



GCSE



C300U20-1

FRIDAY, 10 NOVEMBER 2023 – MORNING

MATHEMATICS – COMPONENT 2

CALCULATOR – ALLOWED MATHEMATICS

FOUNDATION TIER

**2 hours 15 minutes plus your additional
time allowance**

**A CALCULATOR WILL BE REQUIRED
FOR THIS EXAMINATION**

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	3	
3.	5	
4.	4	
5.	3	
6.	4	
7.	6	
8.	3	
9.	4	
10.	6	
11.	5	
12.	4	
13.	5	
14.	9	
15.	5	
16.	4	
17.	4	
18.	4	
19.	3	
20.	4	
21.	5	
22.	5	
23.	8	
24.	4	
25.	6	
Total	120	

(Turn over)

ADDITIONAL MATERIALS

An additional formulae booklet.

A ruler, a protractor and a pair of compasses may be required.

(Turn over)

**ITEMS INCLUDED WITH QUESTION
PAPER**

A separate Formula List.

A separate Diagram Booklet.

**Cut out shapes for Question 18 (a) and
Question 18 (b).**

**The Diagram Booklet MUST be
handed in to the invigilators and
sent for marking.**

(Turn over)

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball – point pen, black felt tip or your usual method.

Write your name, centre number and candidate number in the spaces on the front cover.

Answer ALL questions.

Write your answers in the spaces provided.

If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the questions(s) correctly.

Take π as 3.142 or use the π button on your calculator.

(Turn over)

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part – question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

(Turn over)

- 1. Look at the table for Question 1 in the separate Diagram Booklet.**

The table shows the costs to post letters and parcels.

Use costs from the table to answer the following.

continued on the next page . . .

(Turn over)

Question 1 continued

- 1. (a) Maria posts one 2nd class small letter and one 1st class parcel. What is the total cost of posting these two items?**

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

- 1. (b) How much less does it cost
to post three large letters
2nd class than to post three
large letters 1st class?**

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

**1. (c) Gareth spent £15.95 posting
large letters 1st class.**

How many letters did he post?

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (d) Lee has £3.50

**Does he have enough money
to post five small letters?**

Yes

☐

No

☐

Give the reason for your answer.

[1 mark]

(Turn over)

- 2. Look at the diagram for Question 2 in the separate Diagram Booklet.**

SHAPE A is shown on a square grid. Each square on the grid represents a 1 cm square.

- (a) On the grid provided for Question 2 (a) in the separate Diagram Booklet, draw a SQUARE that has the same area as SHAPE A.**

Remember, each square on the grid represents a 1 cm square.

[1 mark]

continued on the next page . . .

(Turn over)

Question 2 continued

**2. (b) (i) Work out the perimeter of
SHAPE A.**

[1 mark]

continued on the next page . . .

(Turn over)

Question 2 (b) continued

- 2. (b) (ii) On the grid provided for Question 2 (b) (ii) in the separate Diagram Booklet, draw a RECTANGLE that has the same perimeter as SHAPE A.**

Remember, each square on the grid represents a 1 cm square.

[1 mark]

(Turn over)

- 3. (a) Write the number six million five hundred and twenty thousand in figures.**

[1 mark]

- (b) Look at the diagram for Question 3 (b) in the separate Diagram Booklet.**

Shade $\frac{3}{5}$ of the shape shown.

[1 mark]

continued on the next page . . .

(Turn over)

Question 3 continued

- 3. (c) Rearrange these five boxes to create a calculation with an answer of 8**

4	6	24	+	÷
---	---	----	---	---

Write your calculation in the boxes below.

					=	8
--	--	--	--	--	---	---

(Turn over)

[1 mark]

continued on the next page . . .

(Turn over)

Question 3 continued

3. (d) Write 465 784

(i) correct to the nearest 10

[1 mark]

(ii) correct to the nearest 1000

[1 mark]

(Turn over)

- 4. Look at the diagram for Question 4 in the separate Diagram Booklet. The diagram shows two fair spinners, Spinner A and Spinner B.**

(a) Each spinner is spun once.

Circle the expression that best describes the chance of each of the following events occurring.

continued on the next page . . .

(Turn over)

Question 4 (a) continued

4. (a) (i) Spinner A lands on a circle.

IMPOSSIBLE
UNLIKELY
EVEN CHANCE
LIKELY
CERTAIN

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 (a) continued

4. (a) (ii) Spinner B lands on a square.

IMPOSSIBLE
UNLIKELY
EVEN CHANCE
LIKELY
CERTAIN

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

- 4. (b) Look at the diagram for Question 4 (b) in the separate Diagram Booklet.**

The diagram shows a probability scale.

Spinner B is spun once.

What is the probability it lands on a star?

Mark your answer with an arrow ($\downarrow$) on the probability scale.

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

- 4. (c) A different spinner, spinner C, is spun once.**

The probability that spinner C lands on a star is $\frac{3}{16}$

What is the probability that spinner C does NOT land on a star?

[1 mark]

(Turn over)

- 5. (a) Look at the diagram for Question 5 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale.**

Calculate the value of x .

$x =$ _____

[1 mark]

continued on the next page . . .

(Turn over)

Question 5 continued

- 5. (b) Look at the diagram for Question 5 (b) in the separate Diagram Booklet. The diagram is NOT drawn to scale.**

Calculate the value of y .

$y =$ _____

[2 marks]

(Turn over)

- 6. Look at the diagram for Question 6 in the separate Diagram Booklet. The diagram shows a grid.**

ABCD is a kite.

Three of its vertices have been plotted on the grid.

- (a) Plot point D on the grid to complete the kite.**

[1 mark]

continued on the next page . . .

(Turn over)

Question 6 continued

6. (b) Write down the coordinates of point D.

D = (_____ , _____)

[1 mark]

(c) Draw a reflection of the kite ABCD in the x axis.

[2 marks]

(Turn over)

- 7. Look at the diagram for Question 7 in the separate Diagram Booklet.**

The diagram shows a graph of the average maximum daily temperature ($^{\circ}\text{C}$) and the average monthly rainfall (mm) in Greece.

- (a) (i) Which month has the highest rainfall?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 7 (a) continued

- 7. (a) (ii) Calculate the difference in average maximum daily temperature between the warmest month and the coolest month.**

[2 marks]

continued on the next page . . .

(Turn over)

Question 7 (a) continued

7. (a) (iii) Courtney wants to go on holiday to Greece.

She does not want the average maximum daily temperature to be over 30°C and hopes for as little rain as possible.

Which month would be the most suitable for Courtney to go to Greece?

[1 mark]
(Turn over)

Question 7 continued

- 7. (b) The formula shown below can be used to convert between temperatures in degrees Fahrenheit (F) and temperatures in degrees Celsius (C).**

$$F = 1.8C + 32$$

On a particular day in Greece, the temperature was 25°C.

Use the formula to convert this temperature to degrees Fahrenheit (F).

(Turn over)

31

[2 marks]

(Turn over)

- 8. Alex and Louise buy some cereal bars and drinks at a shop.**

Look at the diagram for Question 8 in the separate Diagram Booklet.

The diagram shows the items that Alex and Louise bought and their total cost.

Assume that:

- each cereal bar is identical**
- each drink is identical.**

continued on the next page . . .

(Turn over)

Question 82 continued

**Find the cost of one cereal bar and
the cost of one drink.**

(Turn over)

One cereal bar costs _____

One drink costs _____

[3 marks]

(Turn over)

- 9. Look at the diagram for Question 9 in the separate Diagram Booklet.**

The manager of a shop calculates the wages of her staff at the end of each week.

