AQA

Level 3 Certificate
MATHEMATICAL STUDIES

Paper 1

| 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
* 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 1350/1.

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

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Candidate signature _____

1350/1

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

1   The table shows the numbers of staff working in each area of a department store.

Sales	Administration	Management
130	58	9

The owner wants to find out the opinions of the staff about the store.

He chooses two staff from each area to ask.

1   **(a)** Give **two** reasons why this is **not** a good sample of staff to take.

[2 marks]

1   **(b)** Give a full description of a better sampling method the owner could use.

[4 marks]

2 **(a)** Related to interest rates, what do the letters AER stand for?

Circle your answer.

[1 mark]

Average Equity Rate   Annual Evaluation Rate

Annual Equivalent Rate   Average Endowment Rate

2 **(b)** Sam invests £1000 in a savings account.

The compound interest rate is fixed at 4% each year.

How many years will it take for the value of his investment to exceed £2000?

[3 marks]

Turn over for the next question

Turn over ▶

3 Use **Taxation 2013-2014** on pages 2 and 3 of the Preliminary Material.

During the year 2013-14, Salma was employed on an annual salary of £21 588

She had a personal tax-free allowance of £9440

She paid National Insurance at the non-contracted out rate.

Salma started saving when she received her pay at the end of April 2013.

To the nearest £10, she saved $\frac{1}{8}$ of her monthly take-home pay each month.

Had she saved enough money to pay for a £1300 holiday by the end of November 2013?

You **must** show your working.

[8 marks]

Turn over for the next question

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

4

- The World Health Organisation (WHO) collects data about life expectancy.
- The WHO estimates the average life expectancy at birth for a person born in a particular country.

4   (a)   The data below are for 193 countries.

Life expectancy at birth (l years)	Number of countries		
$45 \leqslant l < 50$	12		
$50 \leqslant l < 60$	24		
$60 \leqslant l < 70$	44		
$70 \leqslant l < 75$	53		
$75 \leqslant l < 80$	32		
$80 \leqslant l < 85$	28		

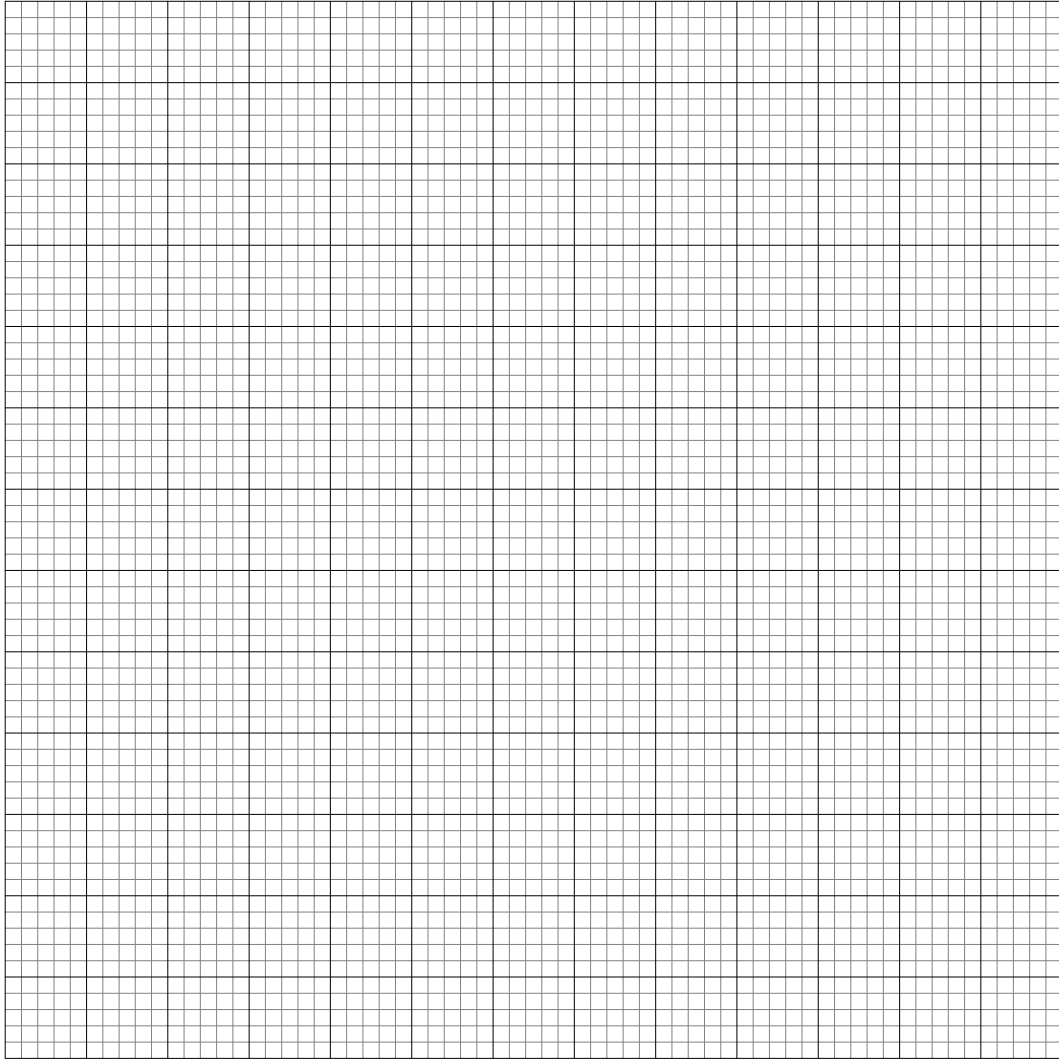The life expectancy at birth for a person in the UK is 77 years.

