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Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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4275676946

GEOGRAPHY **0460/41**

Paper 4 Alternative to Coursework **October/November 2014**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Calculator
Ruler

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

The Insert contains Fig. 3 for Question 1.
The Insert is **not** required by the Examiner.
Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages and **1** Insert.

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1 A class of students went on a field visit to two beaches in Dorset, South West England. One beach was in a sheltered bay and the other beach was exposed to the sea. In class, the students had been studying how different types of wave affected beaches.

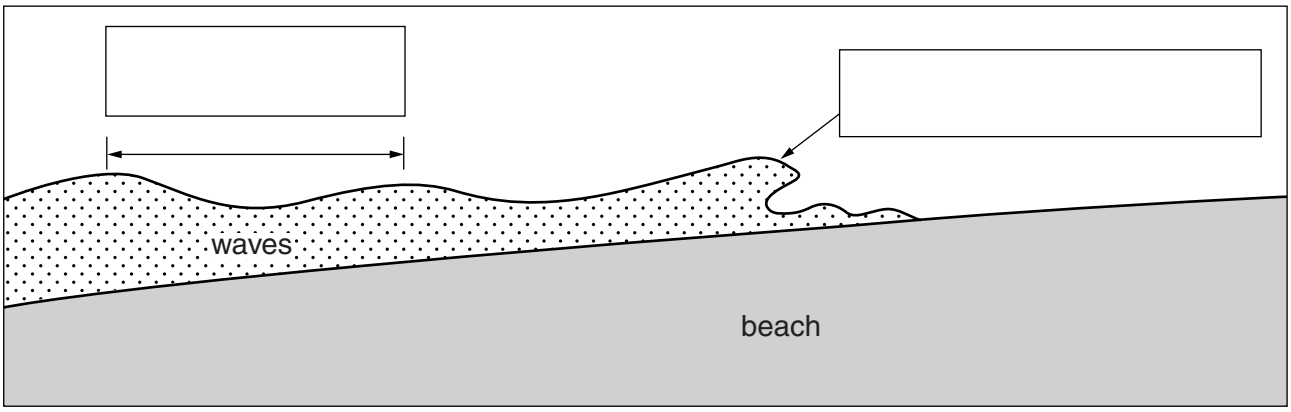
(a) (i) Before they went on the visit, the students had studied constructive and destructive waves. Add the following labels to Fig. 1 (below) to show important features of the two types of waves.

Waves close together Waves far apart

Breaking wave spills forward Breaking wave plunges downwards [2]

Different types of waves

Constructive waves



Destructive waves

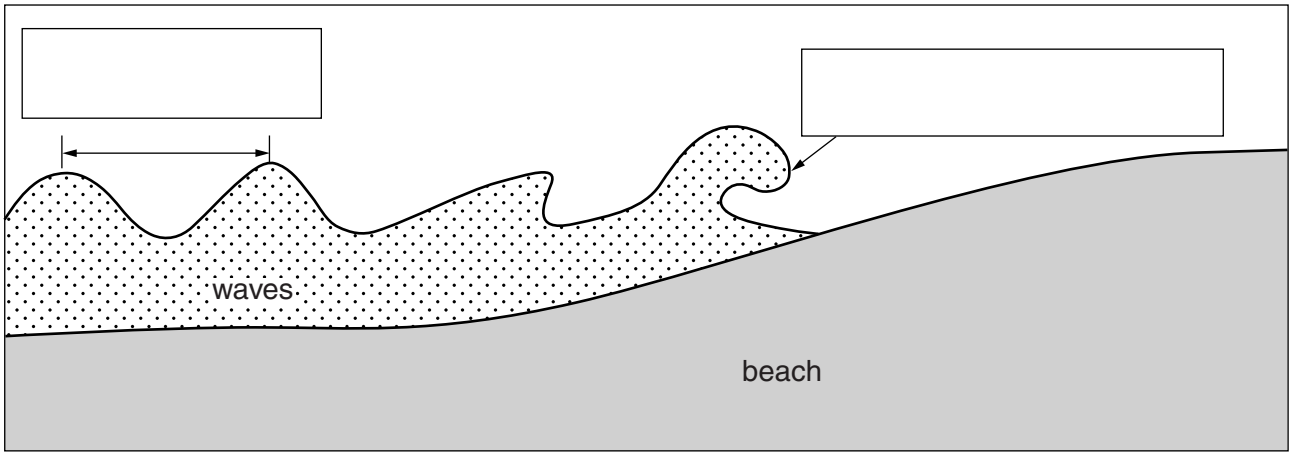


Fig. 1

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(ii) Wave frequency is the number of waves per minute.

