

Level 3 Certificate

MATHEMATICAL STUDIES

Paper 2A – Statistical techniques

Date Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a clean copy of the Preliminary Material (enclosed)
- a scientific calculator or a graphics calculator
- a copy of the formulae sheet and a copy of the statistical tables
- a ruler.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the bottom of this page.
- Answer **all** questions.
- You must answer each question in the space provided for that question. If you require extra space, use an AQA supplementary answer book; do **not** use the space provided for a different question. You do not necessarily need to use all the space provided.
- Do not write outside the box around each page.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions should be given to an appropriate degree of accuracy.
- You may **not** refer to the copy of the Preliminary Material that was available prior to this examination. A clean copy is enclosed for your use.

Information

- The marks for questions are shown in brackets. The maximum mark for this paper is 60.
- The paper reference for this paper is 1350/2A.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number Candidate number

Surname

Forename(s)

Candidate signature _____

2

Pete wants to buy a house.

His annual salary is £66 000

The bank will lend him three times his annual salary for a mortgage.

This is 90% of the house price.

He makes these notes:

$$3 \times 66\,000 = 188\,000$$

$$188\,000 \times 0.9 = 169\,200$$

So I can buy a house up to £169 200

This does not look right. What have I done wrong?

Critically analyse Peter's notes making corrections where necessary.

[3 marks]

3 Use **Positive spin** on the Preliminary Material.

3 (a) The editor of the local newspaper received a letter of complaint to say the data had been badly presented.

Was the complaint justified?

[2 marks]

3 (b) The newspaper headline for the 2014 by-election result said:

Half of Newark voters did not vote and UKIP made the biggest gain

Does the data support these claims?

[3 marks]

3 (c) Comment on the validity of each of the statements made by the three candidates on page 3 of the Preliminary Material.

Show working to justify your comments.

[8 marks]

Turn over for the next question

5 Three judges at a college music competition award marks to nine singers as shown.

Singer Judge	A	B	C	D	E	F	G	H	I
Will	71	72	85	63	64	70	62	79	73
Kylie	75	77	68	84	82	66	81	69	80
Ricky	75	83	64	89	84	67	73	66	78

