



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

Level 3 Certificate

MATHEMATICAL STUDIES

Paper 2A Statistical techniques

Wednesday 25 May 2016

Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

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

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer questions in the space provided. Do not write outside the box around each page or on blank pages.
- 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.
- You may ask for more answer or graph paper, which must be tagged securely to this answer booklet.
- The paper reference for this paper is 1350/2A.



J U N 1 6 1 3 5 0 2 A 0 1

PB/Jun16/E5

1350/2A

Answer **all** questions in the spaces provided.

1 Use **Facebook Facts** on page 2 of the Preliminary Material.

1 (a) According to the article, Facebook had 1230 million monthly active users worldwide by the end of 2013

Circle 1230 million written in standard form.

[1 mark]

1230×10^6

1.23×10^7

1.23×10^8

1.23×10^9

1 (b) Suggest **two** improvements that could be made to the presentation of the bar chart in the article.

[2 marks]

Improvement 1

Improvement 2



1 (c) Joe has just started working for Survey Hunt, a social media research company.

Joe calculates the mean increase in the number of active Facebook users per year from the beginning of 2008 to the end of 2013

His calculation is as follows.

$$\frac{(145 - 58) + (360 - 145) + (680 - 360) + (845 - 608) + (1056 - 845) + (1230 - 1056)}{5}$$

Critically analyse Joe’s calculation, stating any corrections or improvements that could be made.

[3 marks]

Turn over ►



1 (e) On 4 February 2014, Lena had 50 shares in Facebook.

The exchange rate that day was £1 = \$1.60

She said,

“My shares in Facebook are worth more than £2000”

Was she correct?

You **must** show your working.

[2 marks]

Turn over for the next question

Turn over ►



4 For a piece of coursework, Tom and Amy decided to investigate cars passing their school between 3 pm and 4 pm

4 (a) Describe the population in their investigation.

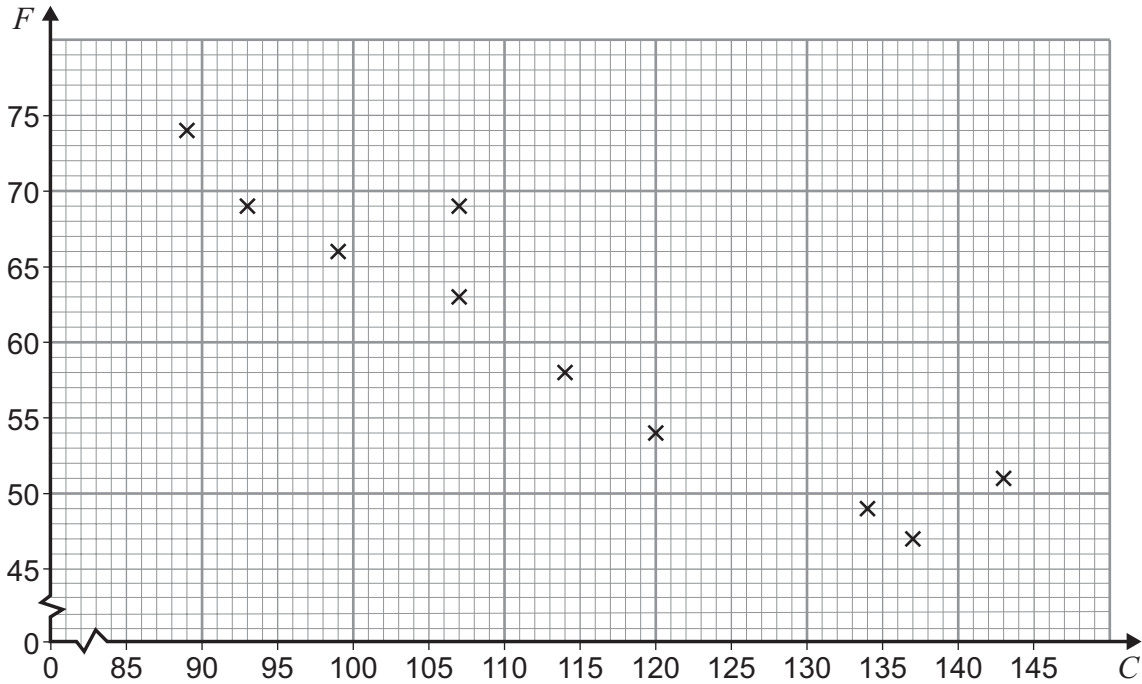
[2 marks]



4 (c) Tom also recorded the make and model of each car in his sample.

For each car, he found the figures for
 the fuel economy in miles per gallon (F)
 the CO₂ emissions in grams per kilometre (C)

He plotted F against C on this scatter diagram.



Calculate the equation of the regression line of F on C .

Draw the regression line on the scatter diagram.

You may use the table below if you wish.

[6 marks]

C										
F										



4 (d) You have to pay vehicle tax if you own a car.

The vehicle tax you pay depends on the CO₂ emissions of your car, as shown in the table.

Band	A	B	C	D	E	F
CO ₂ emissions (g per km)	Up to 100	101–110	111–120	121–130	131–140	141–150
Vehicle tax per year	£0	£20	£30	£110	£130	£145

You want to buy a car for which the vehicle tax is not more than £30 per year.

Using your graph or the equation of the regression line of F on C , estimate the minimum fuel economy of a car you might buy.

[3 marks]

Answer _____ mpg

Turn over for the next question

Turn over ►



5 Ten students are selected to take a Maths test, an English test and a Science test.

Kenny is absent for the Science test.

Here are the test scores.

	Maths	English	Science
Cathy	14	50	28
Seema	30	42	26
Olena	39	68	30
Joanne	45	45	37
Kenny	95	65	<i>absent</i>
Beth	50	35	45
Shazia	57	85	39
John	67	50	58
Harry	79	44	59
Abdul	63	72	74

A teacher wants to estimate Kenny's score in the Science test.

Using statistical analysis and reasoning, advise the teacher whether she should use scores from the Maths test or the English test to help her.

You must comment on the validity of the score the teacher will award Kenny in the Science test if she follows your advice.

You **do not** need to estimate Kenny's score in the Science test.

[5 marks]



6 Charles travels to work by bus.

The time he leaves home depends on which of two buses, A and B, he decides to travel on.

Bus A

Time he leaves home	8.30 am
The mean time he takes to get to work	26 minutes
The standard deviation of the time to get to work	4 minutes

Bus B

He leaves home at 8.35 am

Here are the times, in minutes, he takes to get to work on 10 randomly selected days using bus B.

23 22 26 20 20
23 27 20 23 26

6 (a) Compare the times he arrives at work using bus A and bus B.

[6 marks]



There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED**

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