| Surname | | Other Names | |
|---|---|---|---|
| Centre Number | | | Candidate Number | | | | | | | | | |
| Candidate Signature | | | | | | | | | | | | |

| For Examiner's Use |
|---|
| |

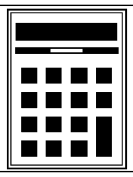
General Certificate of Secondary Education
June 2007

**MATHEMATICS (MODULAR) (SPECIFICATION B) 33001/HA**
**Module 1 Higher Tier Section A**

**H**

Monday 18 June 2007 1.30 pm to 1.55 pm

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



Time allowed for Section A: 25 minutes

**Instructions**
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 25 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

**Information**
- The maximum mark for Section A is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

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

| For Examiner's Use | | | |
|---|---|---|---|
| **Section A** | | **Section B** | |
| Question | Mark | Question | Mark |
| 1 | | 5 | |
| 2 | | 6 | |
| 3 | | 7 | |
| 4 | | 8 | |
| | | 9 | |
| Total Section A | | | |
| Total Section B | | | |
| TOTAL | | | |
| Examiner's Initials | | | |

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

**1** The table summarises the travelling time to work of 80 people.

| **Travelling time, $t$ (minutes)** | **Number of people** |
|---|---|
| $0 < t \leqslant 10$ | 6 |
| $10 < t \leqslant 20$ | 17 |
| $20 < t \leqslant 30$ | 19 |
| $30 < t \leqslant 40$ | 23 |
| $40 < t \leqslant 50$ | 15 |

(a) Calculate an estimate of the mean travelling time.

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Answer ..... minutes *(4 marks)*

(b) Explain why the median travelling time is in the class interval $20 < t \leqslant 30$

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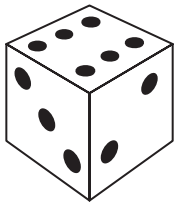
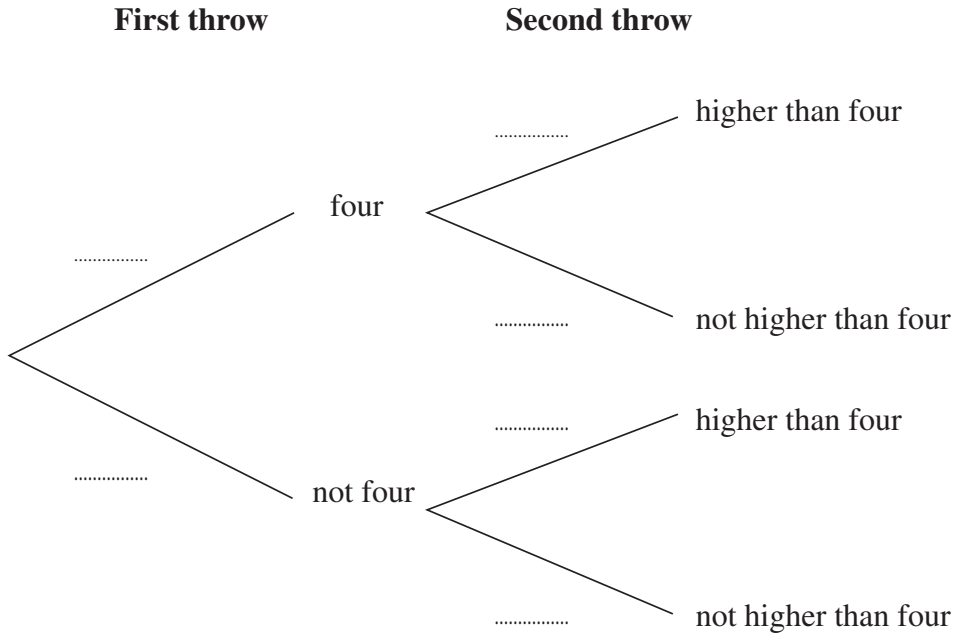
*(2 marks)*

6

**2** Alia has a fair six-sided dice.
She throws it twice.



(a) Complete the tree diagram.




*(3 marks)*

(b) Calculate the probability that Alia throws a four and then throws a number higher than four in that order.

