REVISE EDEXCEL GCSE (9–1)

Mathematics

REVISION WORKBOOK

Foundation

For the (9–1) exams

Pearson
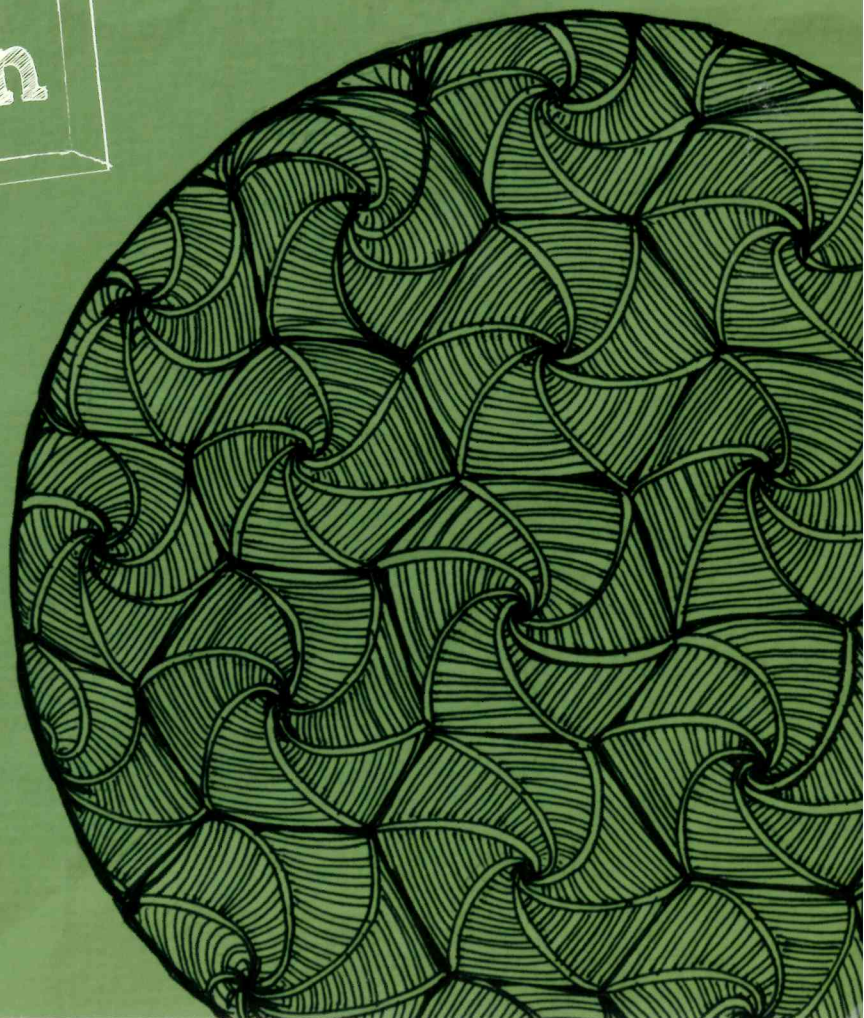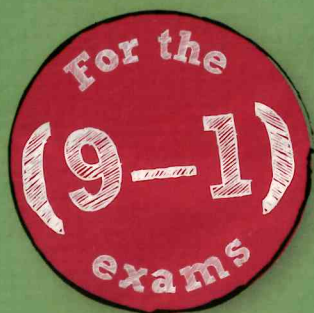
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REVISION WORKBOOK

Series Consultant: Harry Smith
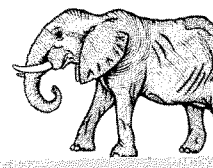
Author: Navtej Marwaha

Also available to support your revision:

Revise GCSE Study Skills Guide   9781447967071

The **Revise GCSE Study Skills Guide** is full of tried-and-trusted hints and tips for how to learn more effectively. It gives you techniques to help you achieve your best – throughout your GCSE studies and beyond!

Revise GCSE Revision Planner   9781447967828

The **Revise GCSE Revision Planner** helps you to plan and organise your time, step-by-step, throughout your GCSE revision. Use this book and wall chart to mastermind your revision.

Contents

A small bit of small print
Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions in 'Now try this' have been written to help you practise every topic in the book. Remember: the real exam questions may not look like this.

Two-way tables

Guided

1 70 children each visited a city last week.
The two-way table shows some information
about these visits.

> Look for rows or columns
> with one empty cell.

	Bath	Warwick	Lichfield	Total
Boys	17 − 7 = ...	14	....	32
Girls	7	....	....	70 − 32 = ...
Total	17	25	....	70

Complete the two-way table. **(2 marks)**

2 80 children each chose one school activity from dodgeball, football and rounders.
The two-way table shows some information about their choices.

	Dodgeball	Football	Rounders	Total
Girls	12	....	....	41
Boys	18 − 12 = ...	19	....	....
Total	18	....	25	80

(a) Complete the two-way table. **(2 marks)**

(b) How many boys chose football? .... **(1 mark)**

(c) How many girls chose an activity? .... **(1 mark)**

(d) How many girls chose dodgeball? .... **(1 mark)**

3 The two-way table shows some information about the colours of motorbikes
and cars in a garage.

	White	Blue	Red	Total
Motorbikes	7	....	....	22
Cars	....	8	....	....
Total	10	17	....	50

(a) Complete the two-way table. **(2 marks)**

(b) Write down the total number of motorbikes. .... **(1 mark)**

(c) How many cars were there in total? .... **(1 mark)**

(d) How many cars were not blue? .... **(1 mark)**

Pictograms

1 The pictogram shows the numbers of hours of sunshine in Wolverhampton on Monday, Tuesday and Wednesday of one week.

Monday	◯ ◯ ◯ ◯
Tuesday	◯ ◯ ◯
Wednesday	◯ ◯ ◖
Thursday	
Friday	

◯ represents 2 hours

(a) Work out the number of hours of sunshine on Monday.

.... hours **(1 mark)**

(b) How many more hours of sunshine were there on Monday than Wednesday?

.... hours **(1 mark)**

There were 4 hours of sunshine on Thursday and 3 hours of sunshine on Friday.

(c) Use this information to complete the pictogram. **(2 marks)**

2 The pictogram gives information about the number of packets of chocolates sold by a shop some days in one week.

Monday	▭ ▭ ▭ ▭
Tuesday	▭ ▭ ▭
Wednesday	▭ ▭ ▱
Thursday	
Friday	

(a) The total number of packets of chocolates sold on Monday and Tuesday was 130.
Complete the key.

▭ represents .... packets **(1 mark)**

(b) How many packets of chocolates were sold on Wednesday?

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

70 packets of chocolates were sold on Thursday.
60 packets of chocolates were sold on Friday.