She uses the diagram shown.

continued on the next page . . .

Question 9 continued

9. (a) Hamza is a junior sales assistant.

**Last week he worked for
25 hours and had a bonus
of £80**

**What was Hamza's total wage
last week?**

(Turn over)

[2 marks]

continued on the next page . . .

(Turn over)

Question 9 continued

- 9. (b) Julie is a senior sales assistant.
Last week her total wage was
£271 including a bonus of £64**
- How many hours did Julie work
last week?**

(Turn over)

[2 marks]

(Turn over)

10. Jarrad won £3000 in a competition.

(a) He spent £500 and gave 37% of the remaining money to charity. This was shared equally between five different charities.

How much did each charity receive?

Each charity received _____

[4 marks]

continued on the next page . . .

(Turn over)

Question 10 continued

10. (b) Jarrad saves £600 of the £3000

What percentage of the £3000

does Jarrad save?

Jarred saves _____ %

of the £3000

[2 marks]

(Turn over)

11. (a) Simplify each of the following.

(i) $e + 7f + 5e - 9f$

[2 marks]

(ii) $6w \div 2w$

[1 mark]

continued on the next page . . .

(Turn over)

Question 11 continued

- 11. (b) Amanda buys 5 bags of apples.
Each bag contains n apples.
She gives away 2 apples from
EACH BAG.**

**Write an expression for the
total number of apples Amanda
has left.**

(Turn over)

45

[2 marks]

(Turn over)

12. Look at the information provided for Question 12 in the separate Diagram Booklet.

The Cowell family are planning a holiday to Spain for seven days.

They can either pay for a package deal or pay for return flights, accommodation and food separately.

The costs are shown in the information.

continued on the next page . . .

(Turn over)

Question 12 continued

On the holiday there will be two adults and two children.

The children are aged 8 and 1 years old.

They each require return flights, accommodation and food.

The Cowell family wish to choose the cheaper option.

continued on the next page . . .

(Turn over)

Question 12 continued

Which option should they choose?

Package Deal

☐

Pay Separately

☐

Show how you decide.

(Turn over)

49

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[4 marks]
(Turn over)

13. (a) Three fair coins are thrown at the same time.

(i) Look at the table for Question 13 (a) (i) in the separate Diagram Booklet.

Complete the table to list all the different possible outcomes.

The first row has been completed for you.

You may not need all the lines in the table.

[2 marks]

continued on the next page . . .

(Turn over)

Question 13 (a) continued

**13. (a) (ii) Write down the probability
that the outcome is three
heads.**

[1 mark]

continued on the next page . . .

(Turn over)

Question 13 continued

13. (b) When four fair coins are thrown at the same time, the probability that the outcome is two heads and two tails is 0.375

If the same four coins are thrown 136 times, how many times would you expect to get the outcome two heads and two tails?

(Turn over)

53

[2 marks]

(Turn over)

- 14. (a) The amount of electricity and gas used in a home is measured in units.**

In the first week of May, the Singh family used 56 units of electricity and 245 units of gas. The cost per unit of electricity is 32p.

The total cost for the units of electricity and gas the Singh family used in the first week of May was £39.97

continued on the next page . . .

(Turn over)

Question 14 (a) continued

**What is the cost of one unit
of gas?**

(Turn over)

One unit of gas costs _____

[4 marks]

continued on the next page . . .

(Turn over)

Question 14 continued

14. (b) The Singh family are calculating their electricity bill for the 30 days of June.

- **They use 210 units of electricity in June.**
- **The cost per unit of electricity is 32p.**
- **They pay a fixed charge of 28p per day.**
- **VAT at 5% is added to the total of these costs.**

continued on the next page . . .

(Turn over)

Question 14 (b) continued

**Calculate the total cost of the
Singh family's electricity bill for
June.**

(Turn over)

**The total cost of the Singh family’s
electricity bill for June is**

[5 marks]
(Turn over)

**15. Look at the diagram for Question 15
in the separate Diagram Booklet.
The diagram shows a graph.**

**Rhiannon cycled from her home
to a park.**

**She cycled 15 miles along a
straight road.**

The graph shows her journey.

continued on the next page . . .

(Turn over)

Question 15 continued

**15. (a) On her journey to the park,
Rhiannon had a puncture.
How long did Rhiannon stop to
repair the puncture?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 15 continued

15. (b) Rhiannon was, on average, travelling faster before she had a puncture than after she had a puncture.

Without calculating any speeds, explain how you can tell this from the graph.

[1 mark]

continued on the next page . . .

(Turn over)

Question 15 continued

15. (c) (i) Rhiannon left the park at 11:30 and cycled back along the same road to a friend's house that is 5 miles from her home. This journey took 45 minutes. Draw this journey on the graph.

[1 mark]

continued on the next page . . .

(Turn over)

Question 15 (c) continued

15. (c) (ii) Calculate the average speed of Rhiannon's journey from the park to her friend's house. Give your answer in miles per hour.

(Turn over)

65

[2 marks]

(Turn over)

16. Look at the diagram for Question 16 in the separate Diagram Booklet. The diagram shows a map of a holiday park.

(a) Measure and write down the bearing of the Reception from the Park entrance.

[1 mark]

continued on the next page . . .

(Turn over)

Question 16 continued

16. (b) Amir is camping at the holiday park.

His tent is on a bearing of 025° from the Park entrance and 280° from the Park exit.

Mark with a T, the position of Amir's tent on the map.

[3 marks]

(Turn over)

17. Look at the diagram for Question 17 in the separate Diagram Booklet. The diagram shows a Venn diagram.

The universal set ($\mathcal{E}$) contains the numbers 4, 9, 12, 18, 23, 32, 50, 64 and 72

S is the set of square numbers.

F is the set of factors of 36

continued on the next page . . .

(Turn over)

Question 17 continued

17. (a) Show this information on the Venn diagram.

[2 marks]

continued on the next page . . .

(Turn over)

Question 17 continued

17. (b) A number is selected at random from the universal set ($\mathcal{E}$).

Find the probability that the number selected is a factor of 36 but NOT a square number.

[2 marks]

(Turn over)

18. Look at the diagram for Question 18 in the separate Diagram Booklet.

The diagram shows triangle A and triangle B on a grid.

(a) Describe fully the single transformation that maps triangle A onto triangle B.

A cut out shape is available for this question.

(Turn over)

[2 marks]

18. (b) Translate triangle A using the

vector $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$, label it C.

**A cut out shape is provided for
this question.**

[2 marks]

(Turn over)

19. Shortbread biscuits are made from flour, butter and sugar.

**Their masses are in the ratio
4 : 3 : 2 respectively.**

**(a) What fraction of a shortbread
biscuit is made up of sugar?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 19 continued

19. (b) 1400 g of flour is used to make a batch of shortbread biscuits. How many grams of butter is used for this batch of shortbread biscuits?

(Turn over)

75

_____ **g of butter.**

[2 marks]

(Turn over)

**20. Lucy bought a car 9 years ago
for £12 250**

**The car depreciated in value by
18% in the FIRST year.**

**In each of the following years,
her car depreciated by 15% of its
previous year's value.**

**By how much has the car decreased
in value in the last 9 years?**

(Turn over)

[illegible]

(Turn over)

Lucy's car has decreased in value by

[4 marks]

(Turn over)

21. Regan caught 70 fish on a fishing trip.

He measured the length of each of the fish in centimetres.

Look at the table for Question 21 in the separate Diagram Booklet. The table shows his results.

(a) Calculate an estimate for the mean length of these fish.

(Turn over)

continued on the next page . . .

