AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

# GCSE
# APPLICATIONS OF MATHEMATICS (LINKED PAIR)

**H**

## Higher Tier Unit 1 Finance and Statistics

Friday 6 November 2015 Morning Time allowed: 1 hour 30 minutes

**Materials**

For this paper you must have:
- a calculator
- mathematical instruments.

**Instructions**
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a $\pi$ button, take the value of $\pi$ to be 3.14 unless another value is given in the question.

**Information**
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 4 and 8. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, tracing paper and graph paper. These must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

**Advice**
- In all calculations, show clearly how you work out your answer.

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

**1 (a)** A games console usually costs £275
The cost is reduced by 15%

Work out the reduced price.

**[3 marks]**

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Answer £ .....

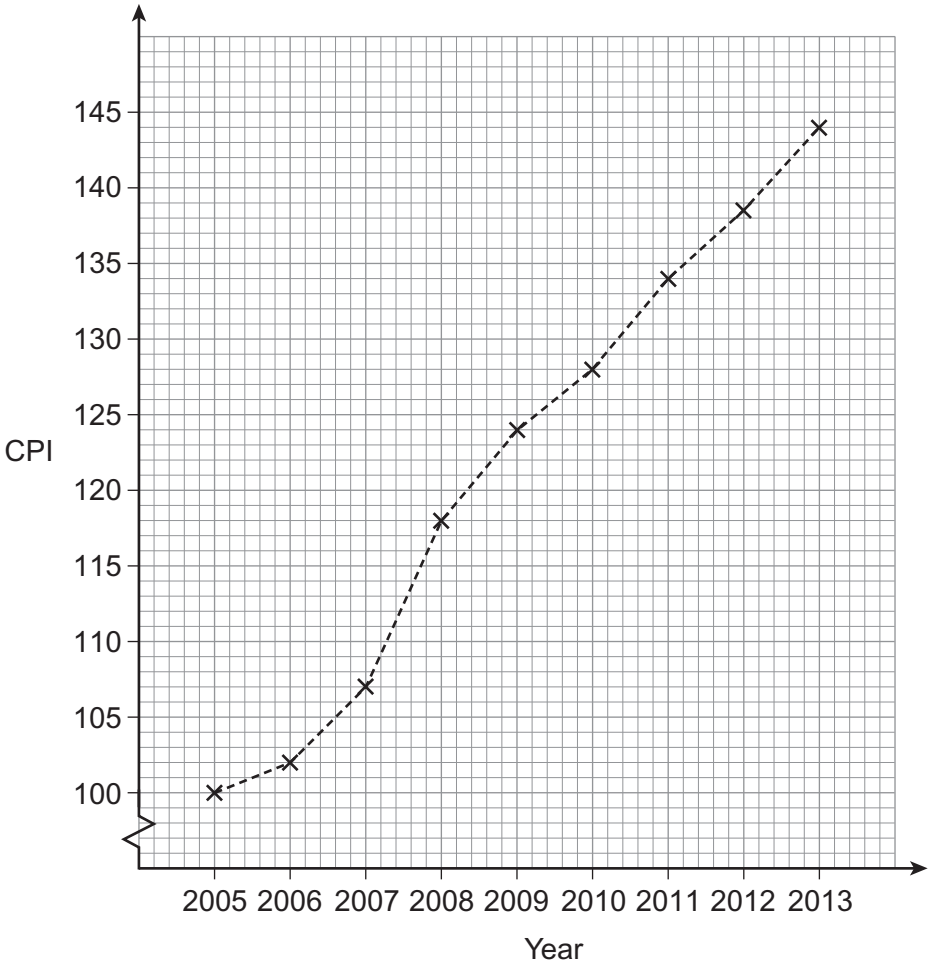
**1 (b)** A coat is reduced by 35%

Circle the multiplier that works out 35%

**[1 mark]**

0.035 0.35 3.5 1.35

**2** The time series graph shows the Consumer Price Index (CPI) for food each year from 2005 to 2013




**2 (a)** A loaf of bread cost £1.00 in 2005

Use the graph to estimate how much the loaf cost in 2013

**[1 mark]**

Answer £ .....