(c) Use this information to complete the pictogram. **(2 marks)**

Bar charts

1 Shaheen works at an animal shelter for dogs. She has alsatians, bulldogs, labradors and poodles.

Guided

This bar chart shows some information about the alsatians and bulldogs.
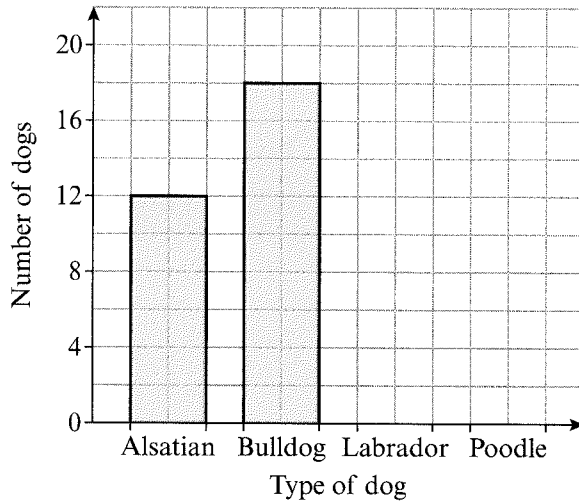
(a) Shaheen also has 8 labradors and 11 poodles in the animal shelter.
Complete the bar chart. **(2 marks)**

(b) Write down the most common dog.

> Look for the highest bar.

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

(c) Work out the total number of dogs in the animal shelter.

12 + ... + ... + ... = ... **(2 marks)**
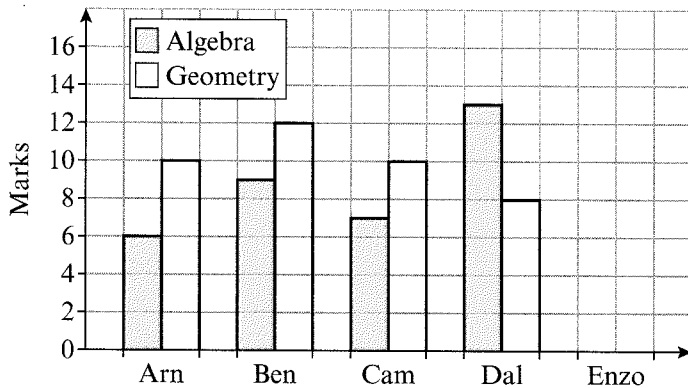
2 Some students each sat an algebra test and a geometry test. Each test was out of 15 marks. The dual bar chart shows the results of four of these students.

Guided

(a) Who got more marks in their algebra test than their geometry test?

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

(b) How many more marks did Arn get in her geometry test than in her algebra test?

10 − .... = ... **(1 mark)**

Enzo got 9 marks in his algebra test and 14 marks in his geometry test.

(c) Show this information on the dual bar chart. **(2 marks)**

3 Julie asked the students in her class which type of pets they had at home.
The bar chart shows some information about the results from her class.

Write down two things that are wrong with the bar chart.
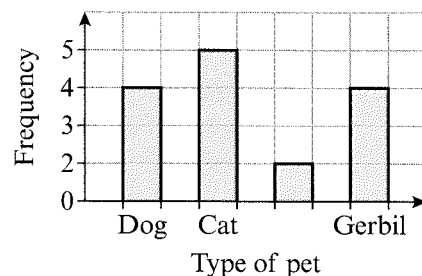
1 ....

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

Pie charts

1 Brett carries out a survey of 60 people.
He asks them their favourite takeaway.
The table shows this information.
Draw a pie chart to represent this data.

Favourite takeaway	Frequency
Indian	14
Chinese	21
Italian	9
Other	16
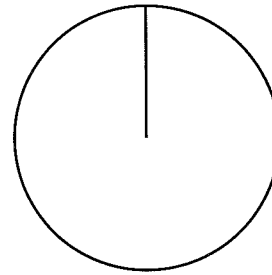
You need to calculate the angles first.

$\frac{14}{60} \times 360° = $ ....

$\frac{\text{.............................}}{60} \times 360° = $ ....

$\frac{\text{.............................}}{60} \times 360° = $ ....

$\frac{\text{.............................}}{60} \times 360° = $ ....

(3 marks)

2 Dhruv asked his friends to tell him their
favourite colour. The table shows his results.
Draw a pie chart to show his results.

Favourite colour	Frequency
Blue	23
Green	31
Red	22
Yellow	14
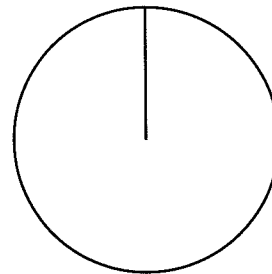
$\frac{\text{.............................}}{90} \times 360° = $ ....

$\frac{\text{.............................}}{90} \times 360° = $ ....

$\frac{\text{.............................}}{90} \times 360° = $ ....

$\frac{\text{.............................}}{90} \times 360° = $ ....

(3 marks)

3 Elaine carries out a survey of some students.
The pie chart shows some information about
their favourite sport.

(a) 20 students said that cricket is their favourite sport.
How many students said that darts is their
favourite sport?

Darts 30° Cricket 60° Rugby Football

....
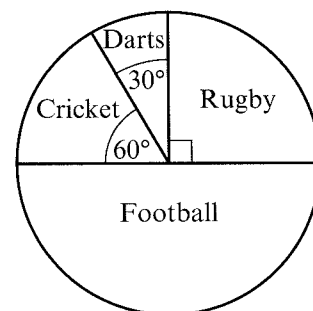
(1 mark)

(b) Show that 120 students took part in the survey.

(2 marks)

Scatter graphs

1 The weights of seven magazines and the number of pages in each one were recorded. The scatter graph gives information about these results.

Weight (g)
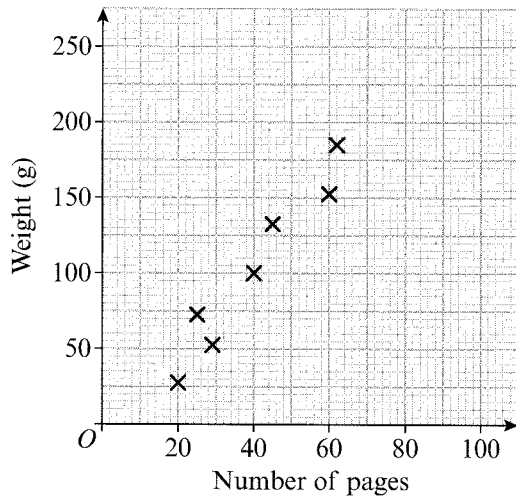
Number of pages

(a) What type of correlation does this scatter graph show?

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

(b) Estimate the weight, in g, of a magazine with 50 pages.

┌─────────────────────────┐
│ Draw a line of best fit. │
└─────────────────────────┘

.... g **(2 marks)**

(c) Estimate the weight, in g, of a book with 80 pages.

.... g **(1 mark)**

(d) Nik says, 'As the number of pages increases, the books get heavier.' Does the scatter graph support Nik's statement?

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

(e) Make two comments explaining why your estimate in part (c) might not be accurate.