The students had learned that destructive waves have a higher frequency than constructive waves. Describe a method they could use to measure wave frequency on the field visit.

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The students tested the following hypotheses:

Hypothesis 1: *The beach profile is steeper where wave frequency is higher.*

Hypothesis 2: *The size of beach material is larger on the beach where wave frequency is higher.*

(b) The students measured wave frequency ten times at each of the two beaches. The results are shown in Table 1 below.

Table 1

Beach A

Measurement	1	2	3	4	5	6	7	8	9	10	Average
Wave frequency (number of waves per minute)	11	12	14	12	15	13	13	13	15	12	13

Beach B

Measurement	1	2	3	4	5	6	7	8	9	10	Average
Wave frequency (number of waves per minute)	6	6	7	8	7	7	6	8	7	8	

(i) Calculate the average wave frequency for Beach B. Write your answer into Table 1. [1]

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(ii) Use the results in Table 1 to complete Fig. 2, below, by plotting the number of measurements at Beach A where a frequency of 15 waves per minute was recorded. [1]

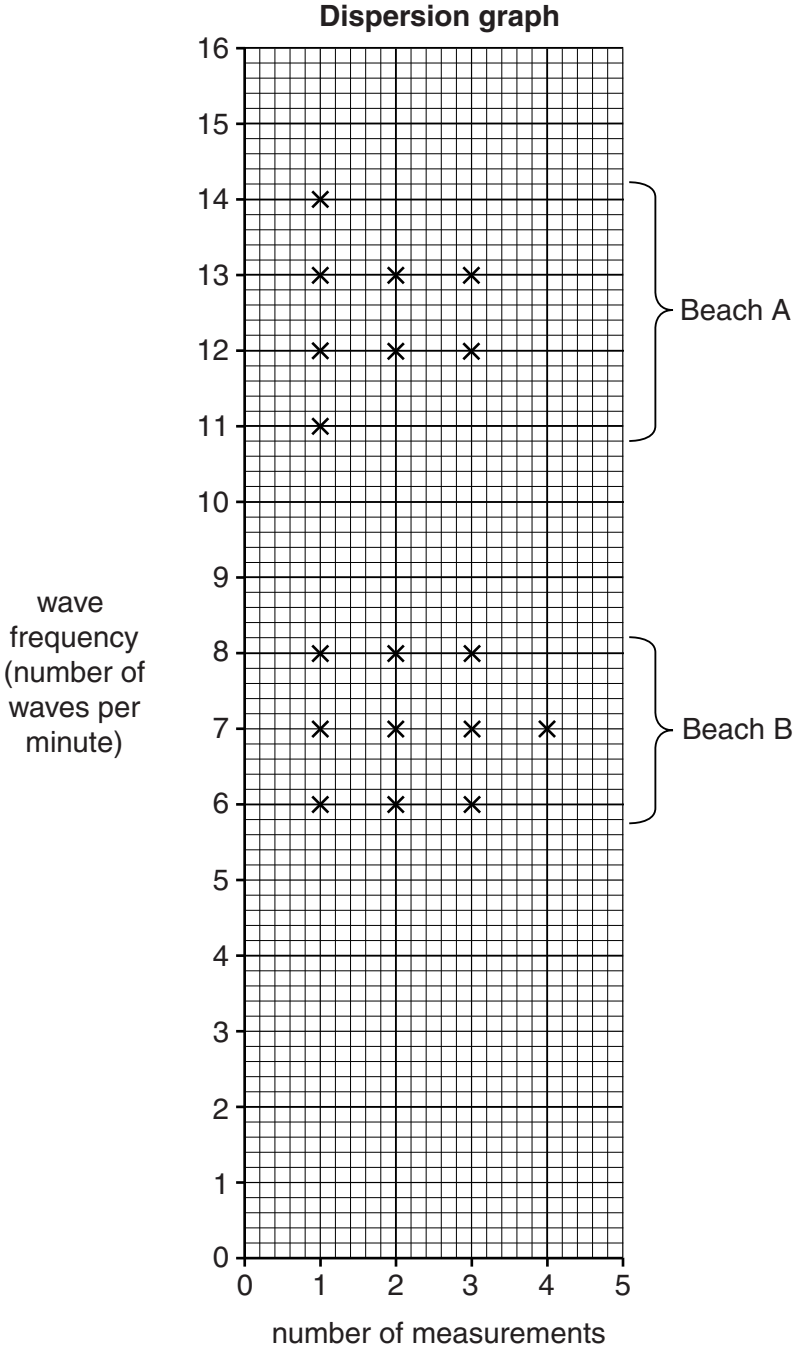


Fig. 2

(iii) Use the information in Fig. 2 to complete the following table.