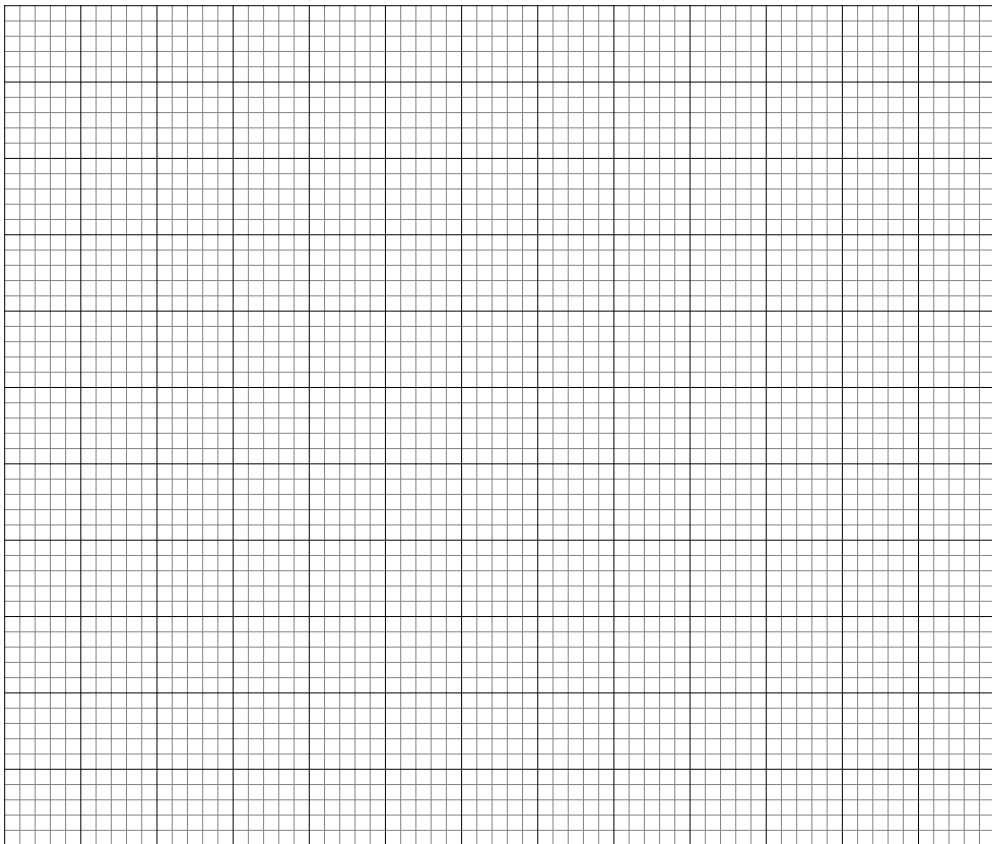
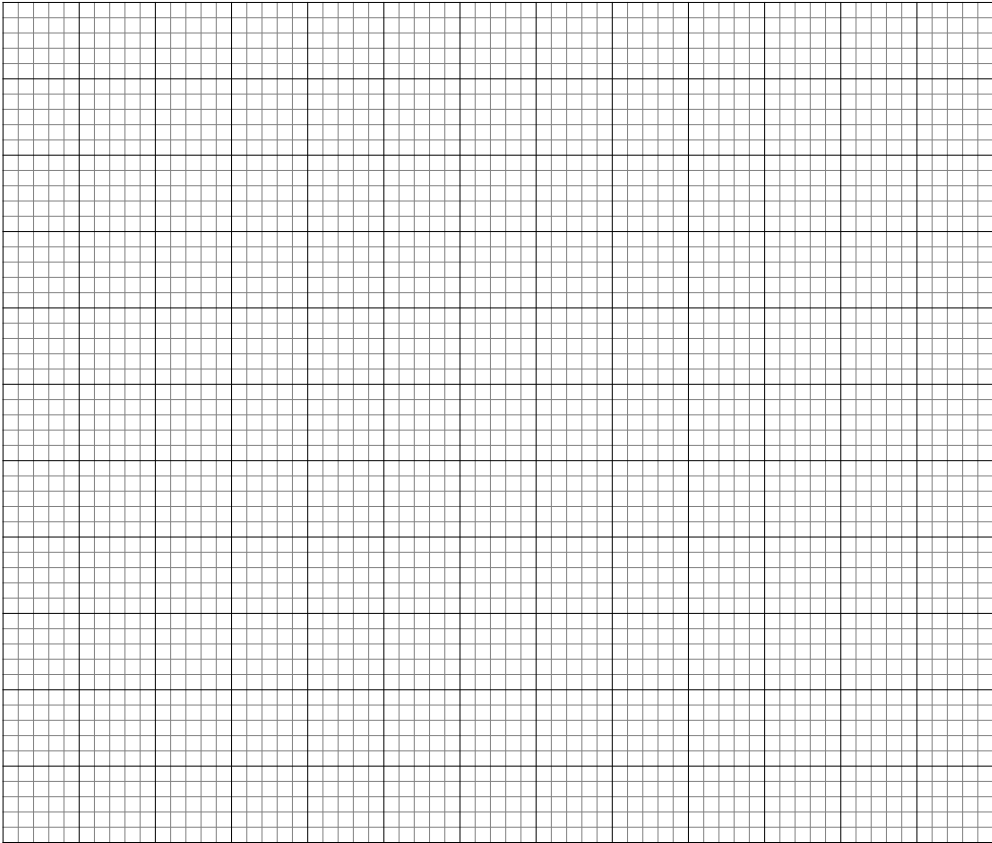
The organisers of this music competition decide to exclude the marks awarded by Will to singers in the competition.