A newspaper headline said:

UK in top 40 countries for life expectancy

Use the given data to comment on the newspaper's headline.

You may use the grid on the next page if you wish.

[4 marks]

Question 4 continues on the next page

For the whole world, the WHO gives the mean life expectancy at birth as 68.5 years.

The table below shows the life expectancy at birth sorted by world region and gender.

Region	Life expectancy at birth	
	Female	Male
Africa	61.0	57.9
Americas	77.7	71.9
Eastern Mediterranean	72.1	68.3
Europe	80.1	74.0
South-East Asia	72.2	68.2
Western Pacific	75.8	71.1

4 **(b)** Compare the life expectancy by region and gender, commenting on any trends.

Compare the mean life expectancy given by WHO with the data in the table.

Consider whether region or gender has a greater effect on life expectancy.

[4 marks]

4 **(c)** Estimate how far a person is likely to walk in their lifetime.

Show details of your assumptions and calculations.

[6 marks]

Answer _____

Turn over for the next question

Turn over ▶

5

- When Carly started work she had a student loan of £12 000
- She started work on January 1st 2014 with an annual salary of £17 000
- She has to make repayments to the Student Loan Company.
- Each year she has to repay 9% of everything she earns in excess of £16 365
- To model her annual repayments, Carly assumed that her salary would increase by £1500 each year.
- She set up a simple spreadsheet as shown below.

	A	B	C	D	E
1	End of year	Salary (£)	Repayment (£)		
2	2014	17 000	57.15		
3	2015	18 500	192.15		
4	2016	20 000	327.15		
5					
6					
7					
8					

5 **(a)** Write a formula for cell C4

[2 marks]

5 **(b)** Simple interest at 2% is added to Carly's outstanding loan at the start of every year.