(Turn over)

Question 21 continued

21. (b) Regan thinks that the median length of fish is in the group $70 \leq L < 75$

Is Regan correct?

Yes ☐ **No** ☐

Give the reason for your answer.

[1 mark]

(Turn over)

22. Look at the diagrams for Question 22 in the separate Diagram Booklet. The diagrams are NOT drawn to scale.

Jan has a large piece of card.

The card has width 60 cm and length 96 cm (Diagram 1).

She uses a machine to cut identical circles out of the card.

Each circle has a radius of 6 cm (Diagram 2).

Jan has cut five circles as shown on Diagram 3.

continued on the next page . . .

(Turn over)

Question 22 continued

She continues in this way to cut as many circles as possible from the card.

- 22. (a) What is the maximum number of circles Jan can cut out of the card?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 22 continued

**22. (b) Jan cuts out the maximum
number of circles from the card.
What area of card is left over?**

(Turn over)

85

Area of card left over _____

[4 marks]

(Turn over)

23. (a) Expand and simplify
 $(p + 3)(p + 7)$

[2 marks]

continued on the next page . . .

(Turn over)

Question 23 continued

23. (b) Solve $7x + 6 = 4x + 7$

[2 marks]

continued on the next page . . .

(Turn over)

Question 23 continued**23. (c) Factorise $y^2 - 400$**

[1 mark]**continued on the next page . . .****(Turn over)**

Question 23 continued

23. (d) Solve the following simultaneous equations.

$$7x - 3y = 26$$

$$x + y = 3$$

You must show all your working.

(Turn over)

90

$x =$ _____

$y =$ _____

[3 marks]

(Turn over)

24. Look at the diagram for Question 24 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows two shapes that are similar.

Find the value of g and the value of h .

(Turn over)

g = _____

h = _____

[4 marks]

(Turn over)

25. Look at the diagram for Question 25 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

Vaughan cycles down a track from the top of a mountain to the bottom.

The track goes down at an angle of 48° to the horizontal.

Vaughan is 800 feet above ground level.

continued on the next page . . .

(Turn over)

Question 25 continued

25. (a) Vaughan cycles from the top of the track to the bottom of the track.

What distance has he cycled?

The distance Vaughan has cycled is

_____ feet. [4 marks]

(Turn over)

Question 25 continued

25. (b) (i) State an assumption you have made in answering part (a).

[1 mark]

continued on the next page . . .

(Turn over)

Question 25 (b) continued

25. (b) (ii) If your assumption is not correct, what effect would this have on your answer to part (a)?

[1 mark]

END OF PAPER

TOTAL 120 MARKS

(Turn over)

[illegible]

(Turn over)

[illegible]

(Turn over)

[illegible]

(Turn over)

[illegible]

C300U20-1

FRIDAY, 10 NOVEMBER 2023 – MORNING

MATHEMATICS – COMPONENT 2
CALCULATOR – ALLOWED MATHEMATICS
FOUNDATION TIER

**The Diagram Booklet MUST
be handed in to the invigilators
and sent for marking.**

Diagram Booklet

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

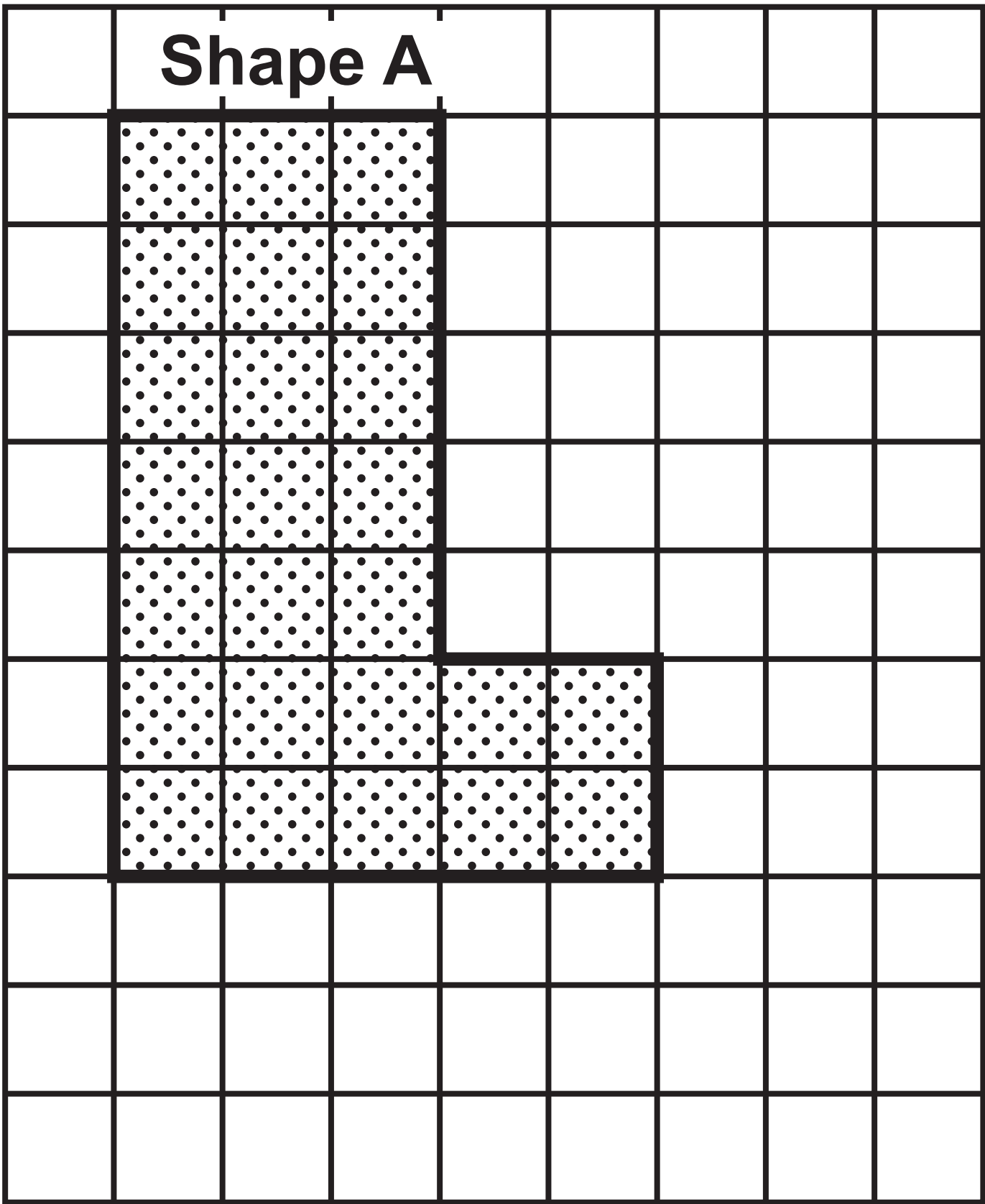
Question 1

Table

Cost of posting		
	1st class	2nd class
Small letter	95p	68p
Large letter	£1.45	£1.05
Parcel	£4.45	£3.35