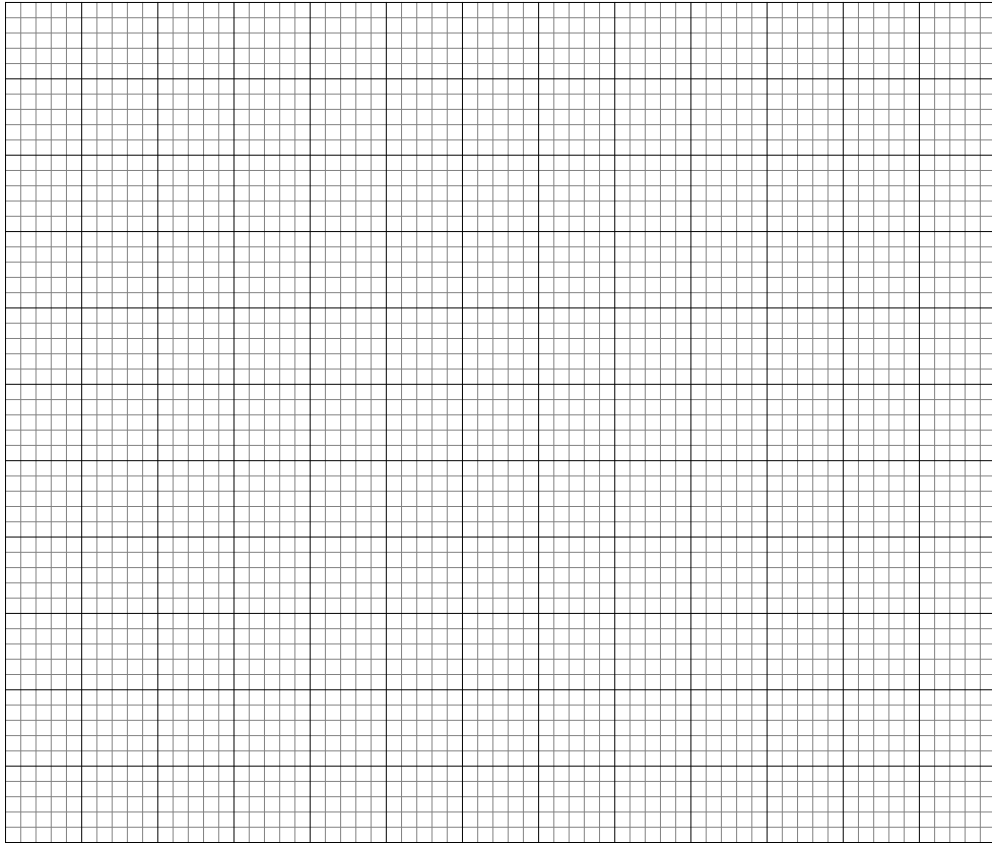
You are writing a report for the college magazine about this.

Use statistical analysis and reasoning to comment on the organisers' decision.

You may use the grids on the following pages if you wish.

[6 marks]





Turn over for the next question

- 6** If you measure your heart rate when you are resting, it is known as your resting heart rate. The table below shows the resting heart rates in beats per minute (bpm) of eleven football players.

Resting heart rate (bpm)
47
65
69
62
71
90
67
80
52
53
61

- 6 (a)** Resting heart rates in the general adult population are normally distributed with mean 71 bpm and standard deviation 12 bpm.

Compare the resting heart rates of these eleven football players to those of the general population.

[5 marks]

A screening test is offered to people with a resting heart rate which is at least two standard deviations above the mean for the general population.

6 (b) Show that none of the football players would be offered this screening test.

[2 marks]

6 (c) There are 35 000 patients in Stokeville primary health care trust.
It intends to offer the screening test to all patients who qualify for it.
Each screening test costs £23.95

How much should the trust staff expect this testing to cost?

