evaluate 20000 ÷ 0.7.

37. The probability appeared written as a fraction in a large proportion of the working seen but there were still expressions such as 'likely' scoring no marks where this was given alone. Some gave the probability of obtaining a '2' as '2/6' and '3' as '3/6' and combined them together to produce variations of '2/6,3/6' or '5/6' as the final answer. Those who perhaps gave more thought to each outcome came up with '1/6' as the required individual probability and scored 1mark for showing this fraction. Combining together the two '1/6' values proved to be troublesome. A more logical approach might have been to consider taking the two events out of a total of six and writing the fraction as '2/6' directly. Giving the final answer in the form '2 out of 6', or similar, received only a method mark for identifying the '2' and the '6'. Some statements were seen which tried to resolve the issue with 'it might but it might not' offering a flavour of the more bizarre. Around 56% of the candidates scored both available marks.

38. This question was well understood with 97% of candidates correctly answering the question. A very small minority forgot to take the total probability away from 1 and an even smaller minority forgot to write their working.

39. Just under 60 % of the candidates scored full marks in this question.

However, "0.35" was often seen, apparently derived by candidates using a number sequence approach or one based on symmetry. A significant minority of candidates, who did not have access to a calculator or preferred not to use one, and who recorded a fully correct method, were able to gain 1 mark. These candidates were often unable to add the three given probabilities or subtract their total from 1 with accuracy.

40. This question was well answered with 70% of candidates scoring 2 marks. A small minority of candidates described the likelihood of taking a black pencil, or gave a word or phrase instead of the answer (⅜ or equivalent) required. It is good to report that few candidates gave the probability in an unacceptable form or as a whole number.

41. Part (a) was answered well by the vast majority of the candidates.

Part (b) was answered well by most candidates. A common error here was to write the final answer as 10/50 (typically) or 10/100 (rarely).

42. Calculating the missing probability in the opening question did not pose too much of a problem with many correct answers seen. For those who did make a mistake the addition 0.5 + 0.3 leading to 0.9, 0.08, or similar was still rewarded as long as the subtraction 1 – (0.5 + 0.3) was shown in the working thus gaining the method mark.

In part (b) calculating how many green counters were in the bag needed an appreciation that the product 50 × 0.3 would yield the correct result. The more successful ones were able to indicate this product correctly but a few found difficulties in evaluating the result. It gave rise to answers involving the digits 1 and 5 with 0.15 and 150 being the most common. The most common other errors, however, occurred in using the probability from part (a) as answers were given for the blue counter rather than the green one as had been asked in the question. Also, some candidates spent needless time calculating the amount for each colour, and then often failed to identify the one required in the question. Nearly 70% of the candidates scored all 4 marks with around 25% scoring 2 marks.

43. On this paper we did not test the drawing of a pie chart, instead we gave candidates a pie chart and asked them to interpret it.

Parts (a)(i) and (ii) were both correct in 35% of cases. The mark-scheme was set up to accept answers written as fractions, decimals and percentages but 1 mark compensation was given for those candidates that wrote both answers as 1 out of 4 and 3 out of 4. We also allowed one mark in part (a)(ii) for those candidates that wrote an answer that was 1 – their answer to a(i). No marks at all were awarded for those candidates that wrote any of their probabilities as ratios as a ratio of 1:4 or 3:4 are probabilities out of 5 and 7 respectively.

In part (b), only 30% of candidates scored full marks for an answer of 72. One mark was awarded for a method that realised that 30º was a twelfth of 360º or one person was represented by 5º or for a partial method to add at least 3 correct frequencies out of the five; 8% gained this method mark which more candidates could have gained this method mark if they had shown their attempt to add.

44. This question proved to be very successful with 55% of candidates being able to write out the missing 17 combinations successfully. One mark was obtained by 25% of candidates that could give an additional 6 outcomes but 20% scored no marks. Interestingly a significant number of candidates thought there were only 3 numbers on the dice since only 1, 2 and 3 were shown in the diagram. The most successful candidates gave their combinations in an ordered fashion, either by all the greens followed by all the blues followed by all the reds or by all the ones, all the twos etc.

45. This question was very well understood with 76% gaining all four marks in part (a) and (b). Partial credit was given for those who wrote their probabilities incorrectly and for those who thought that 1 – (0.35 + 0.1 + 0.3) was 1 – 0.39 and wrote 0.61 as their answer for part (a) and that 0.35 + 0.1 was equal to 0.36 in part (b). However, a number of candidates showed no working, and so a wrong answer of 0.61 in part (a) scored no marks. In part (b) the most common error was to multiply 0.1 and 0.35 together instead of adding. There were also a significant number of candidates who hadn't read the question carefully enough, and added the probabilities for green and red, rather than yellow and red. In part (c) the question was well answered by most candidates with 78% scoring both marks whilst those that wrote 0.3 × 200 scored 1 mark as did those who wrote the answer as 60/200. The vast majority of those who scored no marks did so because they divided 200 by 0.3, instead of multiplying.