Circle the type of wave that was breaking on each beach.

Beach	Type of wave	
Beach A	constructive	destructive
Beach B	constructive	destructive

[1]

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(c) (i) The students measured the profiles of the two beaches. They used a tape measure, two ranging poles and a clinometer. Describe how they measured the profiles.

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(ii) The students used their results to draw profiles of beaches A and B.
These are shown in Fig. 3 (Insert).

What conclusion would the students make about **Hypothesis 1:** *The beach profile is steeper where wave frequency is higher*? Use data from Table 1 and Figs 2 and 3 to support your decision.

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(iii) Explain why type of wave and its frequency can affect the steepness of beach profiles.

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(d) To investigate **Hypothesis 2:** *The size of beach material is larger on the beach where wave frequency is higher,* the students obtained a sample of pebbles from both beaches.

(i) The students chose 25 pebbles from each beach using a systematic sampling method. Describe how they did this.

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(ii) Describe a method to measure the size (length) of each pebble the students collected.

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(iii) Use the following information to complete graphs, Figs 4A and 4B opposite. [2]

Beach A

Pebble number	Size (length in cm)
13	9

Beach B

Pebble number	Size (length in cm)
15	10.5

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Results of fieldwork

Beach A

Average (mean) size = 9.5 cm	Median (middle) size = 9 cm

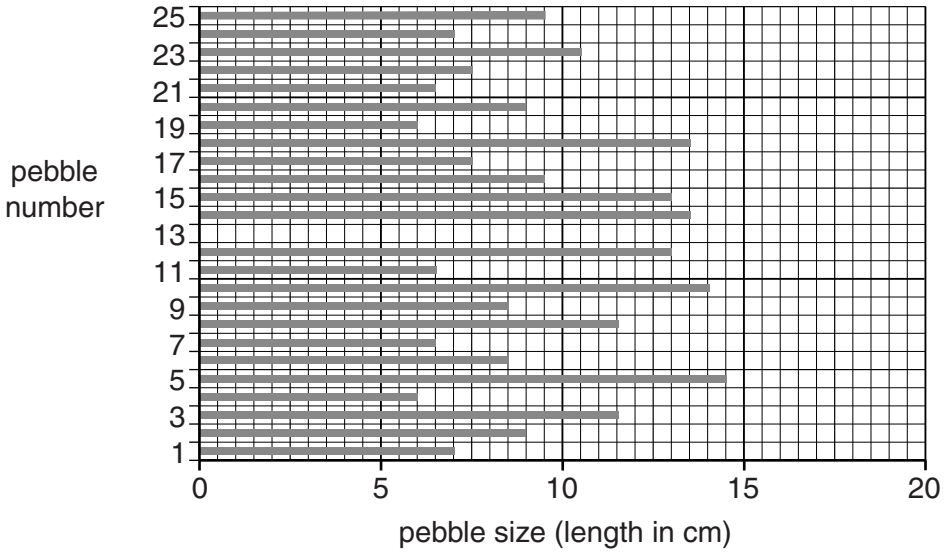


Fig. 4A

Beach B

Average (mean) size = 10 cm	Median (middle) size = 9.5 cm

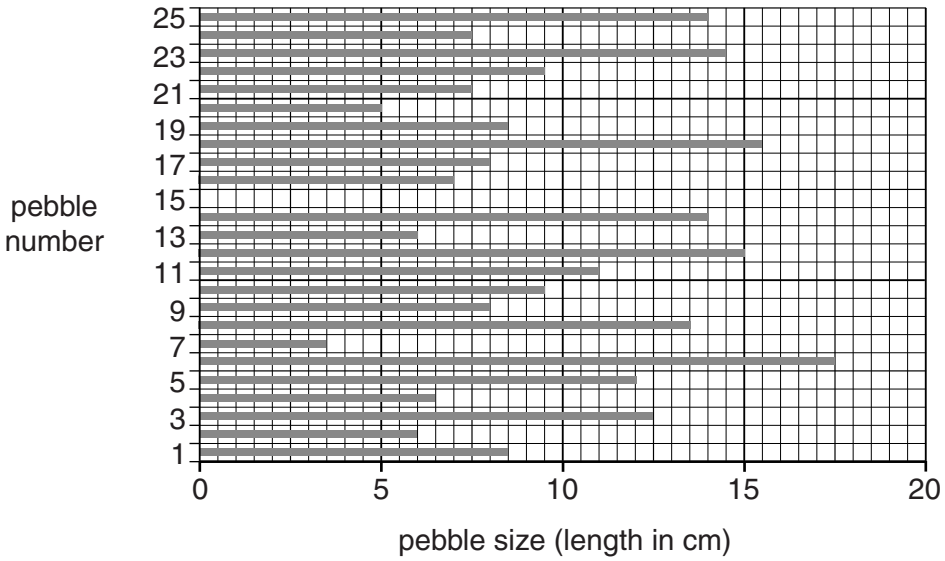


Fig. 4B