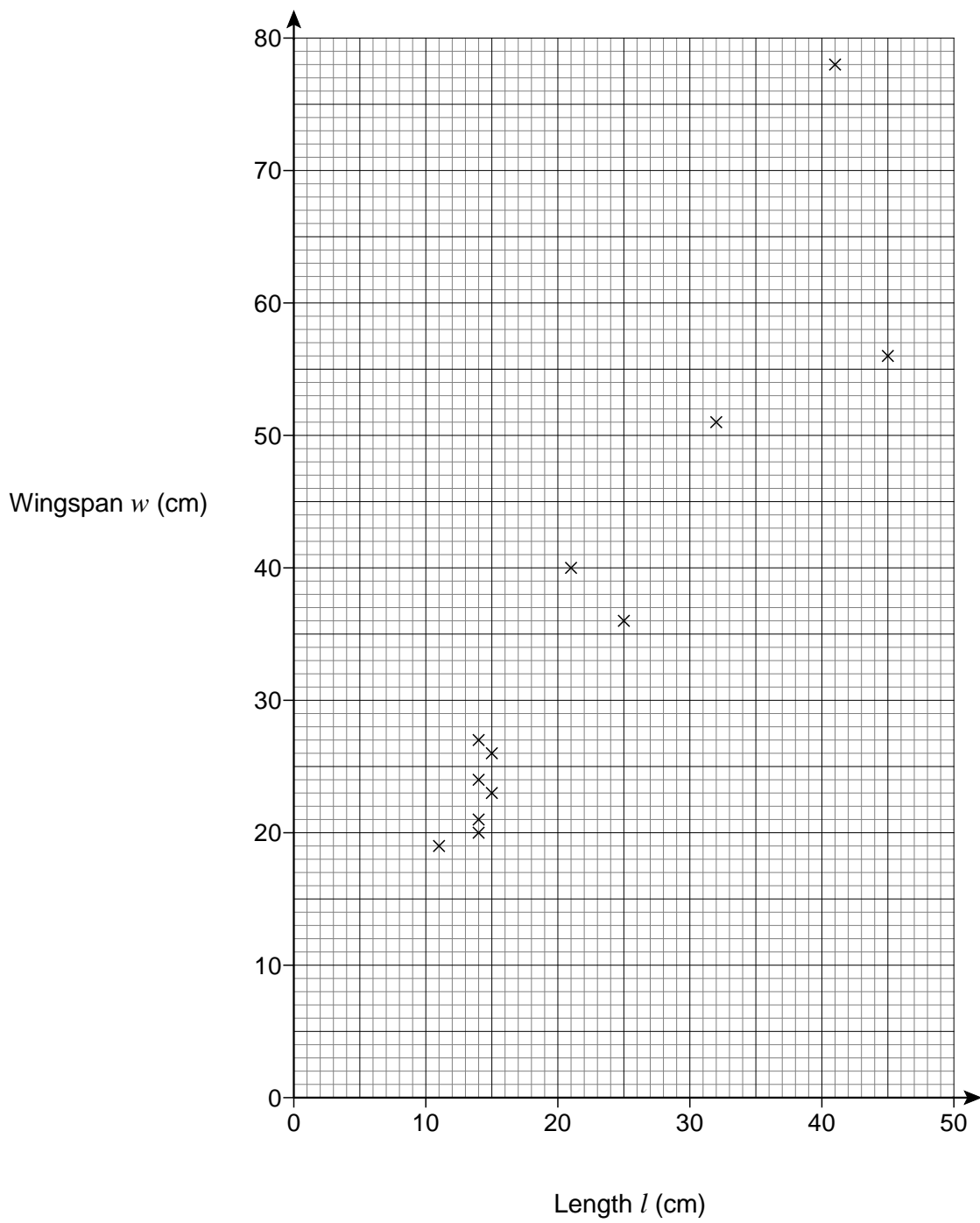
[6 marks]

7 The scatter diagram opposite gives the length and the wingspan of the twelve most common garden birds in the UK.

7 (a) Calculate the equation of the regression line of l on w and plot the line on the scatter graph opposite.