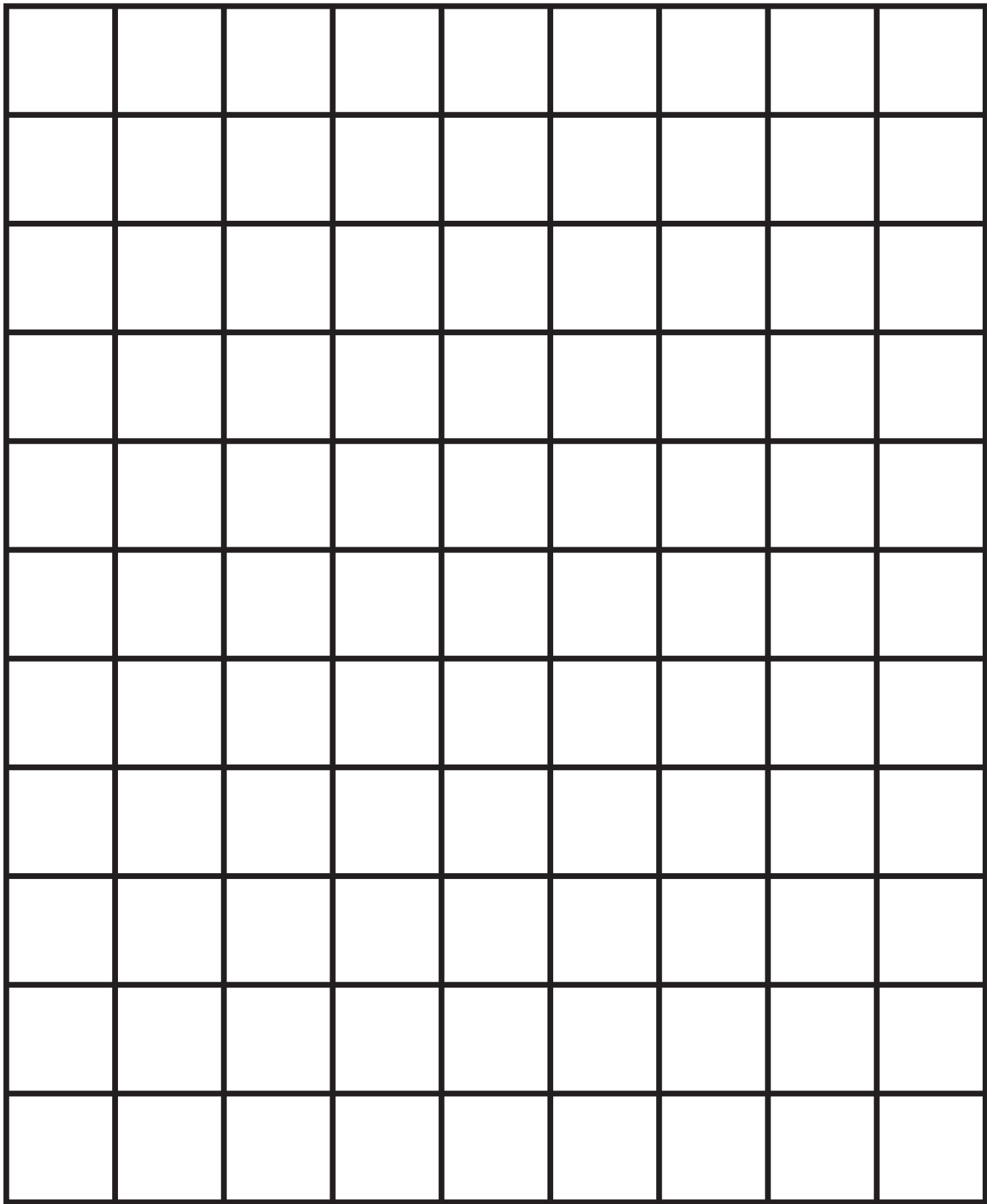
Question 2

Each square represents a 1 cm square



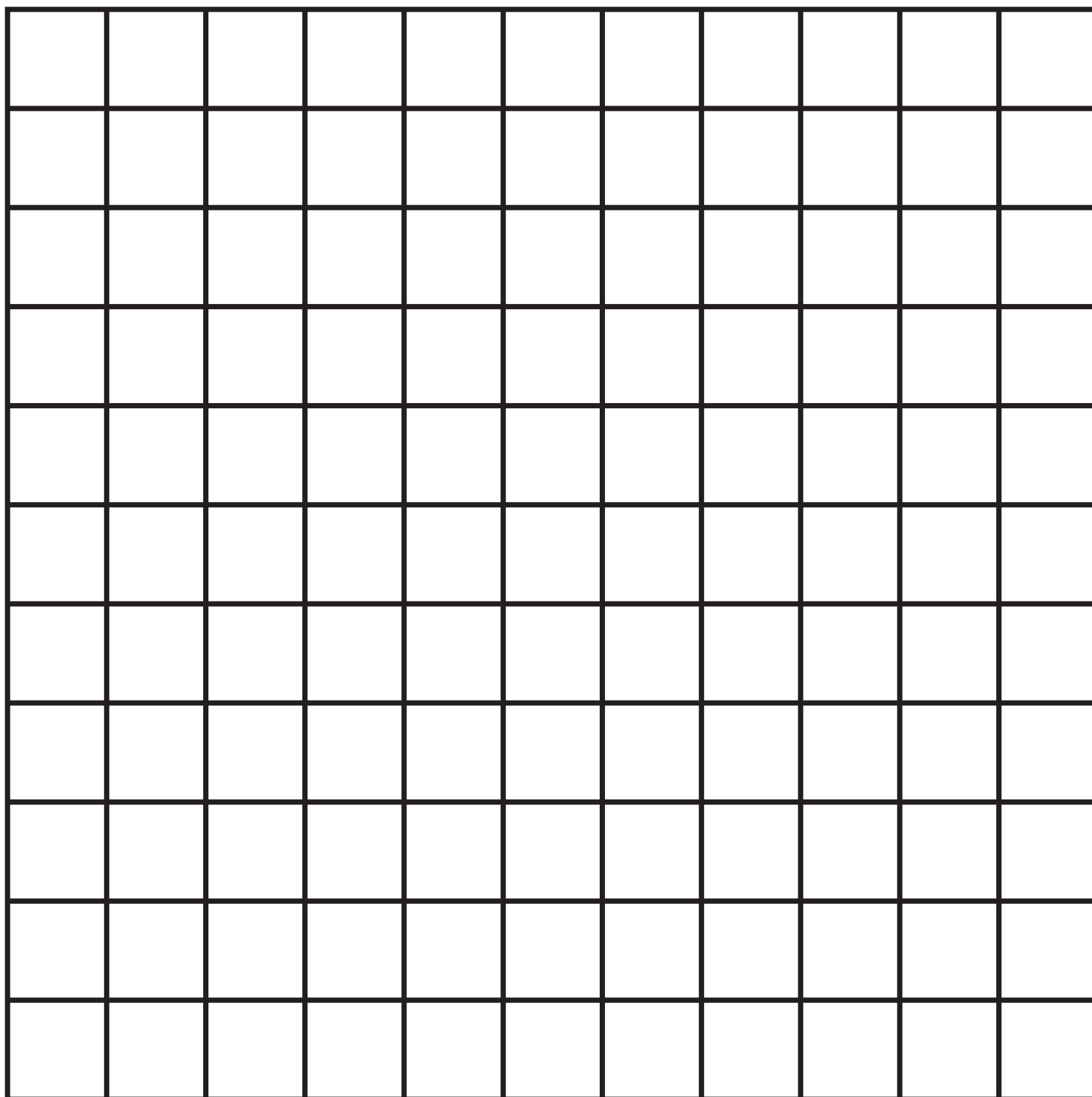
Question 2 (a)