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

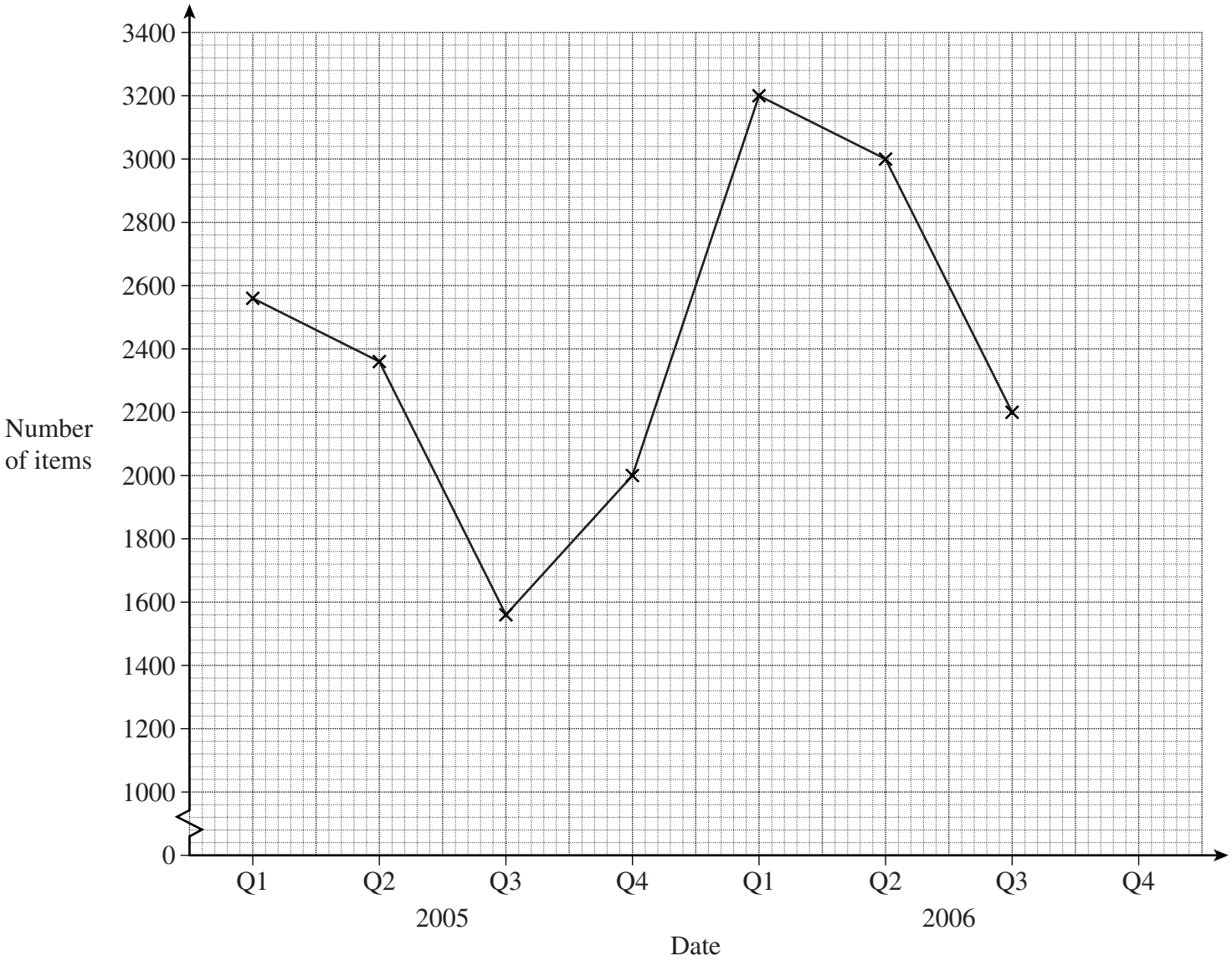
**5**

**3** The table shows the total number of items prescribed every quarter by a doctor over a period of seven quarters.

| **Date** | **Q1 2005** | **Q2 2005** | **Q3 2005** | **Q4 2005** | **Q1 2006** | **Q2 2006** | **Q3 2006** |
|---|---|---|---|---|---|---|---|
| **Number of items** | 2560 | 2360 | 1560 | 2000 | 3200 | 3000 | 2200 |

| **Four-point moving average** | 2120 | 2280 | 2440 | 2600 |
|---|---|---|---|---|

(a) The time series graph shows the original data.
Plot all the moving averages.




*(2 marks)*

(b) (i) Use a trend line to estimate the next moving average.

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

(ii) Calculate an estimate of the number of items prescribed in quarter 4 of 2006.
You **must** show your working.