**2 (b)** In 2011 Elly spent £268 per month on groceries.

Use the graph to estimate how much she would have spent on the same groceries in 2007

**[3 marks]**

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Answer £ .....

8

**Turn over ▶**

**3** Here are three scatter diagrams.

**Diagram 1**

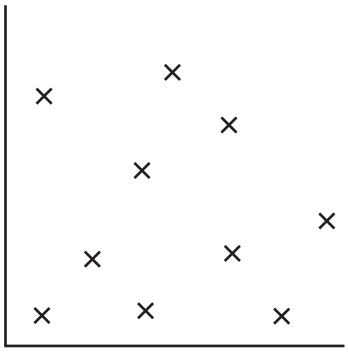


**Diagram 2**

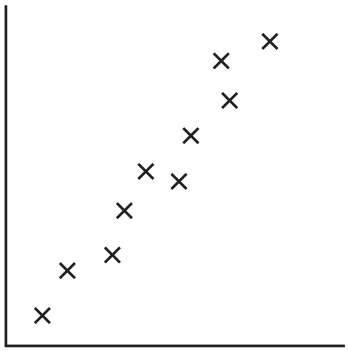
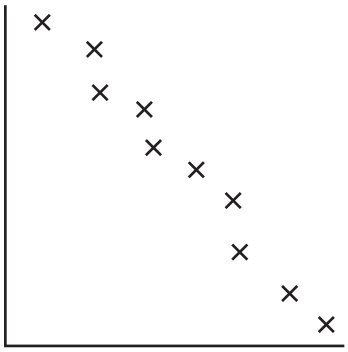


**Diagram 3**



Here are three pairs of variables.

**A** The age of children and the shoe size of children.

**B** The number of hours of sunshine and the number of umbrellas sold.

**C** The marks of students in a maths test and the distance each student travels to school.

Match each scatter diagram to a pair of variables.

**[2 marks]**

**A** Diagram .....

**B** Diagram .....

**C** Diagram .....

***4** Ali sat two maths test papers.
His marks were

Paper 1 $\frac{54}{75}$

Paper 2 $\frac{45}{60}$

For which paper did he get the higher percentage?
You **must** show your working.

**[3 marks]**

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Answer .....

**Turn over for the next question**

5

**5** A company makes light bulbs.
The company wants to test that the light bulbs work.

**5 (a)** Explain why the company should test a sample and not the whole population.

**[1 mark]**

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**5 (b)** The company decides to test the first five light bulbs made one Friday morning.

Give **two** criticisms of this sampling method.

**[2 marks]**

Criticism 1 .....

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Criticism 2 .....

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**6** 200 adults were asked to choose whether they preferred to travel on holiday by road, rail or air.

- 30% of the adults chose road.
- Three times as many women as men chose road.
- 112 of the adults were women.
- One quarter of the women chose rail.
- 37 of the men chose air.

Work out the total number of adults who chose rail.

**[6 marks]**

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Answer .....

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**7** The speeds of 100 vehicles driving through a housing estate were recorded one day.

| **Speed, $s$ (mph)** | **Frequency** | | |
|---|---|---|---|
| $10 < s \leqslant 15$ | 17 | | |
| $15 < s \leqslant 20$ | 46 | | |
| $20 < s \leqslant 25$ | 22 | | |
| $25 < s \leqslant 30$ | 10 | | |
| $30 < s \leqslant 35$ | 5 | | |

**7 (a)** Work out an estimate for the mean speed.

**[4 marks]**

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Answer ..... mph

**7 (b)** The speed limit on roads through the housing estate is 20 miles per hour.

Did vehicles on this estate usually drive within the speed limit?
Give a reason for your answer.

**[1 mark]**

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***8** Ben, Jayne and Phil collect football stickers.

Ben has $x$ stickers.

Jayne has 12 more stickers than Ben.

Phil has twice as many stickers as Jayne.