Each square represents a 1 cm square

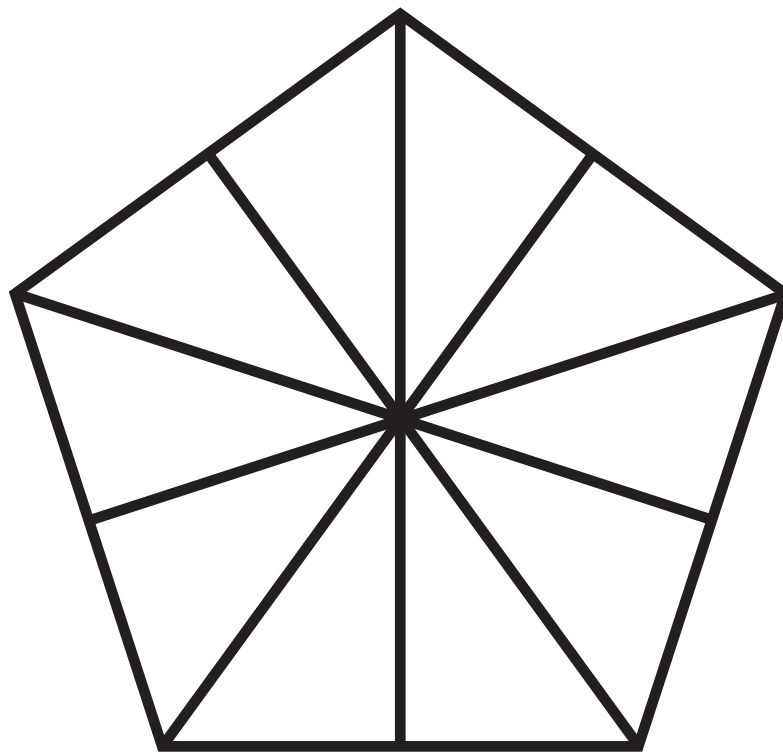


Question 2 (b) (ii)

Each square represents a 1 cm square

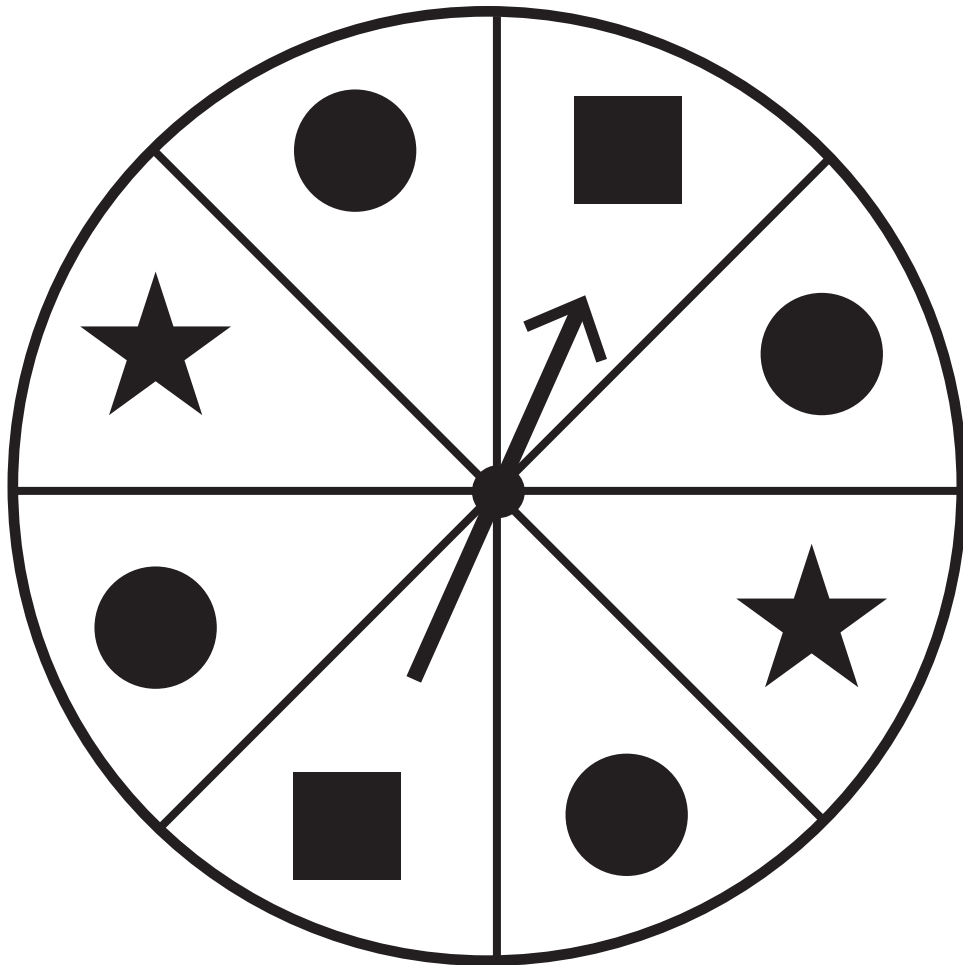


Question 3 (b)