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

5

**Turn over for the next question**

**4** The table shows the gender and number of two types of employee in a college.

| | **Manager** | **Teacher** |
|---|---|---|
| **Male** | 14 | 26 |
| **Female** | 8 | 52 |

Two of these employees are chosen at random to attend a meeting.

Calculate the probability that the chosen employees are a male teacher and any female.

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

4

**END OF SECTION A**

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| Surname | | Other Names | |
|---|---|---|---|
| Centre Number | | | Candidate Number | | | | | | | | | |
| Candidate Signature | | | | | | | | | | | | |

General Certificate of Secondary Education
June 2007

ASSESSMENT and QUALIFICATIONS ALLIANCE

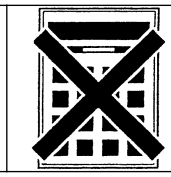
**MATHEMATICS (MODULAR) (SPECIFICATION B) 33001/HB**
**Module 1 Higher Tier Section B**

**H**

Monday 18 June 2007 2.00 pm to 2.25 pm

**For this paper you must have:**
- mathematical instruments.

You must **not** use a calculator.



Time allowed for Section B: 25 minutes

**Instructions**
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

**Information**
- The maximum mark for Section B is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

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

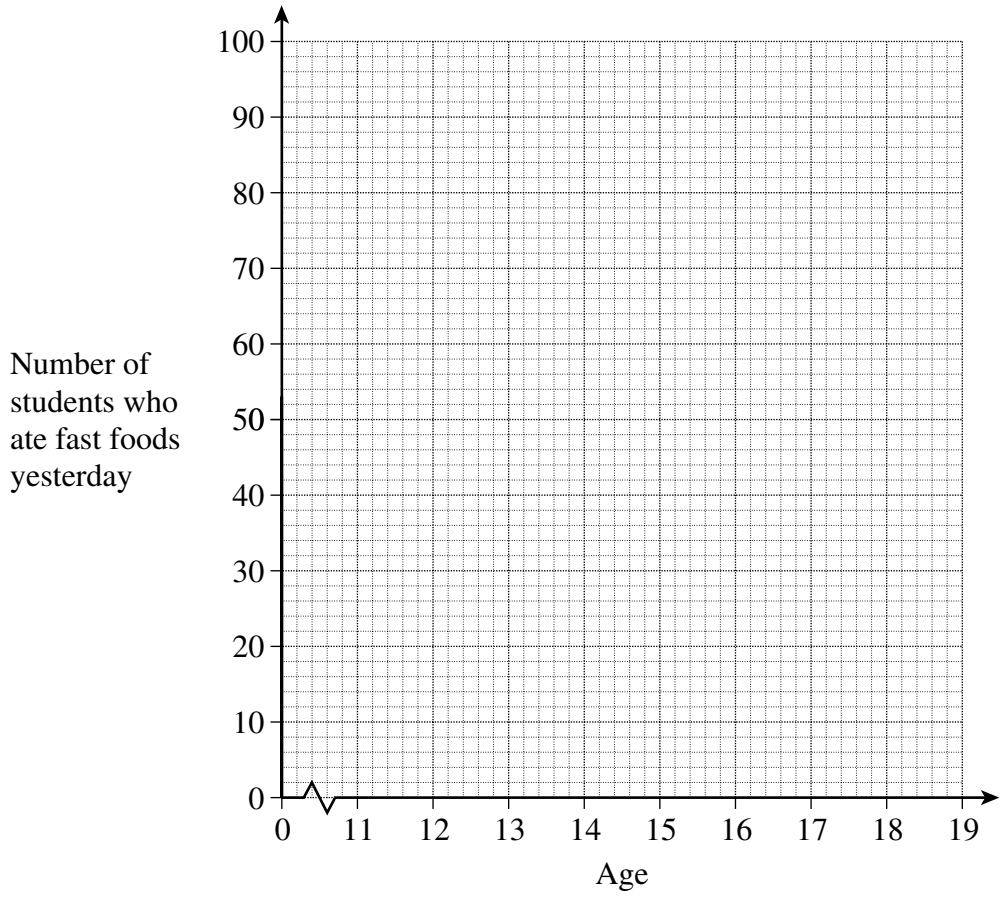
LEAVE MARGIN BLANK

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

**5** Joe carries out a survey about fast foods.
He surveyed 100 students from each age group at his school.
The table shows Joe's results.

| **Age group** | **Number of students who ate fast foods yesterday** |
|---|---|
| 11 to less than 13 | 64 |
| 13 to less than 15 | 88 |
| 15 to less than 17 | 56 |
| 17 to less than 19 | 24 |

Draw a frequency polygon for this data.