[5 marks]

Garden birds
Scatter graph of wingspan against length



Turn over for the next question

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ANSWER IN THE SPACES PROVIDED**

Turn over ▶

8 In the UK women's clothing size is usually indicated by numbers.

The British Standards Institute produced a standard set of sizes from 8 to 32

However, stores do not all use the British Standard.

Dresses with the same size number may have different measurements in different stores.

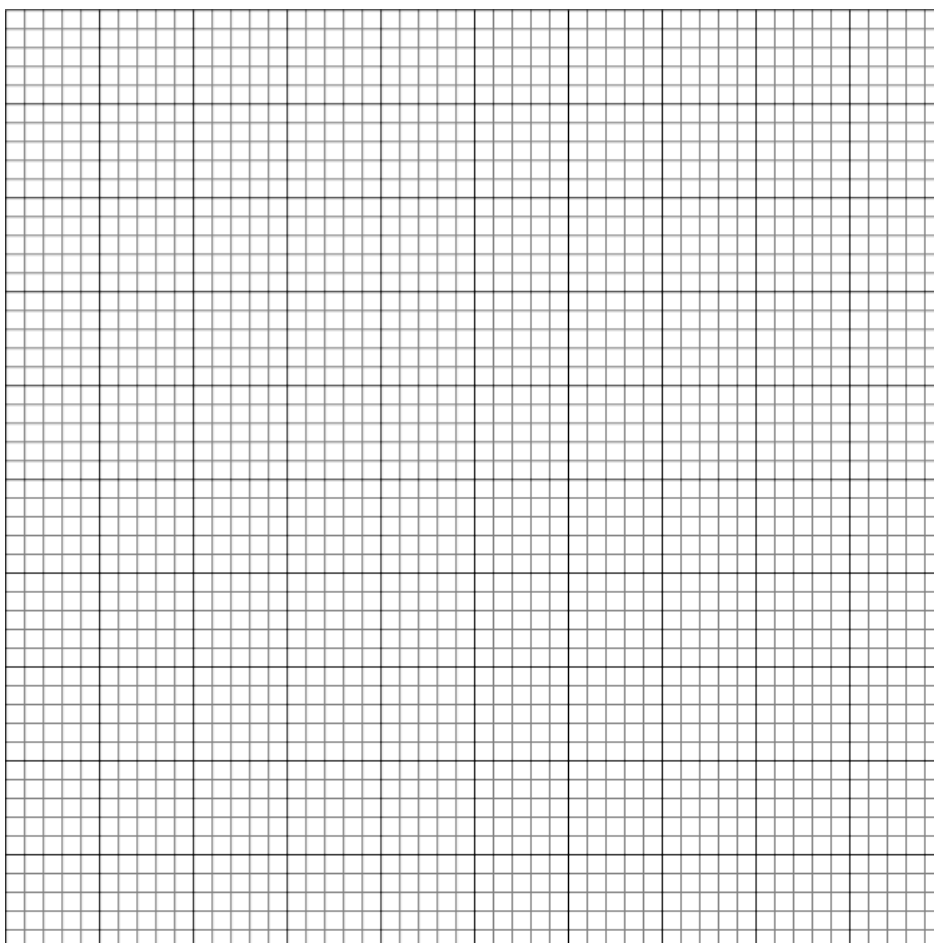
The table below shows some of the actual measurements of size 14 dresses at eight high street stores.

High Street Store	Chest (inches)	Waist (inches)
Italian Connection	37.4	31.1
Matts and Stephens	37.8	31.1
Nix	37.0	30.0
TipShop	38.2	31.2
Denise Poppins	38.2	30.7
Hollis	39.0	31.5
Weiss	39.5	32.1
Elixir	40.2	32.3

8 (a) Describe the correlation between the chest size and waist size of the dresses.

You may use the grid below if you wish.

[3 marks]



- 8 (b) The recommended measurements for a size 14 dress are:

chest	38 inches
waist	31 inches

List the stores in order of how closely they follow these recommendations.

You must show your working to justify your answer.

[3 marks]

END OF QUESTIONS

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