So, after the first year, the outstanding debt is:

£12 000 + interest of £240 – repayment of £57.15

Work out when Carly would first owe less than her original student loan of £12 000

[5 marks]

Turn over for the next question

6 The world's biggest half-marathon, the Great North Run (GNR), is held annually.

The first race took place in 1981

The table below shows the times taken to complete the 2010 race by the 120 members of the 'all GNR' club. These are the runners who have taken part every year since the race began.
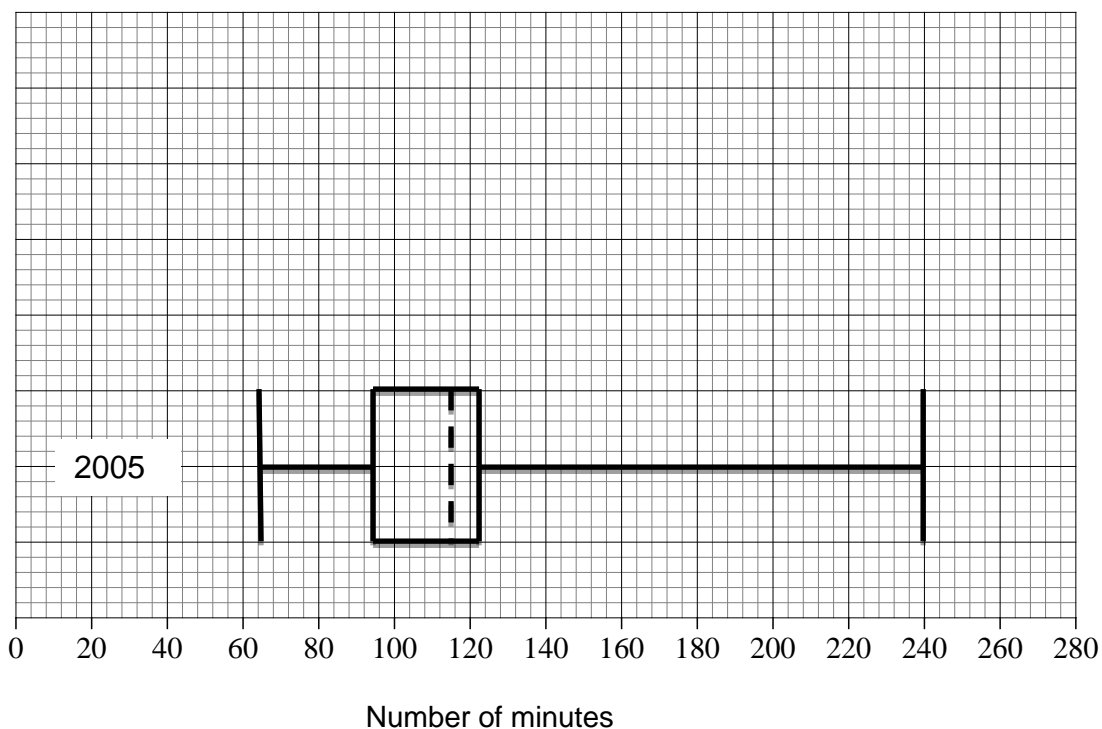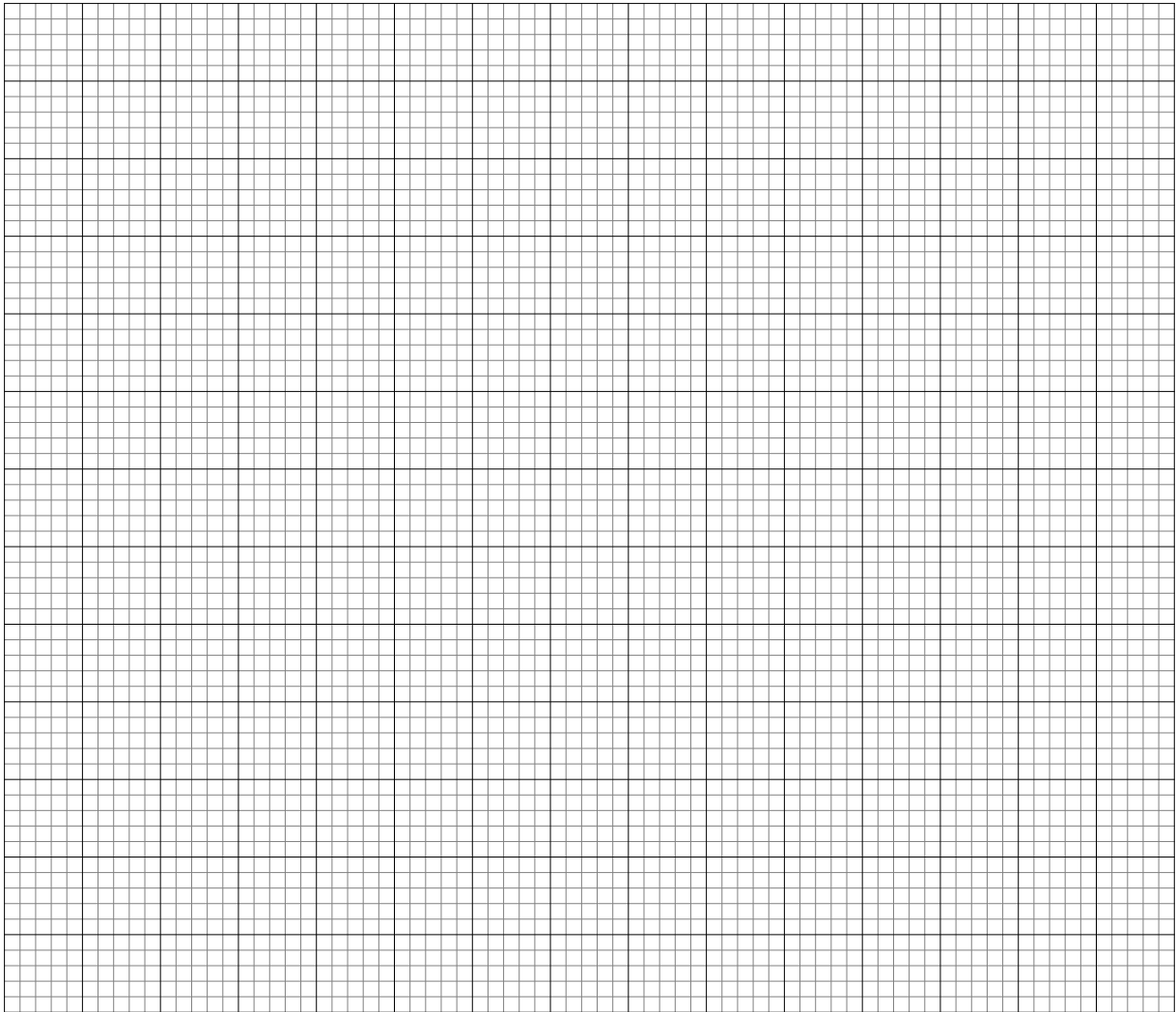
The fastest runner had a time of 89 minutes.
The slowest runner had a time of 268 minutes.