....

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

2 The scatter graph gives information about the price and age of motorbikes.

Price (£)

Age (in years)
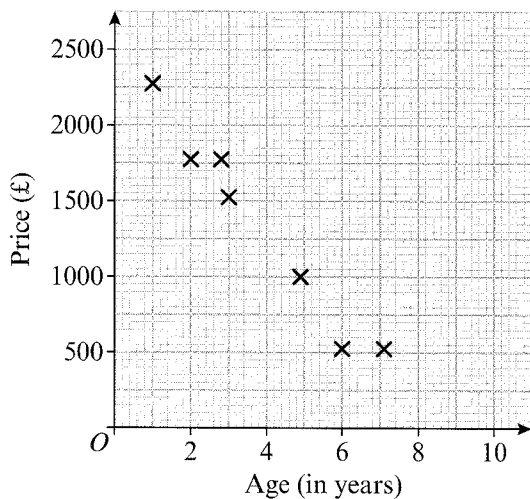
(a) What type of correlation does this scatter graph show?

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

(b) Estimate the price, in £, of a 4-year-old motorbike.

£.................................. **(2 marks)**

(c) Comment on the reliability of the estimate in part (b).

....

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

(d) Tim says, 'As the motorbikes get older they get more expensive.' Does the scatter graph support Tim's statement?

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

Averages and range

1 Here are some numbers.

3, 7, 15, 10, 14, 7, 11

Guided

Work out

(a) the mode

> The most common number.

(b) the median

> Put the numbers in order and then choose the middle number.

3, 7, 7, 10, 11, 14, 15

(c) the mean

> Sum of all the numbers divided by how many there are.

(d) the range

> Highest − lowest

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

2 The heights, in cm, of five children are shown.

157, 161, 171, 156, 160

Guided

(a) Work out the mean height.

(157 + 161 + ... + ... + ...) ÷ 5

= ....cm

(2 marks)

(b) The height of a sixth child is 158 cm. Work out the new mean.

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

3 (a) Bob has three cards. Each card has a number on it. The numbers are hidden. The mode of the three numbers is 6. The mean of the three numbers is 7.

> You will need to use problem-solving skills throughout your exam – **be prepared!**

| ? | | ? | | ? |

Work out the three numbers on the cards.

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

(b) Emma has five cards. She wants to write down a number on each card such that

| ? | | ? | | ? | | ? | | ? |

the mode of the five numbers is 7
the median of the five numbers is 8
the mean of the five numbers is 9
the range of the five numbers is 5.

Work out the five numbers on the cards.

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

Averages from tables 1

1 The table shows the numbers of goals scored by a football team in each of 30 matches.

Number of goals	Frequency	
0	7	$0 \times 7 =$ ....
1	9	$1 \times 9 =$ ....
2	6	$2 \times 6 =$ ....
3	5	$3 \times 5 =$ ....
4	3	$4 \times 3 =$ ....

> Draw an extra column.

> Add up the final column to work out the total number of goals.

Work out

(a) the mode

Mode is ....   **(1 mark)**

(b) the median

Median $= \dfrac{30 + 1}{2} =$ ....th value $=$ ....   **(2 marks)**

(c) the mean

Mean $= \dfrac{\text{total number of goals}}{\text{frequency}} = \dfrac{\text{...........................}}{\text{...........................}} =$ ....   **(3 marks)**

(d) the range

Range $=$ highest value $-$ lowest value $=$ .... $-$ .... $=$ ....   **(2 marks)**

2 The table shows information about the results of rolling a dice 25 times. Work out

Score	Frequency
1	3
2	1
3	5
4	3
5	7
6	6

(a) the mode

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

(b) the median

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

(c) the mean.

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

3 Jordan carried out a survey of the number of chocolates 25 students ate in one week.

Number of chocolates	Frequency
0	3
1	4
2	6
3	5
4	4
5	3

(a) Jordan worked out the mean of the number of chocolates eaten. He got an answer of 6. Explain why it is impossible for the mean to be 6.

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

(b) Work out the correct mean.

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

(c) Jordan decides to ask one more person. This person ate no chocolates in this week. Will the mean of the number of chocolates eaten increase or decrease? Give a reason for your answer.

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

Averages from tables 2

Guided

4 The table shows information about the number of hours spent on the internet last week.

Number of hours	Frequency f	Midpoint x	f × x
$0 \leqslant h < 2$	6	1	$6 \times 1 = $ ....
$2 \leqslant h < 4$	7	3	$7 \times 3 = $ ....
$4 \leqslant h < 6$	3	5	$3 \times 5 = $ ....
$6 \leqslant h < 8$	9	7	$9 \times 7 = $ ....
$8 \leqslant h < 10$	10	9	$10 \times 9 = $ ....

(a) Write down the modal class.

Modal class is .... **(1 mark)**

(b) Write down the class interval which contains the median.

Median $= \dfrac{35 + 1}{2} = $ ....th value.

Median is in class .... **(2 marks)**

(c) Work out an estimate for the mean number of hours.

> Multiply the frequency by the midpoint of each group.

> Add up the final column to work out the total number of hours.

Mean $= \dfrac{\text{total number of hours}}{\text{frequency}} = \dfrac{\text{...............................}}{\text{...............................}}$

Mean = ... **(4 marks)**

(d) Explain why your answer to part (c) is an estimate.

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

5 Ian asked 25 students how many minutes they each took to get home from school.

Time taken (t minutes)	Frequency
$0 \leqslant h < 10$	6
$10 \leqslant h < 20$	7
$20 \leqslant h < 30$	3
$30 \leqslant h < 40$	9

(a) Ian used this information to work out the mean of the times taken. He got an answer of 54 minutes. Explain why it is impossible for the mean time to be 54 minutes.

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

(b) Work out an estimate for the mean time taken.

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

(c) Ian realises he has missed out a student. This student takes 32 minutes to get home from school. Ian says, 'The mean time of the students will increase.' Is he correct? Give a reason to support your answer.

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

Line graphs

1 The table shows information about annual turnover of a company in millions of pounds.

Year	Turnover (£ millions)
2008	13
2009	10
2010	12
2011	13
2012	15
2013	16
2014	18

(a) Draw a time series graph to represent this data.
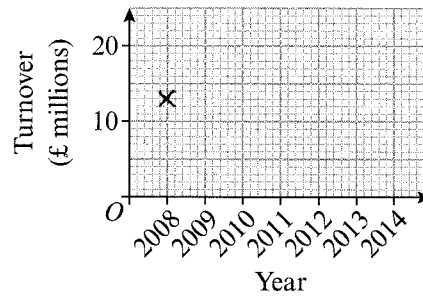
Plot the points from the table.

(2 marks)

(b) Describe the trend.

Use the correct language: upwards or downwards.

....