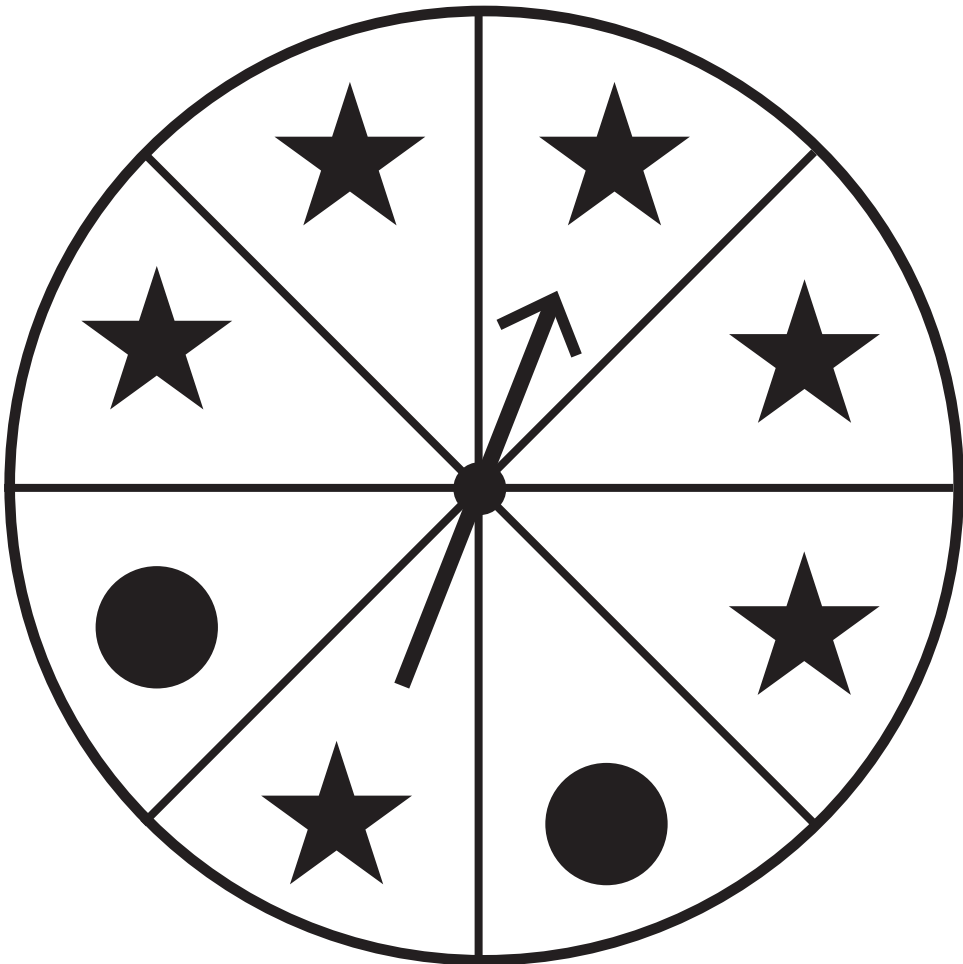


Question 4

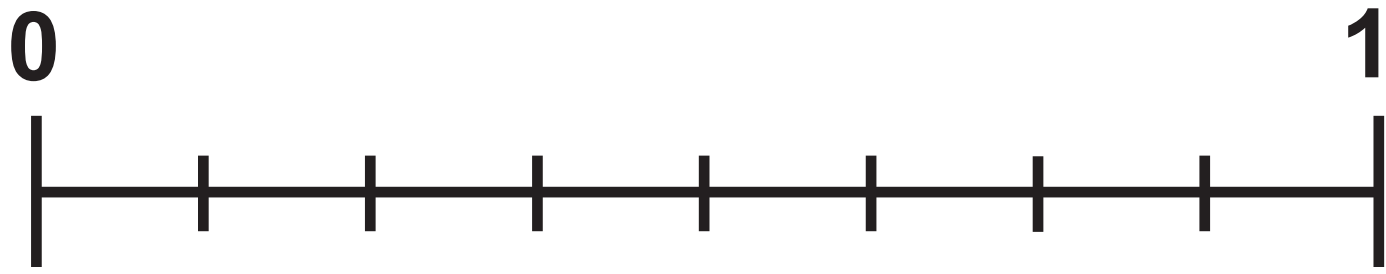
SPINNER A



SPINNER B

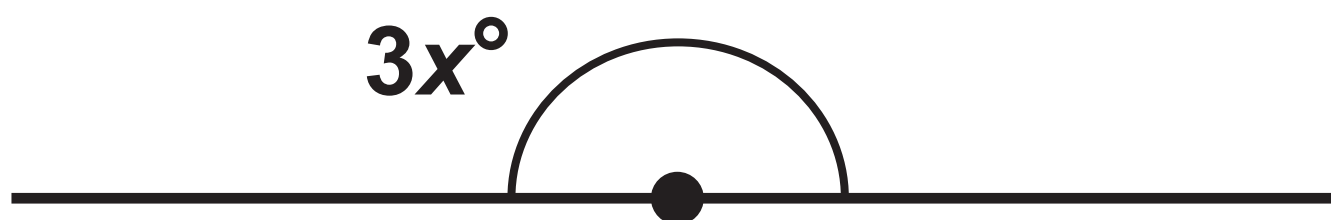


Question 4 (b)



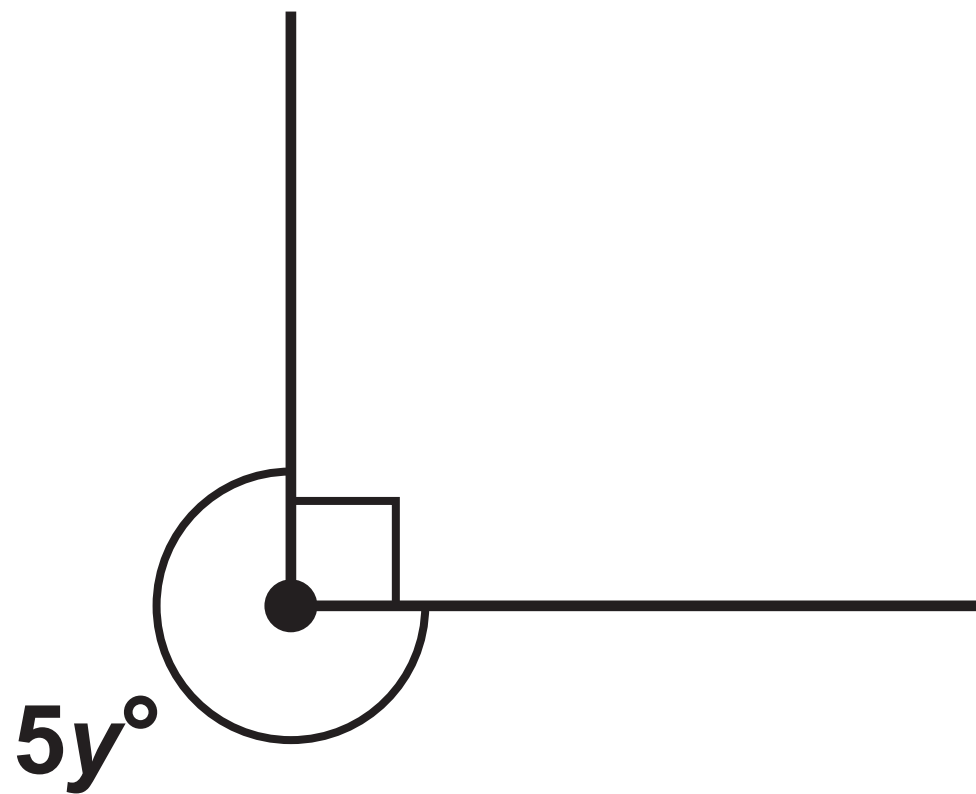
Question 5 (a)