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(iv) What conclusion would the students make about **Hypothesis 2:** *The size of beach material is larger on the beach where wave frequency is higher*? Support your decision with evidence from Figs 4A and 4B.

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(e) The students also did a fieldwork investigation to compare pollution on the two beaches.

Explain how they could collect appropriate data for their investigation.

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[Total: 30 marks]

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2 A group of students from a town in Peru did some fieldwork about the Central Business District (CBD) of the town. They wanted to decide where the boundary of the CBD occurred. They had learned in class that this is known as 'delimiting the CBD'. They had discussed with their teacher different techniques that could be used to delimit the CBD and decided to make their decision based on pedestrian flows in the town.

(a) First the students had to decide where the centre of the CBD was. Suggest **two** features which they could use to identify the central point.

1 .....

2 .....[2]

The students wanted to test the following hypotheses:

Hypothesis 1: *Pedestrian flow decreases away from the centre of the CBD.*

Hypothesis 2: *The tallest buildings are located in the CBD.*

(b) To investigate **Hypothesis 1** the students worked in pairs to do pedestrian counts at 30 points in the town. They decided that all counts would be done between 09.00 and 09.20 on the same day.

(i) Give **two** advantages of this decision.

1 .....

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2 .....

.....[2]

(ii) In the space below draw a recording sheet which the students could have used for the pedestrian count.

[3]

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(c) The results of the pedestrian count are shown in Fig. 5 below. Some isolines have been drawn on the map to show pedestrian flow.