(1 mark)

2 Joe recorded the number of letters he received each day for a period of time. The graph gives some information about his results.
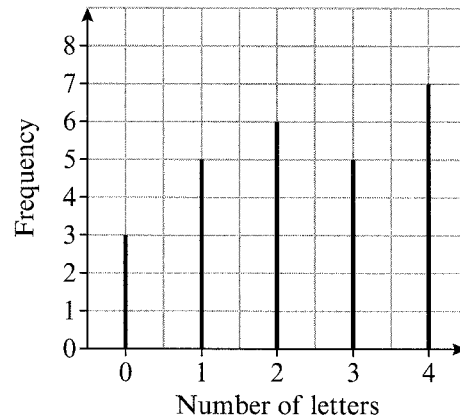
(a) Write down the modal number of letters.

....

(1 mark)

(b) Work out the total number of letters Joe received during this period of time.

$(0 \times 3) + (1 \times ....) + (2 ....) +$

$(........................ \times ....) + (........................ \times ....)$

$= ....$

(2 marks)

3 The vertical line graph shows the shoe sizes of some children.

You will need to use problem-solving skills throughout your exam – **be prepared!**
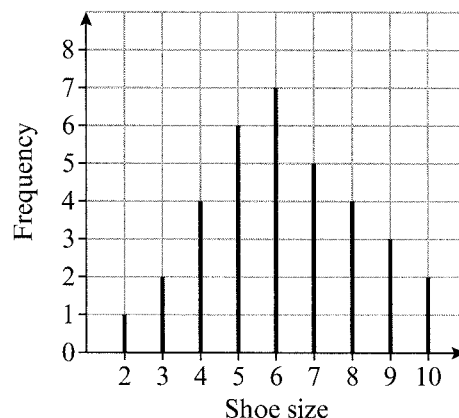
(a) Write down the modal shoe size.

....

(1 mark)

(b) Work out the mean shoe size.

....

(3 marks)

123

Stem-and-leaf diagrams

Guided

1 Mary recorded the weights, in kg, of 15 people. Here are her results.

86	50	47	76	73	59	67	79
47	62	51	63	77	61	65	

(a) Draw an ordered stem-and-leaf diagram to show this information. **(3 marks)**

> Start by writing down the stems.

```
4 |
5 |
```

Key:

(b) Write down the modal weight.

....kg **(1 mark)**

(c) Work out the median weight.

(d) Show that the range is 39 kg.

....kg **(2 marks)**   .... **(2 marks)**

2 Asha recorded the heart rates of each of 19 people. Here are her results.

53	65	78	82	81	91	59	65	75	97
93	61	72	94	83	79	88	87	65	

(a) Draw an ordered stem-and-leaf diagram. **(3 marks)**

(b) Write down the modal heart rate.

Key:

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

(c) Work out the median heart rate.

(d) Work out the range.

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

3 Patrick collected some information about the heights, in cm, of 15 plants. This information is shown in the stem-and-leaf diagram.

> Use the key to interpret the stem-and-leaf diagram.

```
6 | 1 2 3 5
7 | 2 4 5 6 7
8 | 1 3 4 8
9 | 3 x
```

Key: 6 | 1 represents 61 cm

(a) Explain why there is no modal value.

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

(b) Work out the median height.

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

(c) The range is 35 cm. Work out the value of x.

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

(d) What plant height does the data value x represent?

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

Sampling

1 Simon wants to find out the number of hours spent on homework in his school each week. He surveys seven children from his class. Here are his results.

> You will need to use problem-solving skills throughout your exam – **be prepared!**

PROBLEM SOLVED!

9   7   4   2   6   5   3

(a) Write down one advantage of taking a sample.

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

(b) Use this data to estimate the mean number of hours spent doing homework each week by students.

> Add up all the values and divide by how many there are.

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

(c) Comment on the reliability of this estimate.

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

(d) How could Simon reduce bias in his sample?

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

2 An experiment is carried out by flying paper aeroplanes. The scatter graph shows some information about the distance flown, in m, and the wingspan, in cm. A line of best fit has been drawn.

Guided
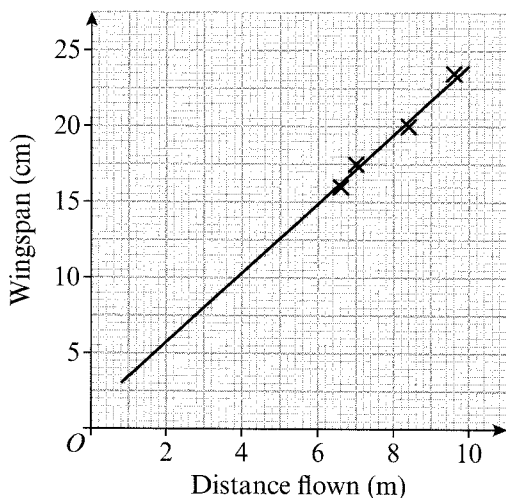
(a) Use the line of best fit to estimate the wingspan, of a plane which flies 9 m.

> Draw a vertical line to the line of best fit.

....cm **(1 mark)**

(b) Use your line of best fit to estimate the distance flown, by a plane with a wingspan of 5 cm.

.... m **(1 mark)**

(c) Which of your estimates in part (a) or part (b) is more reliable. Give a reason for your answer.

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

(d) Write down one way you could improve this experiment to increase the accuracy of your estimates.

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

Stratified sampling

Guided

1 A school has 750 students. Each student studies one of Latin, Spanish, French and German.
The table shows the number of students who study each of these languages.

Language	Latin	Spanish	French	German
Number of students	170	146	220	214

Peter takes a sample of 50 of these students, stratified by the language studied.
Find the number of students in his sample who study German.

Sample size = 214 .... × .... = ...   **(2 marks)**

2 The table shows information about some students in a sixth form.

	Year 12	Year 13
Number of male students	134	191
Number of female students	172	153

Nisha is going to do a survey of the students in the sixth form.
She uses a sample of 40 students, stratified by year group and by gender.
Work out the number of Year 13 male students.

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

3 A youth club has 450 members. Each member can play one of football,
tennis, rugby and squash.
The table shows the number of members who play each of these sports.

Sport	Football	Tennis	Rugby	Squash
Number of members	95	68	151	136

Bill takes a sample of 65 of these members,
stratified by the sport they play.
Find the number of members playing each of
these sports that should be in the sample.

> Make sure you count the number
> of members in the sample so
> that it adds up to 65.

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

4 The table shows information about the numbers of people who attended a local
charity event.
Gary is going to take a sample of 55 of these people, stratified by gender and by age.

		Age		
		Under 19	19 to 39	Over 39
Gender	Male	136	183	85
	Female	158	200	138

Calculate the number of males aged over 39 that should be in his sample.

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

Comparing data

1 (a) The following table shows the results of two tests out of 100.

	Mean	Range
Maths	62	14
Statistics	56	20

Compare the test scores in Maths and Statistics.

Students did better in .... because the mean

was ....

Students' results in Maths were more ....

because the range was .... **(2 marks)**

(b) The table shows the amount of rainfall, in mm, in Wolverhampton and Dundee one month.