Altogether they have 204 stickers.

Set up and solve an equation to find the value of $x$.

**[5 marks]**

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$x$ = .....

**Turn over for the next question**

10

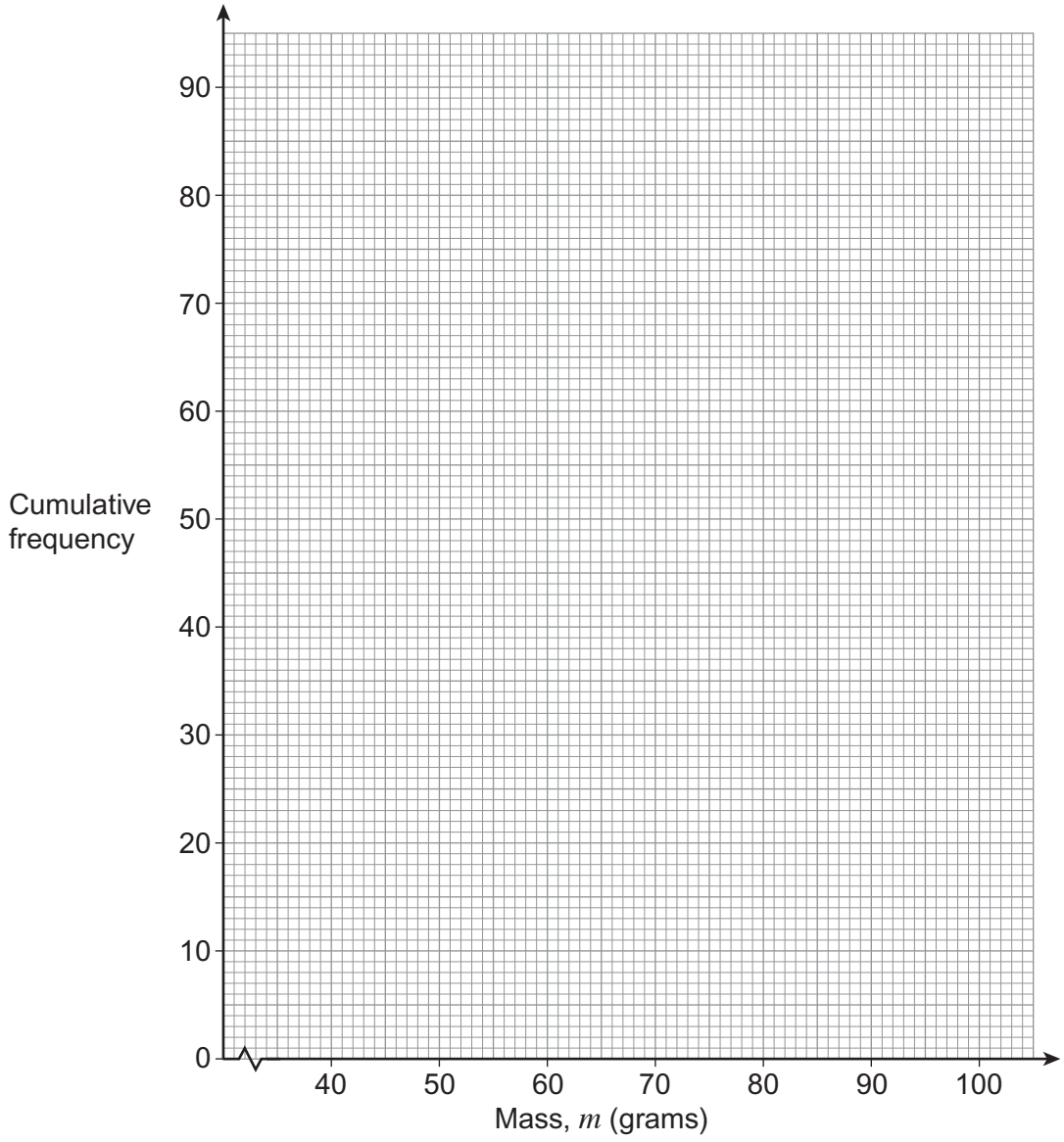
**9** The table shows some information about the mass of 90 apples from a tree in Lucy's garden.