Diagram NOT drawn to scale

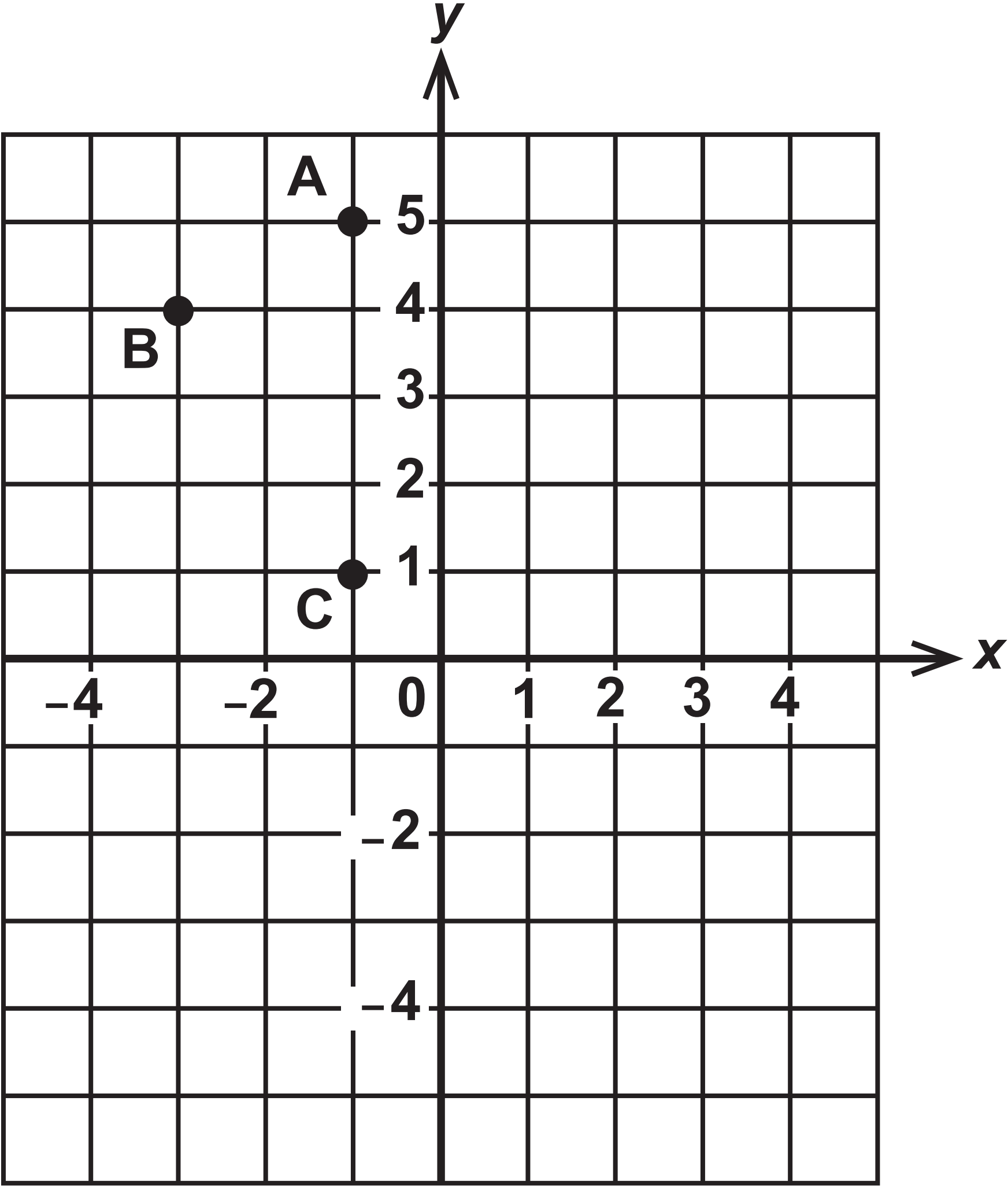


Question 5 (b)

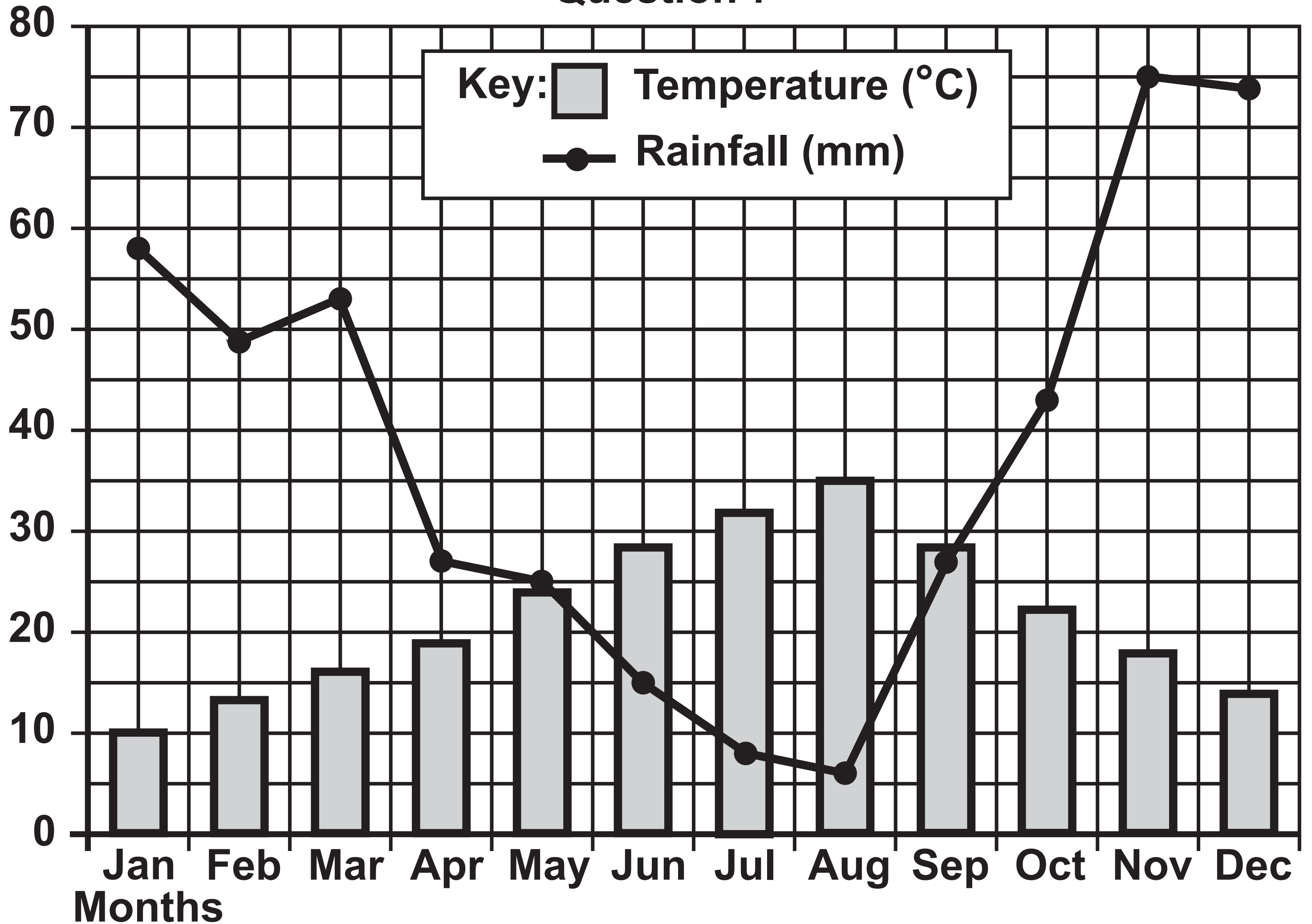
Diagram NOT drawn to scale



Question 6



Question 7

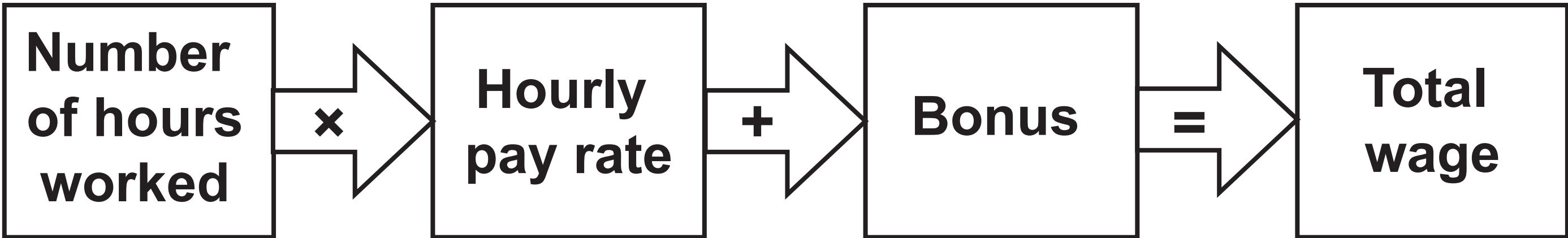


Question 8

Louise	Cereal bar	Cereal bar	Cereal bar	Cereal bar	Total cost £5
Alex	Cereal bar	Drink	Drink	Drink	Total cost £5.60