Length of time, *t* minutes	Number of runners
$0 \leq t < 80$	0
$80 \leq t < 100$	9
$100 \leq t < 120$	35
$120 \leq t < 140$	30
$140 \leq t < 160$	18
$160 \leq t < 180$	10
$180 \leq t < 200$	8
$200 \leq t < 280$	10
$280 \leq t$	0

The times of the 'all-GNR' club runners were also recorded in 2005

The data for 2005 is shown as a box and whisker diagram below.

Number of minutes

Compare the performance of the 'all-GNR' club runners in 2005 and 2010

You may use the grid on the next page if you wish.

[10 marks]

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

7 **(a)** Each year the European Union asks each member country to provide data for the volume of landfill waste per person.

What type of data is collected by the European Union?

Tick **all** boxes that apply.

[2 marks]

continuous	discrete	primary	secondary
☐	☐	☐	☐

7 **(b)** You may use **Waste** on pages 4 and 5 of the Preliminary Material.

In recent years people have been encouraged to recycle where possible.

However, if waste cannot be recycled it is put into a landfill site.

- A new landfill site is to be built for a small town.
- The site will have a hole in the ground and the town's waste will be put into the hole.
- The site needs to be used for a minimum of 15 years.

Estimate the dimensions of the hole.

Show details of your assumptions and calculations.

[9 marks]

 Answer

END OF QUESTIONS

There are no questions printed on this page

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