| Mass, $m$ (grams) | Frequency |
|---|---|
| $40 \leqslant m < 50$ | 5 |
| $50 \leqslant m < 60$ | 13 |
| $60 \leqslant m < 70$ | 20 |
| $70 \leqslant m < 80$ | 25 |
| $80 \leqslant m < 90$ | 15 |
| $90 \leqslant m < 100$ | 12 |

| Mass, $m$ (grams) | Cumulative frequency |
|---|---|
| $m < 40$ | 0 |
| $m < 50$ | |
| $m < 60$ | |
| $m < 70$ | |
| $m < 80$ | |
| $m < 90$ | |
| $m < 100$ | |

**9 (a)** Complete the table and draw a cumulative frequency graph to show this information.

**[4 marks]**



**9 (b)** Use your graph to estimate the median and interquartile range.

**[3 marks]**

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Median ..... g

Interquartile range ..... g

**9 (c)** The table shows information about apples from a tree in **Adam's** garden.

| | |
|---|---|
| **Median** | 68 grams |
| **Interquartile range** | 25 grams |

Adam says,

"My apples are heavier than Lucy's and more consistent in mass."

Use the information given to make **two** comments on this statement.

**[2 marks]**

Comment 1 .....

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Comment 2.....

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9

**10** Eva has some 10p coins and 20p coins.
She has £5.60 altogether.

One equation to show this information is

$$10x + 20y = 560$$

**10 (a)** Write down what the letters $x$ and $y$ represent.

**[1 mark]**

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**10 (b)** Eva has 35 coins altogether.

Use this information to write down another equation.

**[1 mark]**

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**10 (c)** How many of each type of coin does Eva have?
You **must** show your working.
Do **not** use trial and improvement.

**[3 marks]**

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Number of 10p coins .....

Number of 20p coins .....

**11** A farmer grows potatoes in a field.

The field has an area of 10 hectares, to the nearest hectare.
He can harvest 50 tonnes of potatoes, to the nearest 5 tonnes, from each hectare.

Calculate the upper bound of the possible mass of potatoes he can harvest from the field.