*(2 marks)*

**2**

**6** Hannah and Barbara are playing a game which involves estimating how many yellow beads are in a bag of 500 coloured beads.
Barbara takes 10 beads from the bag.

Her results are

| | | | | |
|---|---|---|---|---|
| red | yellow | white | yellow | blue |
| white | green | yellow | red | yellow |

(a) Write down the relative frequency of yellow for these 10 results.

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

(b) Use Barbara's results to work out the expected number of yellow beads in the bag.

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

(c) Hannah takes a sample of 30 beads from the bag.
Her sample contains 14 yellow beads.
Hannah uses her results to estimate the expected number of yellow beads in the bag.

Who has the better estimate of the number of yellow beads in the bag?
Explain your answer.

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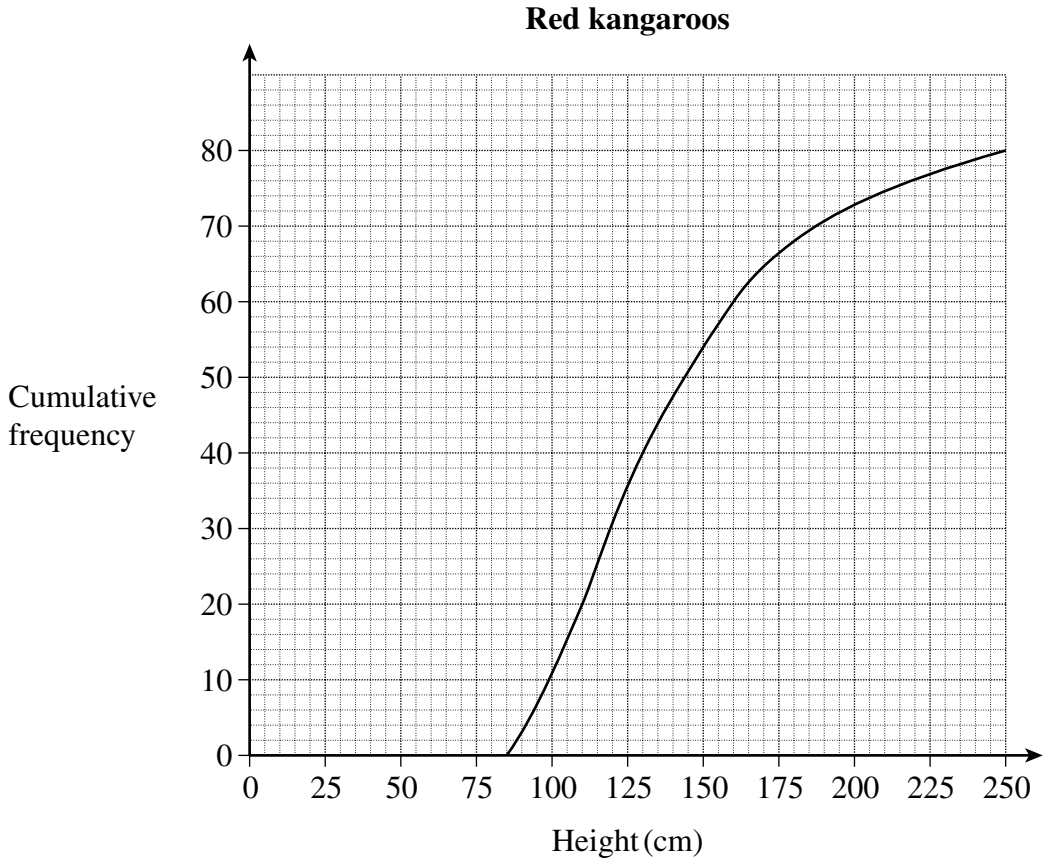
*(2 marks)*

5

**7** The cumulative frequency diagram of the heights of 80 red kangaroos is shown below.




The table below summarises the heights of 80 grey kangaroos.

**Grey kangaroos**

| Lower quartile | Median | Upper quartile |
|---|---|---|
| 85 cm | 105 cm | 120 cm |

Explain why the heights of the grey kangaroos are more consistent than the heights of the red kangaroos.
You **must** show your working.