Number of pedestrians recorded

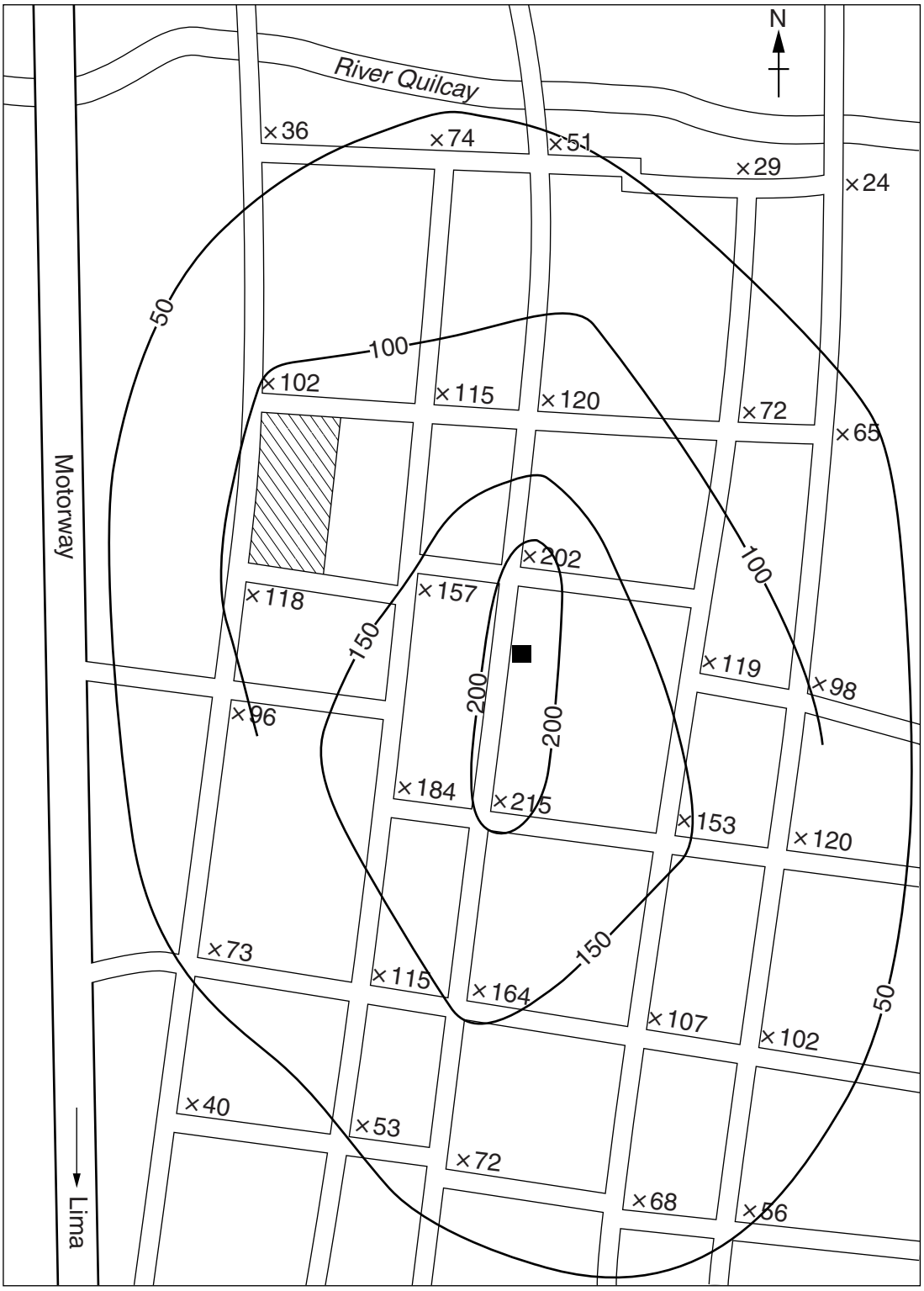


Fig. 5

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(i) On Fig. 5, complete the isoline that shows 100 pedestrians. [2]

(ii) On Fig. 5, shade the area where the number of pedestrians recorded was between 150 and 200. [1]

(iii) What conclusion would the students make to **Hypothesis 1:** *Pedestrian flow decreases away from the centre of the CBD*? Support your answer with evidence from Fig. 5.

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.....[3]

(iv) The market, which is shown on Fig. 5, was closed on the day when the students did the pedestrian count.

What would be the effect of the market being open on the number of pedestrians counted at the two survey sites nearest to the market?

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.....[1]

(v) Suggest **two** other reasons why the number of pedestrians may vary between different areas of the city.

1 .....

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2 .....

.....[2]

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(d) To investigate **Hypothesis 2:** *The tallest buildings are located in the CBD,* the students selected ten buildings at each of the pedestrian recording sites. They counted the number of storeys of each building.

(i) Suggest why counting the number of storeys is an appropriate method of measuring the height of buildings.

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.....[1]

(ii) The students calculated the average number of storeys at each site. The results for one site are shown below.

Building	1	2	3	4	5	6	7	8	9	10
Number of storeys	3	3	5	2	3	4	2	4	3	3

Calculate the average number of storeys at this site. Give your answer to the nearest whole number.

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.....[1]

(iii) The results of the students' fieldwork are shown in Fig. 6 opposite. Use the following information to complete the bars at location **X** on Fig. 6.

Location **X**	Average = 4 storeys

[1]

(iv) To draw a conclusion about **Hypothesis 2:** *The tallest buildings are located in the CBD,* the students decided to use the 150 pedestrian isoline to mark the edge of the CBD. This isoline is drawn on Fig. 6.

Is **Hypothesis 2** true or false? Circle your choice below. Justify your decision using evidence from Fig. 6.

Hypothesis 2 is true Hypothesis 2 is false.