**[4 marks]**

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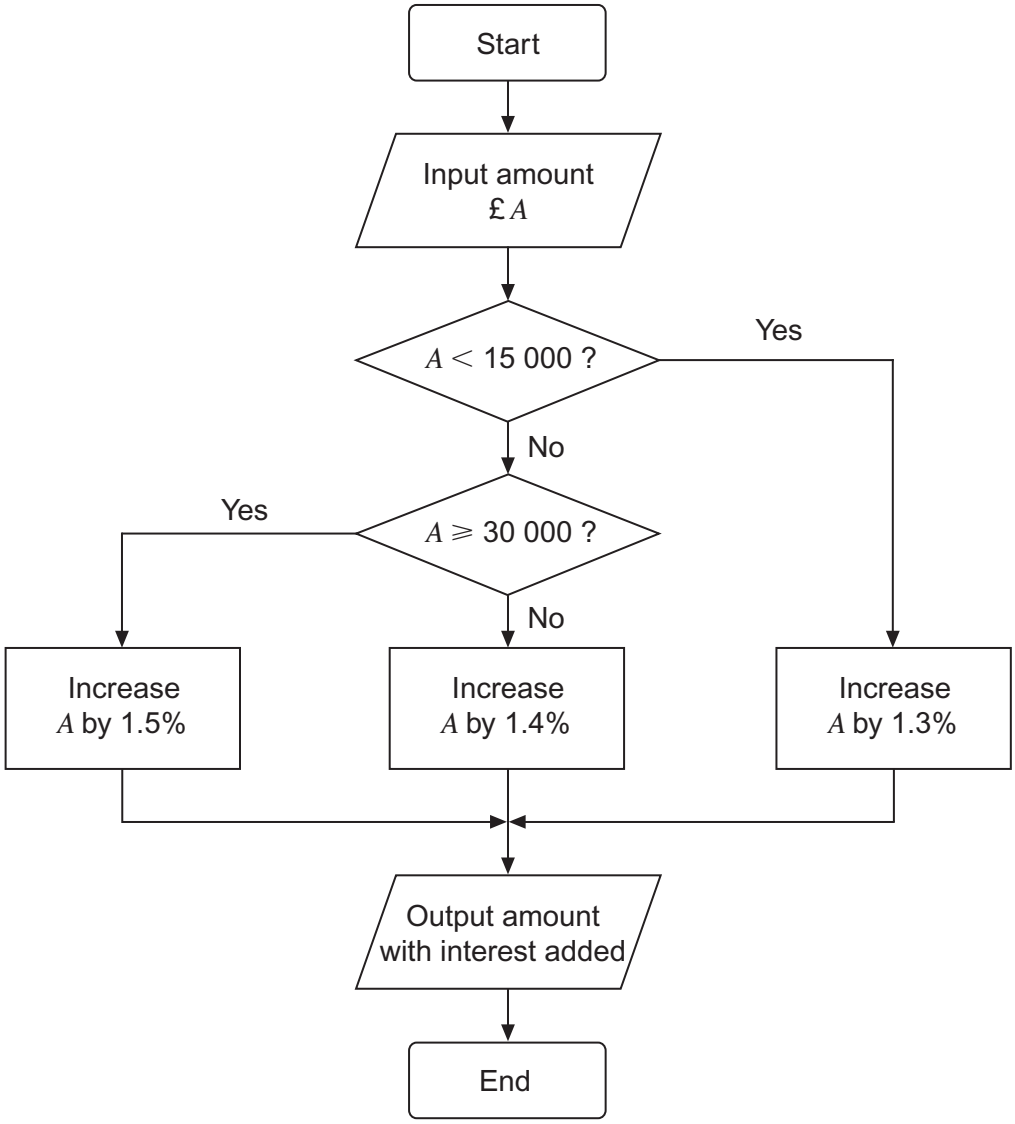
Answer ..... tonnes

**Turn over for the next question**

9

**12** The interest rate for a savings account depends upon the amount invested.
This flow diagram can be used to work out the balance in an account after 12 months.



Jill and Karen both invest some money for 12 months.

Jill invests £12 000
Karen invests £4000 more than Jill.

How much **more** money does Karen receive as interest than Jill?

**[5 marks]**

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Answer £ .....

**Turn over for the next question**

5

**13** A school has 770 students.
The table shows the number of students in each year group.

| Year 9 | Year 10 | Year 11 | Year 12 | Year 13 |
|---|---|---|---|---|
| 206 | 195 | 220 | 99 | 50 |

A sample of 60 students, stratified by year group, is chosen for a survey.

Work out how many **more** students will be chosen from Year 9 than from Year 13

**[3 marks]**

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Answer .....

**14** A company makes 4000 MP3 players.
If the company sells them all for £15 each it will make profit of 25% on the cost price.

**14 (a)** Show that the total cost of making the 4000 MP3 players is £48 000

**[3 marks]**

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**14 (b)** Some of the MP3 players have a damaged cover.

The damaged MP3 players are sold at £5 each.
The rest of the MP3 players are sold at £15 each.

The company makes a profit of 20% altogether on the cost of making all of the MP3 players.

How many of the MP3 players are damaged?