	Mean	Range
Wolverhampton	25	9
Dundee	39	6

Compare the amount of rainfall in Wolverhampton and Dundee.

....

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

2 Mr Jones kept a record of the number of absences for each student in his class for one term. Here are his results.

1   0   1   8   6   4   3   5   2   3   4   2

(a) Work out the mean. (b) Work out the range.

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

Mr Singh also kept a record of the number of absences in his class.
The mean number of absences was 5 and the range was 5.

(c) Compare the number of absences for each class.

....

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

3 The exam marks of classes 11A and 11B are shown in the back-to-back stem-and-leaf diagram.

```
       11A          11B
     5 4 1 | 5 |
   8 6 3 2 | 6 | 2 3 4
   8 7 5 4 | 7 | 1 3 6 7
         2 | 8 | 5 6 8
           | 9 | 3
```

Key: 1 | 5 represents 51 marks

Key: 6 | 2 represents 62 marks

Compare the results of class 11A with the results of class 11B.

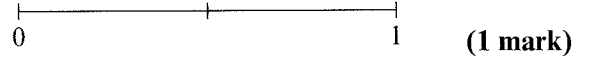> Work out the median and the range and then use these values to compare the data.

....

....

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

127

Probability 1

1 On the probability scale, mark with a cross (×) the probability that

(a) it will rain tomorrow

```
├──────────────┼──────────────┤
0                              1
```
(1 mark)

(b) the sun will not rise tomorrow

```
├──────────────┼──────────────┤
0                              1
```
(1 mark)

(c) a coin is tossed and it will land on heads

```
├──────────────┼──────────────┤
0                              1
```
(1 mark)
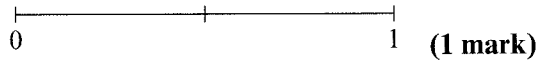
(d) a dice is rolled and it will land on 6.

```
├──────────────┼──────────────┤
0                              1
```
(1 mark)

2 John rolls an ordinary dice. The faces are labelled 1, 2, 3, 4, 5 and 6.
Write down the probability that he gets

> **Guided**

(a) a 5

> How many 5s are there?

....
(1 mark)

(b) an even number

> How many even numbers are there?

....
(1 mark)

(c) a number less than 4

....
(1 mark)

(d) a 10.

....
(1 mark)

3 impossible   unlikely   evens   likely   certain

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

(a) A dice is rolled and a 7 is shown.

(b) A coin is thrown and lands on tails.

(c) 4 April is the day after 3 April.

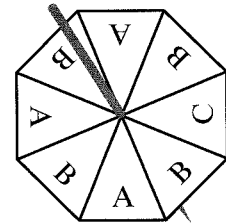.......................... **(1 mark)**   .... **(1 mark)**   .... **(1 mark)**

4 (a) The diagram shows a spinner.
The spinner can land on A or B or C.
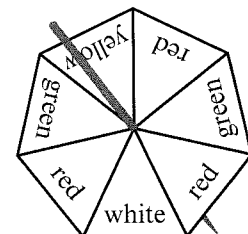Write down the probability that the spinner will land on B.

> How many Bs are there?

....
(1 mark)

(b) Here is a 7-sided spinner.
The spinner is spun once. The spinner will land on one of the colours.
Write down the probability that the spinner will land on green.

....
(1 mark)

Probability 2

5 A box contains cartons of orange juice, apple juice and mango juice.
The table shows each of the probabilities that a carton of juice taken at
random from the box will be orange or apple.

> **Guided**

Carton of juice	Orange	Apple	Mango
Probability	0.3	0.4	

> The probabilities have
> to add up to 1.

A carton is to be taken at random from the box.
Work out the probability that the carton

(a) will be an orange juice or an apple juice

0.3 + ... = ...   **(2 marks)**

(b) will be a mango juice.

1 − (............................. + ...) = ...   **(2 marks)**

6 A bag contains counters which are red or green or white or blue. The table shows
each of the probabilities that a counter taken at random will be red or green or white.

> **Guided**

Colour	Red	Green	White	Blue
Probability	0.35	0.28	0.16	

A counter is to be taken at random from the bag. Work out the probability that
the counter will be blue.

1 − (......................... + ... + ...) = ...   **(2 marks)**

7 A spinner can land on A, B, C or D. The table shows information that the spinner
will land on each letter B or C or D.

Letter	A	B	C	D
Probability		0.26	0.36	0.17

The spinner is spun once. Work out the probability that the letter on the spinner

(a) will be B **and** C   (b) will be A.

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

8 Four athletes Andy, Ben, Carl and Daljit take
part in a race. The table shows the probabilities
of Andy or Ben winning the race.

> You will need to use
> problem-solving skills
> throughout your exam
> – **be prepared!**

PROBLEM SOLVED!

Athlete	Andy	Ben	Carl	Daljit
Probability	0.3	0.38		

The probability that Carl will win is 3 times the probability that Daljit will win. Work out the
probability that the race will be won by

(a) Andy or Ben   (b) Daljit.

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

Relative frequency

⟩ Guided ⟩

1 The table shows information about the number of orders received each month for six months by an internet company.

Month	Jan	Feb	Mar	Apr	May	Jun
Number of orders	28	63	49	61	53	48

An order is chosen at random.
Work out the probability that the order was received in

(a) May

> First work out the total number of orders.

$$\frac{53}{\text{............................}}$$

(2 marks)

> Add up the numbers for January, February and March.

(b) January or February or March

$28 + \text{......................} + \text{......................} = \text{......................}$

....

....

(2 marks)

⟩ Guided ⟩

2 The table shows the total scores when Ethan throws three darts 50 times.

Score	1–30	31–60	61–90	91–120	121–150	151–180
Frequency	14	10	9	8	6	3

He throws another three darts. Estimate the probability that he scores

(a) between 31 and 60

$\text{......................}$ out of $50 = \dfrac{\text{......................}}{50}$

(1 mark)

(b) more than 90

....

(2 marks)

(c) 120 or less

....

(2 marks)

3 A garage keeps records of the cost of repairs it makes to vans. The table gives information about the costs of all repairs which were £500 or less in one month.

Cost (£C)	Frequency
$0 < C \leqslant 100$	20
$100 < C \leqslant 200$	39
$200 < C \leqslant 300$	72
$300 < C \leqslant 400$	33
$400 < C \leqslant 500$	38

(a) Amy needs to repair her van. Estimate the probability her repair costs more than £200.

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

(b) Comment on the accuracy of your estimate.

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

Frequency and outcomes

1 Brett goes to a restaurant.
He can choose from three types of curry and
from three types of naan.
Brett is going to choose one curry and one naan.
Write down the probability that he chooses a
lamb curry with a butter naan.

Curry	Naan
Chicken	Plain
Lamb	Garlic
Vegetable	Butter

> Label chicken as C, etc.

(C, ...) (C, ...) (C, ...)