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Average number of storeys

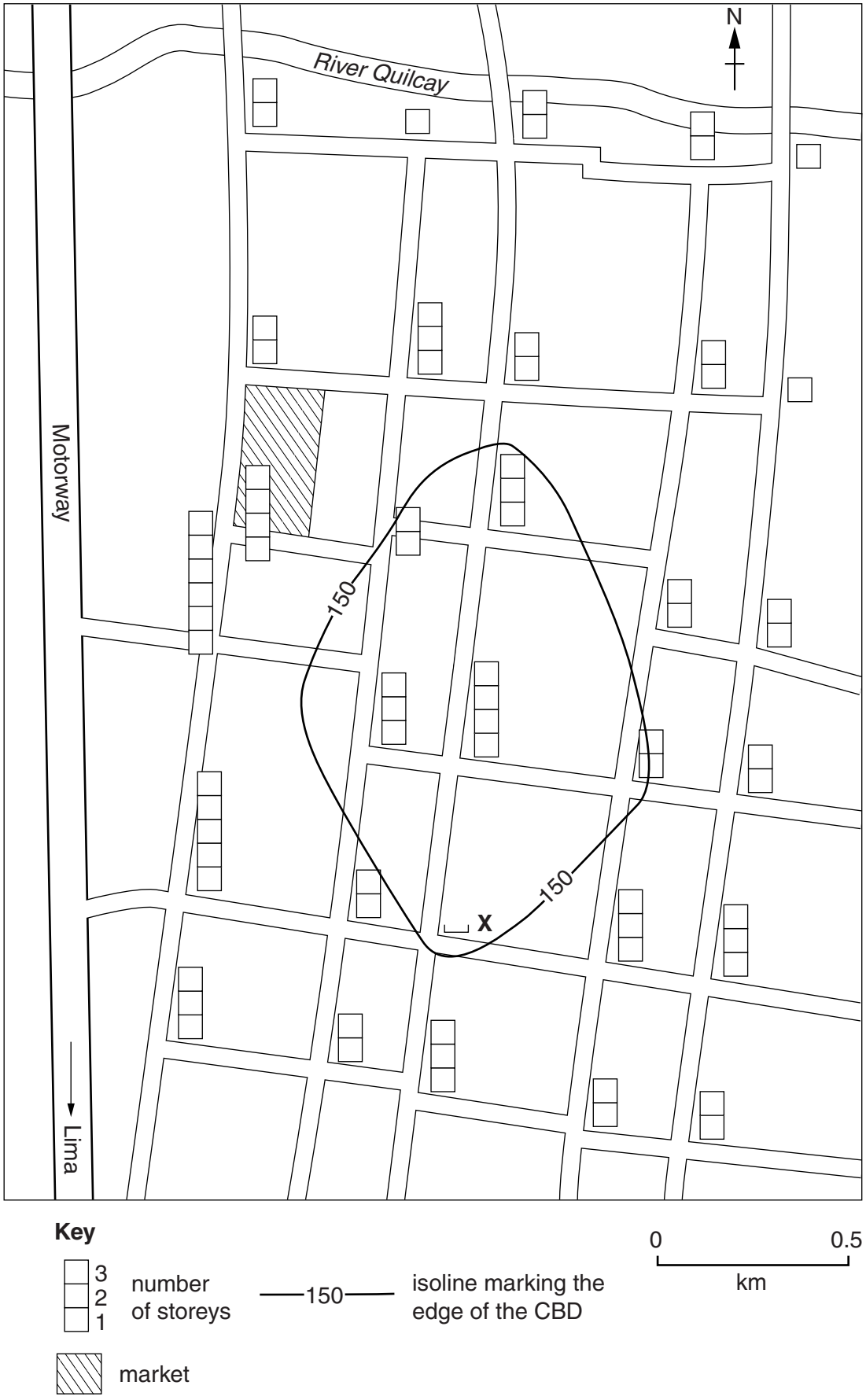


Fig. 6

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(v) Suggest **two** reasons why building heights vary within an urban area.

1 .....

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2 .....

.....[2]

(e) The students used pedestrian flows to delimit the CBD. Which **two** of the following techniques can also be used to delimit the CBD?

	Tick (✓)
Find out the land value (rateable value)	
Interview people who are shopping	
Identify types of vehicles	
Investigate environmental quality	
Identify types of land use	

[2]

(f) How might these fieldwork investigations into pedestrian flows and average building heights have been improved? Do not repeat the same ideas for both investigations.

Pedestrian flows

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Average building heights

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.....[4]

[Total: 30 marks]

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