**[5 marks]**

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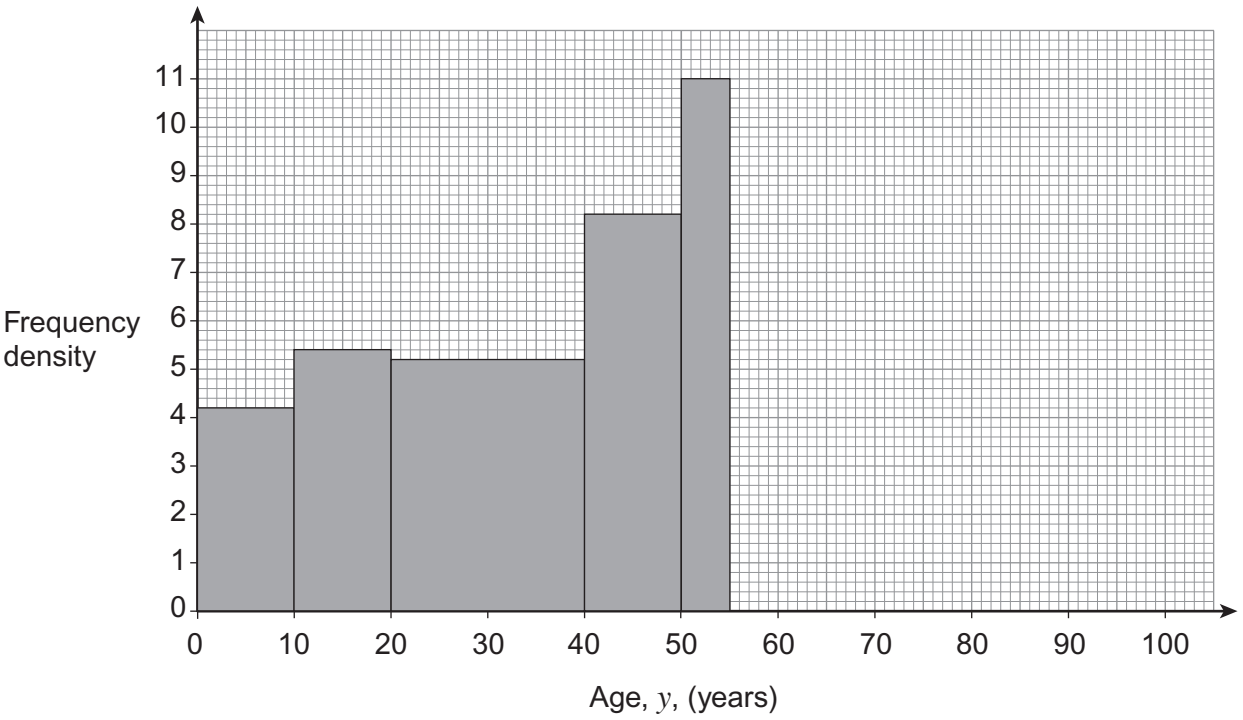
Answer .....

11

**15** The table and histogram show the age distribution of people living in a village.

| Age, $y$ (years) | Frequency |
|---|---|
| $0 < y \leqslant 10$ | 42 |
| $10 < y \leqslant 20$ | |
| $20 < y \leqslant 40$ | |
| $40 < y \leqslant 50$ | 82 |
| $50 < y \leqslant 55$ | |
| $55 < y \leqslant 60$ | 40 |
| $60 < y \leqslant 70$ | 72 |
| $70 < y \leqslant 100$ | 102 |



**15 (a)** Use the table to complete the histogram.

**[3 marks]**

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**15 (b)** Use the histogram to complete the table.

**[3 marks]**

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**15 (c)** Calculate an estimate of the number of people aged 75 or over.

**[2 marks]**

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Answer .....

8

**16** A company uses a coach to take adults and children on day trips to the seaside.

The coach will carry up to 36 passengers.
The fares charged are £5 per adult and £2.50 per child.
The company's takings from fares must be at least £75

Let $x$ be the number of adults and $y$ be the number of children.

**16 (a)** Show that $2x + y \geqslant 30$

**[1 mark]**

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**16 (b)** For a special family day trip to the seaside

there should be more children on the trip than adults
the number of children must not be more than twice the number of adults.

**16 (b) (i)** The lines $x + y = 36$, $y = x$ and $y = 2x$ are shown on the grid.

Show clearly on the graph the region satisfying **all four** conditions.

**[2 marks]**

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**16 (b) (ii)** Use the graph to find the greatest possible amount that could be taken in fares for the trip.
You **must** show your working.