(L, ...) (L, ...) (L, ...)

(V, ...) (V, ...) (V, ...)

Probability = ... **(2 marks)**

2 Martin is holding three cards, labelled X, Y and Z.
He mixes them up and then asks Neil to choose a card at random.

(a) Write down the probability that Neil chooses card Y.

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

Neil replaces his card and Martin mixes the cards up again.
Martin then asks Tej to choose a card.

(b) Complete the table of possible outcomes.

Neil's card									
Tej's card									

(2 marks)

(c) Work out the probability that Neil and Tej both choose the same card.

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

(d) Work out the probability that Neil and Tej choose different cards.

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

3 120 adults were asked if they voted in the general election. 58 of these adults were male.
7 of the females did not vote. 103 of the adults voted.

(a) Draw a frequency tree to show this information.

(3 marks)

One of the males is chosen at random.

(b) Work out the probability that this male did not vote.

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

4 A bag contains 50 counters. They are all either green or blue.
A counter is chosen at random. The probability that it is green is $\frac{3}{10}$.
Work out the number of blue counters in the bag.

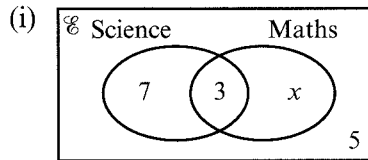....................................... **(2 marks)**

Venn diagrams

> **Guided**

1 The following diagrams represent the subjects studied at college by a group of 30 students. For each diagram

(a) work out the value of x
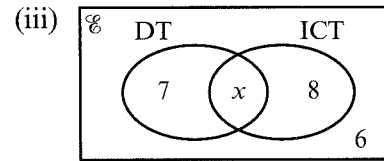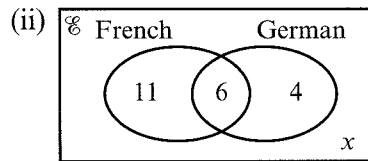
(b) write down the set that x represents.

(i)

$\mathscr{E}$ Science	Maths
7 3 x	
	5

30 − (............................ + ... + ...)

x = ... **(1 mark)**

Students who only study .... **(1 mark)**

(ii)

$\mathscr{E}$ French	German
11 6 4	
	x

x = ... **(1 mark)**

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

(iii)

$\mathscr{E}$ DT	ICT
7 x 8	
	6

x = ... **(1 mark)**

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

2 The Venn diagram shows information about musical instruments played by 40 students. A student is chosen at random. Work out the probability that this student

$\mathscr{E}$ Piano	Guitar
16 5 8	
	11
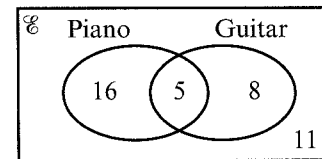
(a) plays the piano and the guitar

(b) plays neither instrument

(c) plays the piano.

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

3 In a class of 30 students, 10 own a PS4, 12 own an X-Box and 4 own both.

(a) Draw a Venn diagram to represent this information.

| $\mathscr{E}$ |
| |
| |
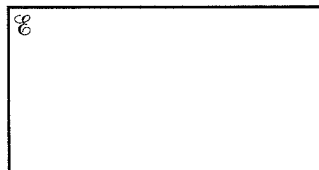
(2 marks)

A student is chosen at random. Find the probability that this student

(b) does not own a PS4 and does not own an X-Box

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

(c) owns a PS4 or an X-Box but not both.   .... **(2 marks)**

Independent events

1 Marcus has ten counters in a bag.
Three of the counters are yellow and the remaining counters are blue.
Marcus chooses a counter at random and notes the colour.
He then puts the counter back into the bag.
He chooses another counter at random and notes the colour.
Work out the probability that

> You will need to use problem-solving skills throughout your exam – **be prepared!**

Guided

PROBLEM SOLVED!

(a) both counters will be yellow

(2 marks)

$$\frac{3}{10} \times \frac{\text{.................}}{10} = \text{..................................}$$

(b) both counters will be blue

(2 marks)

$$\frac{\text{.................}}{10} \times \frac{\text{.................}}{10} = \text{..........................}$$

(c) the counters will be different colours.

$$\frac{\text{.................}}{\text{.................}} \times \frac{\text{.................}}{\text{.................}} + \frac{\text{.................}}{\text{.................}} \times \frac{\text{.................}}{\text{.................}}$$

(3 marks)

$$= \text{...............................}$$

2 A bag contains three blue marbles and seven red marbles.
A marble is chosen at random, replaced, and then another is taken out.

Guided

(a) Complete the probability tree diagram.

(b) Work out the probability that exactly one of each colour is chosen.

First marble   Second marble

0.7 ... R
0.7 ... R
... B
... B
0.7 ... R
... B
0.7 ... B
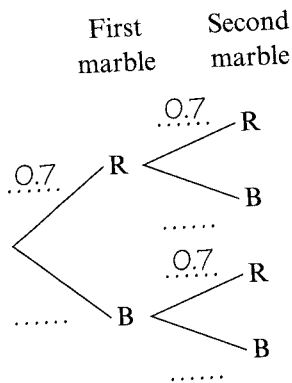
(2 marks)

(3 marks)
....

3 Nav and Asha each take a motorcycle test.
The probability that Nav will pass is 0.9.
The probability that Asha will pass is 0.8.

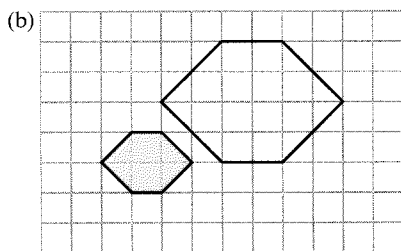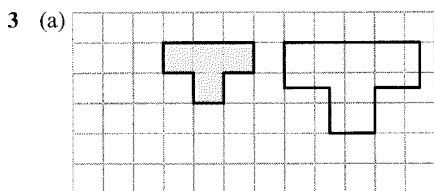(a) Complete the probability tree diagram.

(b) Work out the probability that exactly one of them will pass the test.

Nav   Asha

...... Pass
...... Fail

(2 marks)

(3 marks)
....

3 (a)

(b)
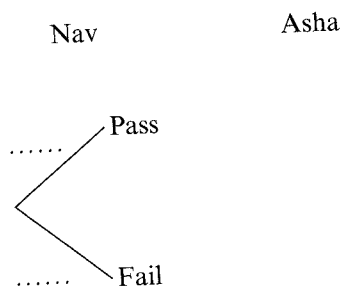
4 Ravina is correct. A and C are the same shape and size. B is an enlargement of A.