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*(4 marks)*

4

**8** The table shows the number of each type of staff at three hospitals.

| Staff | Hospital A | Hospital B | Hospital C |
|---|---|---|---|
| **Doctors** | 8 | 15 | 22 |
| **Nurses** | 26 | 50 | 75 |
| **Others** | 46 | 80 | 120 |

(a) Simon wants to take a stratified sample of size 10 from the staff at hospital A.

Calculate the number of each type of staff that Simon should choose.

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Answer Doctors .....

Nurses .....

Others .....

*(3 marks)*

(b) Tracy wants a stratified sample of size 30 from the doctors in the three hospitals.

Calculate how many doctors Tracy should choose from hospital B.

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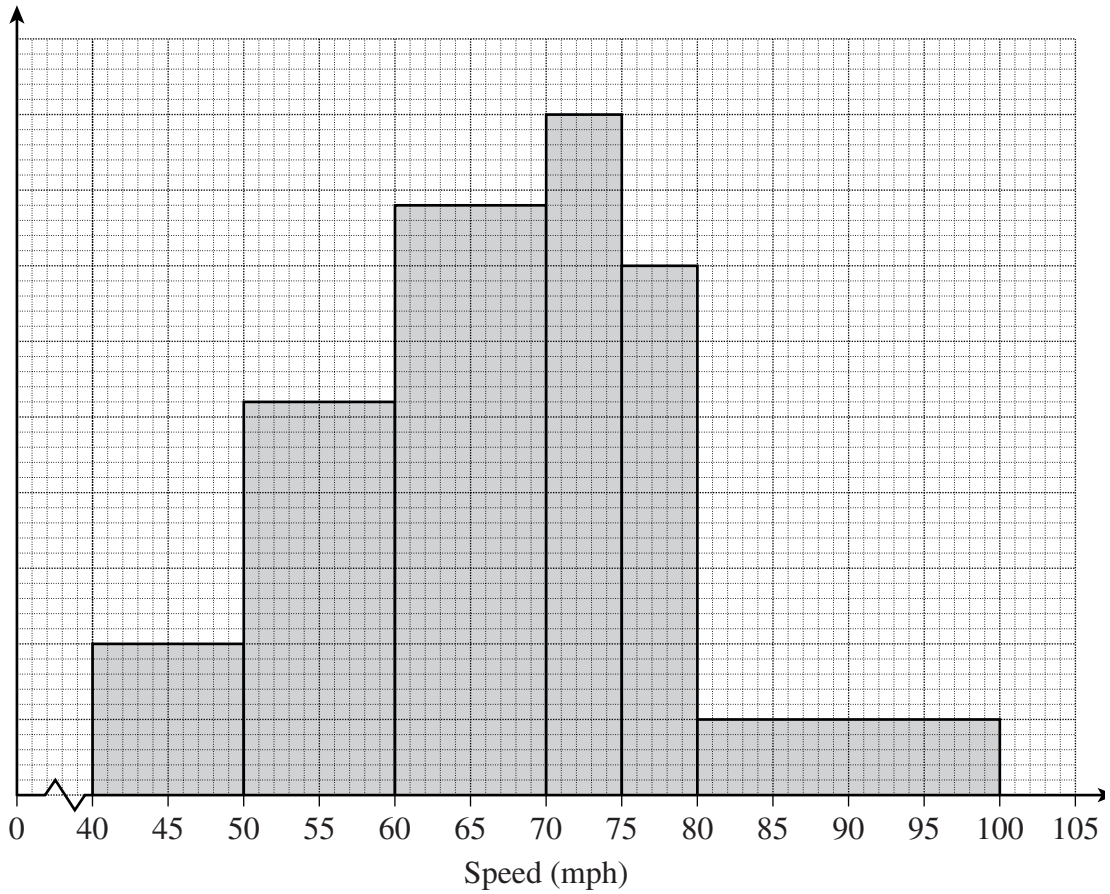
Answer ..... *(2 marks)*

5

**9** The histogram shows the speeds in miles per hour of 250 vehicles on a motorway.




55 vehicles were travelling over 75 mph.
Drivers that travel between 52 and 63 mph reduce their fuel consumption.

Calculate an estimate of the number of vehicles that were travelling between 52 and 63 mph.

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

4

**END OF QUESTIONS**

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