**[3 marks]**

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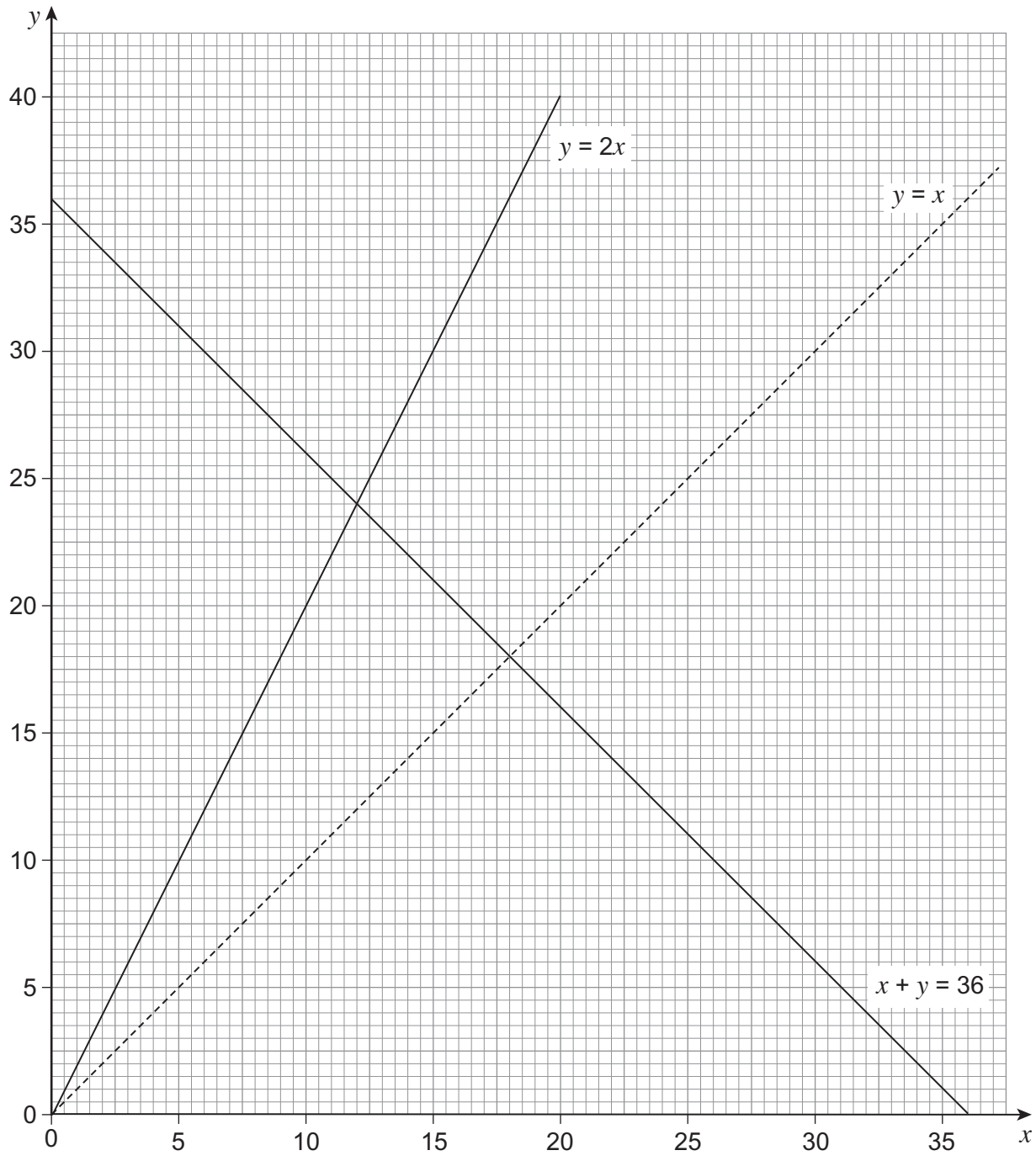
Answer £ .....




**END OF QUESTIONS**

6

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