5 27

110. Similar shapes

1 (a) 120°   (b) 25 cm   (c) 18 cm
2 (a) 33 cm   (b) 8 cm
3 (a) 6.4 cm   (b) 5.7 cm

## 111. Congruent triangles

1 Side AC = side DF, side AB = DE, side BC = EF therefore SSS
2 BC = QR, CA = PR, angle BCA = angle PRQ therefore SAS
3 Side AC = side RP, angle ACB = angle PRQ, therefore not enough information to state whether congruent or not

112. Vectors

1 (a) $\binom{2}{5}$ (b) $\binom{-2}{-5}$ (c) $\binom{5}{3}$

    (d) $\binom{-5}{-3}$ (e) $\binom{5}{-6}$ (f) $\binom{-5}{6}$

2 (a) $a + b$ (b) $-b - a$
3 (a) $p + q$ (b) $-q - p$ (c) $p - q$ (d) $q - p$
4 (a) $a + b$ (b) $-a - b$

113. Problem-solving practice 1

1 18°
2 tray = 60 cm × 40 cm × 2 cm = 4800 cm³
cylinder = $\pi \times 9^2 \times 20$ = 5089 cm³
There will be no water left in the rectangular tray
3 (a) and (b)
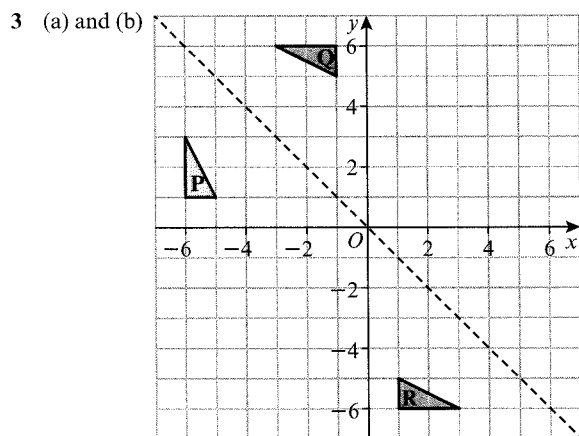
(c) Reflection in the line $y = x$

114. Problem-solving practice 2

4 Yes, she does have enough bags
5 60°
6 (a) 62.0°

    (b) $\sin 42° = \dfrac{12.8}{BD}$ therefore BD = 19.1 m

    It is long enough

PROBABILITY & STATISTICS

115. Two-way tables

1

	Bath	Warwick	Lichfield	Total
Boys	10	14	8	32
Girls	7	11	20	38
Total	17	25	28	70

2 (a)

	Dodgeball	Football	Rounders	Total
Girls	12	18	11	41
Boys	6	19	14	39
Total	18	37	25	80

(b) 19   (c) 41   (d) 12

3 (a)

	white	blue	red	Total
Motorbikes	7	9	6	22
Cars	3	8	17	28
Total	10	17	23	50

(b) 22   (c) 28   (d) 20

116. Pictograms

1 (a) 8 hours   (b) 3 hours
(c)

Monday	O O O O
Tuesday	O O O
Wednesday	O O ◖
Thursday	O O
Friday	O ◖

2 (a) 20 packets   (b) 25 packets
(c)

Monday	▢ ▢ ▢ ▢
Tuesday	▢ ▢ ▢
Wednesday	▢ ▢ ▫
Thursday	▢ ▢ ▢ ▢
Friday	▢ ▢ ▢

117. Bar charts

1 (a)
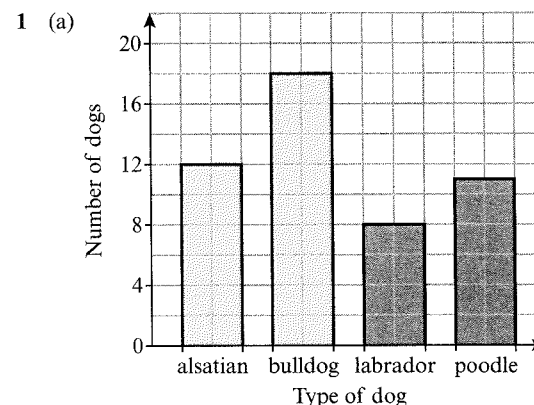
(b) Bulldog   (c) 49
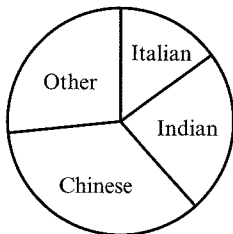
2 (a) Dal   (b) 4
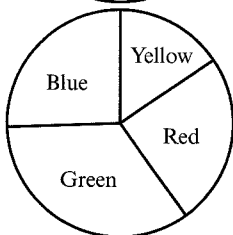
(c)
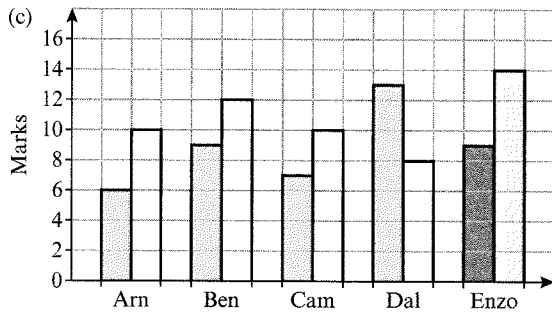
3 1. The scale on the y-axis is not linear
   2. One of the bars is not labelled

118. Pie charts

1

2

3 (a) 10   (b) 20 + 10 + 30 + 60 = 120

119. Scatter graphs

1 (a) Positive (b) 135 g   (c) 225 g   (d) Yes
   (e) The reading is not within the range of data and we are
      having to extend the line of best fit.
2 (a) Negative   (b) £1250
   (c) This reading is reliable   (d) No

120. Averages and range

1 (a) 7   (b) 10   (c) 9.6   (d) 12
2 (a) 161   (b) 160.5
**3** (a) 6, 6, 9 (b) 7, 7, 8, 11, 12

121. Averages from tables 1

1 (a) 1   (b) 1   (c) 1.6   (d) 4
2 (a) 5   (b) 5   (c) 4.12
3 (a) The maximum number of chocolates eaten is 5
   (b) mean = 2.48
   (c) It will decrease as the value is lower than the mean

122. Averages from tables 2

4 (a) $8 \leqslant h < 10$ (b) $6 \leqslant h < 8$ (c) $\frac{195}{35} = 5.57$
   (d) Because we are taking the midpoint
5 (a) The maximum number of minutes is 40
   (b) 21 minutes
   (c) Yes because 32 minutes is greater than the mean

123. Line graphs

1 (a)

            (b) Upwards
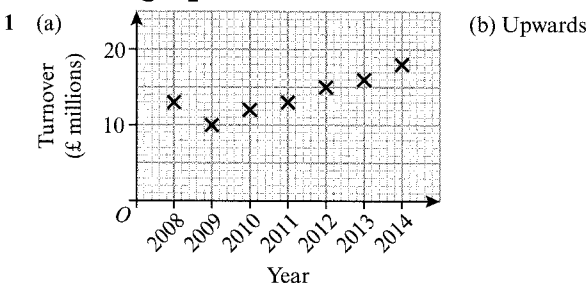
2 (a) 4   (b) 60
3 (a) 6   (b) 6.2

124. Stem-and-leaf diagrams

1 (a)

4	77
5	019
6	12357
7	3679
8	6

Key 4 | 7 means 47 kg
(b) 47 kg   (c) 63 kg   (d) 86 − 47 = 39

2 (a)

5	39
6	1555
7	2589
8	12378
9	1347

Key 5 | 3 means 53 beats
(b) 65 beats   (c) 79 beats   (d) 44 beats
3 (a) No value is repeated and each value only occurs once
   (b) 76   (c) 96   (d) the tallest plant

125. Sampling

1 (a) It is quick, cheap and easier to handle
   (b) 5.14
   (c) Not very reliable as sample is small
   (d) Ask children in different classes in different years
2 (a) 21.5 cm
   (b) 1.8 m
   (c) Part (a) is more reliable as it is within the data range
   (d) Carry out more experiments

126. Stratified sampling

1 14
2 12
3 14, 10, 21, 20
   (one of these needs to be rounded down so an alternative
   answer is 14, 10, 22, 19)
4. 5

127. Comparing data

1 (a) 1. Students did better in Maths because the mean was
       higher.
     2. Students' results in maths were more consistent
       because the range was smaller.
   (b) The amount of rainfall was higher in Dundee because
     the mean was higher. Wolverhampton's amount of
     rainfall was more varied because the range was higher.
2 (a) 3.25   (b) 8
   (c) More students were absent in Mr Singh's class because
     the mean was higher
3 The median in class 11A is less than the median in class 11B
   The range for both classes is the same

128. Probability 1

1 (a)

   (b)

   (c)

   (d)

2 (a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{1}{2}$ (d) 0
3 (a) Impossible   (b) evens   (c) certain
4 (a) $\frac{1}{2}$ (b) $\frac{2}{7}$

129. Probability 2

5 (a) 0.7   (b) 0.3
6 0.21
7 (a) 0   (b) 0.21
8 (a) 0.68   (b) 0.08

130. Relative frequency

1 (a) $\frac{53}{302}$ (b) $\frac{140}{302}$
2 (a) $\frac{1}{5}$ (b) $\frac{17}{50}$ (c) $\frac{41}{50}$
3 (a) $\frac{143}{202} = 0.71$
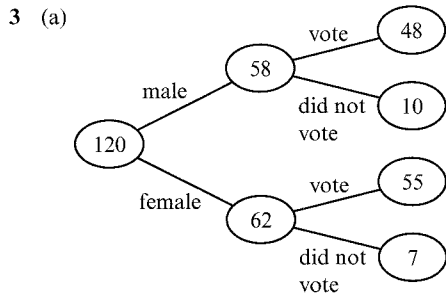 (b) The sample is large so the estimate is accurate

131. Frequency and outcomes

1 (C, P) (C, G) (C, B) (L, P) (L, G) (L, B) (V, P) (V, G) (V, B)
  Probability = $\frac{1}{9}$
2 (a) $\frac{1}{3}$

(b)
Neil's card	X	X	X	Y	Y	Y	Z	Z	Z
Tej's card	X	Y	Z	X	Y	Z	X	Y	Z

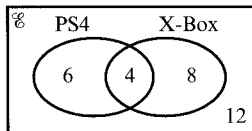(c) $\frac{1}{3}$ (d) $\frac{2}{3}$

3 (a)

(b) $\frac{10}{58} = \frac{5}{29}$
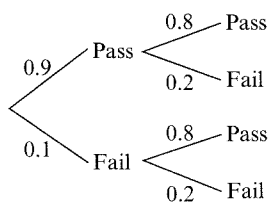
4 35

132. Venn diagrams

1 (a) (i) $x = 15$ (ii) $x = 9$ (iii) $x = 9$
  (b) (i) Students who only study maths
     (ii) Students who don't study French or German
     (iii) Students who study bot DT and ICT
2 (a) $\frac{1}{8}$ (b) $\frac{11}{40}$ (c) $\frac{21}{40}$
3 (a)

(b) $\frac{12}{30}$ (c) $\frac{14}{30}$

133. Independent events

1 (a) $\frac{9}{100}$ (b) $\frac{49}{100}$ (c) $\frac{42}{100}$
2 (a) Each missing branch has same probability, 0.3
  (b) 0.42
3 (a) Nav   Asha   (b) 0.26

134. Problem-solving practice 1

1 (a)
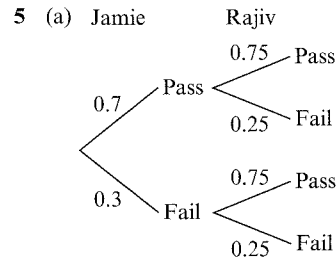|	French	German	Spanish	Total
Female	15	11	13	39
Male	16	17	8	41
Total	31	28	21	80

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

2 (a) (i) 0.75   (ii) 0.2   (b) 30
3 The median height of Park A is greater the median height
  in Park B
  The range of Park B is greater than Park A

135. Problem-solving practice 2

4
Favourite snack in year 11	Frequency	Angle
Burger	40	80°
Chips	90	180°
Hot dog	20	40°
Kebab	30	60°
Total	180	

5 (a) Jamie   Rajiv

(b) $\frac{2}{5}$

6 (a)

(b) $\frac{7}{25}$ (c) $\frac{12}{25}$

MATHS PRACTICE EXAM PAPERS

Paper 1F

1 (a) (i) 7°C   (ii) −11°C
  (b) (i) 6°C   (ii) 10°C

2
Date	Deposit	Withdrawal (£)	Balance (£)
01/05/15			4240.00
06/05/15		300.00	3940.00
15/05/15	345.00		4285.00
19/05/15		450.00	3835.00
27/05/15	1350.00		5185.00

Kate does not have enough money for the garden patio
3 (a) 2   (b) 0.5
  (c) Same chance because the probabilities are equal
4 (a) 14 km
  (b) Harry because he walks 39 km but Lewis walks 37 km

5
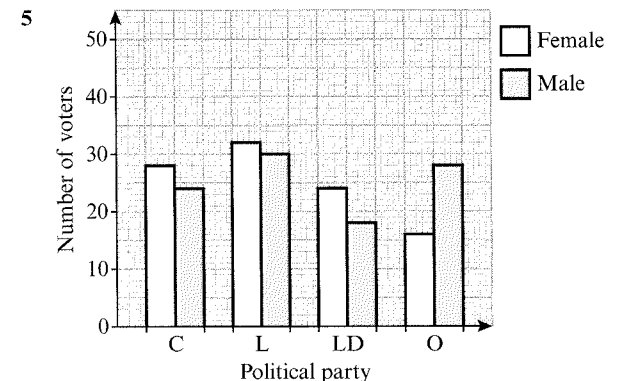
6 (a) $4a$ (b) $10x$ (c) $19e − 8f + 4$
7 (a) $25 − (10 × 2) = 25 − 20 = 5$ Len is correct
  (b) 16   (c) $16 − (4^2 + 3) = −3$