Question 9

WEEKLY WAGES



Hourly pay rates	
Junior sales assistant	£10.42
Senior sales assistant	£11.50

Question 12

Information

PACKAGE DEAL

£2300

**A seven – day holiday
to Spain for a family
of four.**

**RETURN FLIGHTS,
ACCOMMODATION
AND FOOD
INCLUDED.**

PAY SEPARATELY

**RETURN FLIGHTS, ACCOMMODATION
AND FOOD ARE FREE FOR
CHILDREN UNDER 2 YEARS OLD.**

RETURN FLIGHTS

£352 per person

ACCOMMODATION

£43 per person, per day

FOOD

£85 per person, for seven days

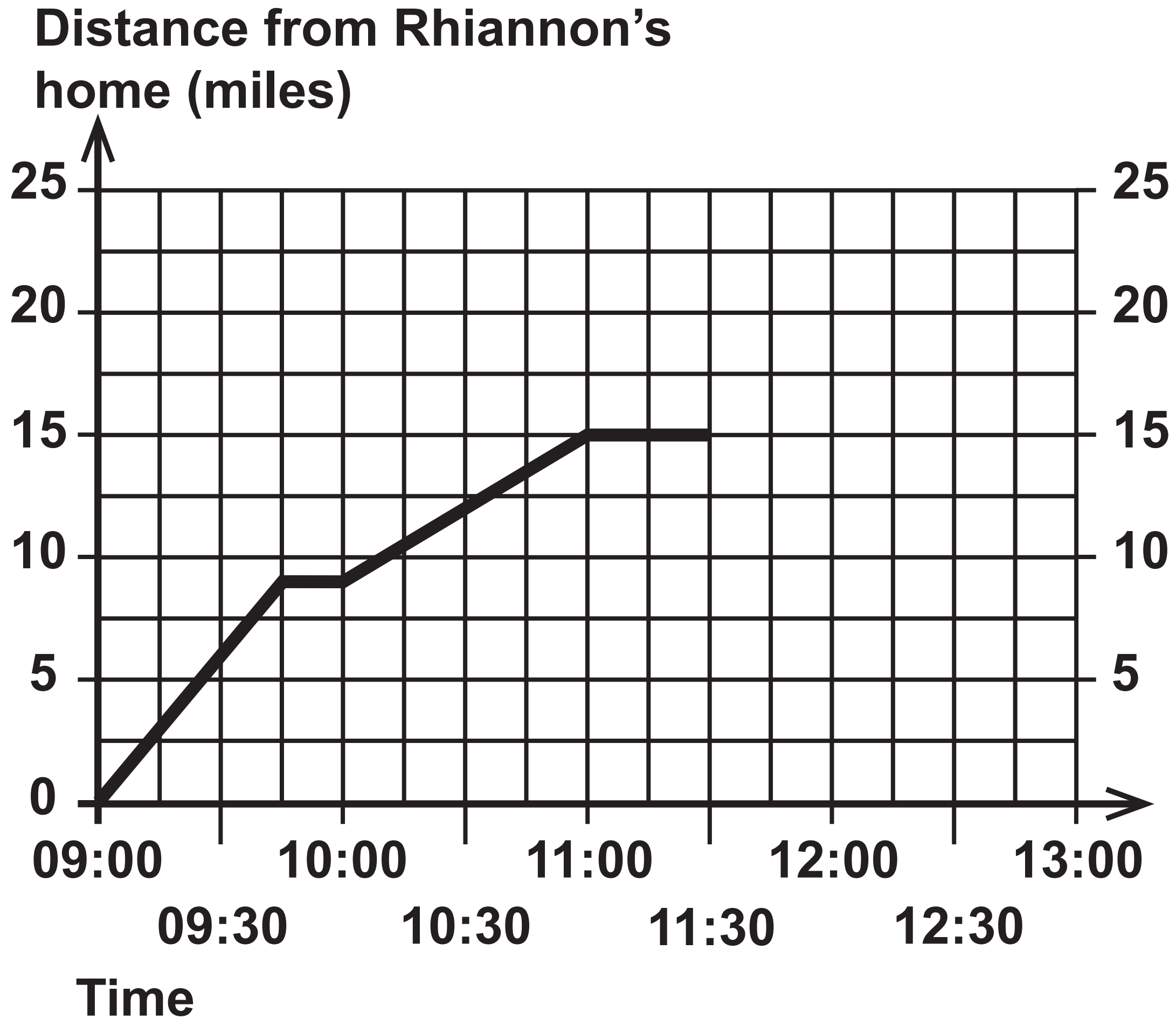
Question 13 (a) (i)

Table

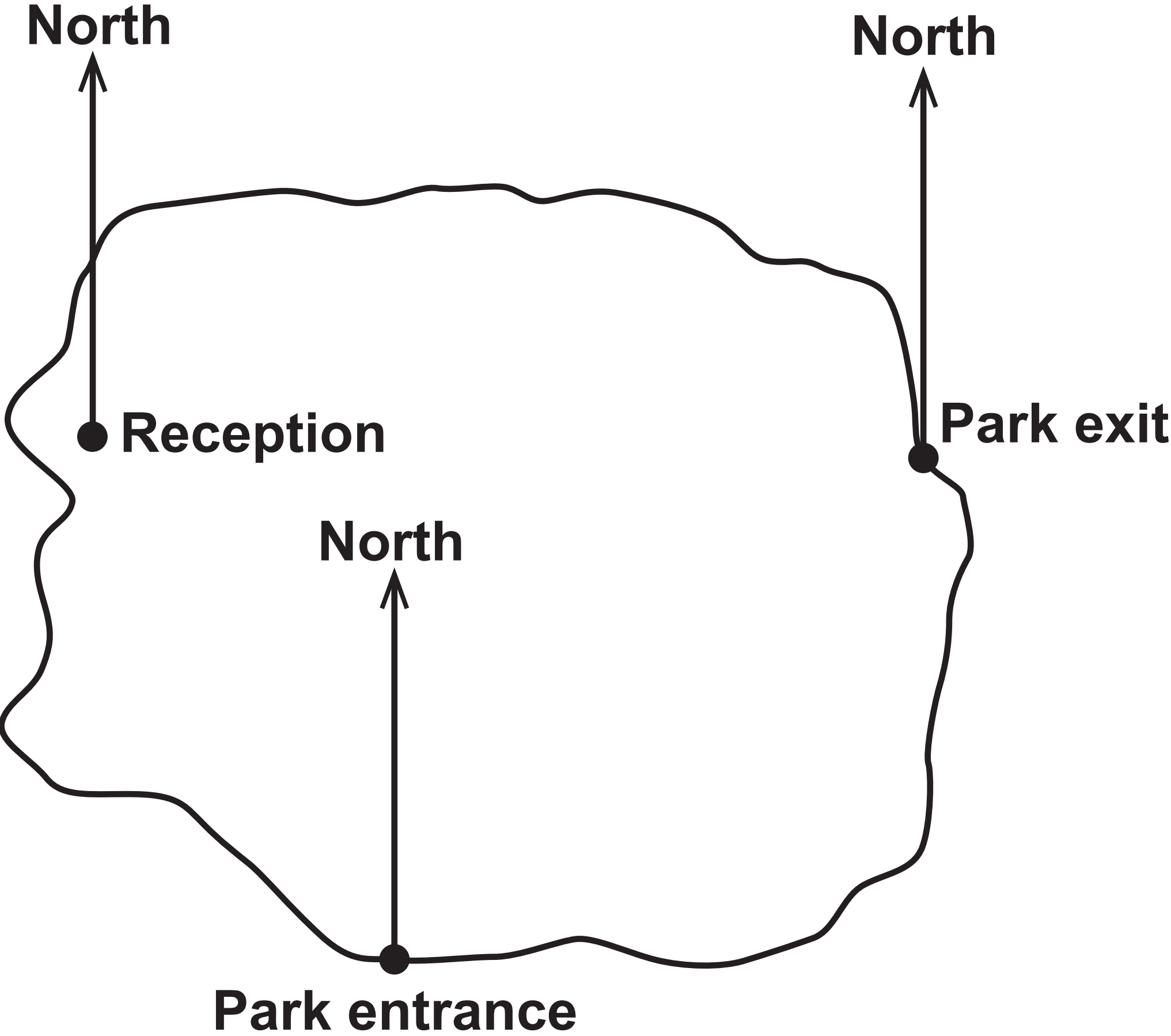
You may not need all the lines in the table.

[illegible]

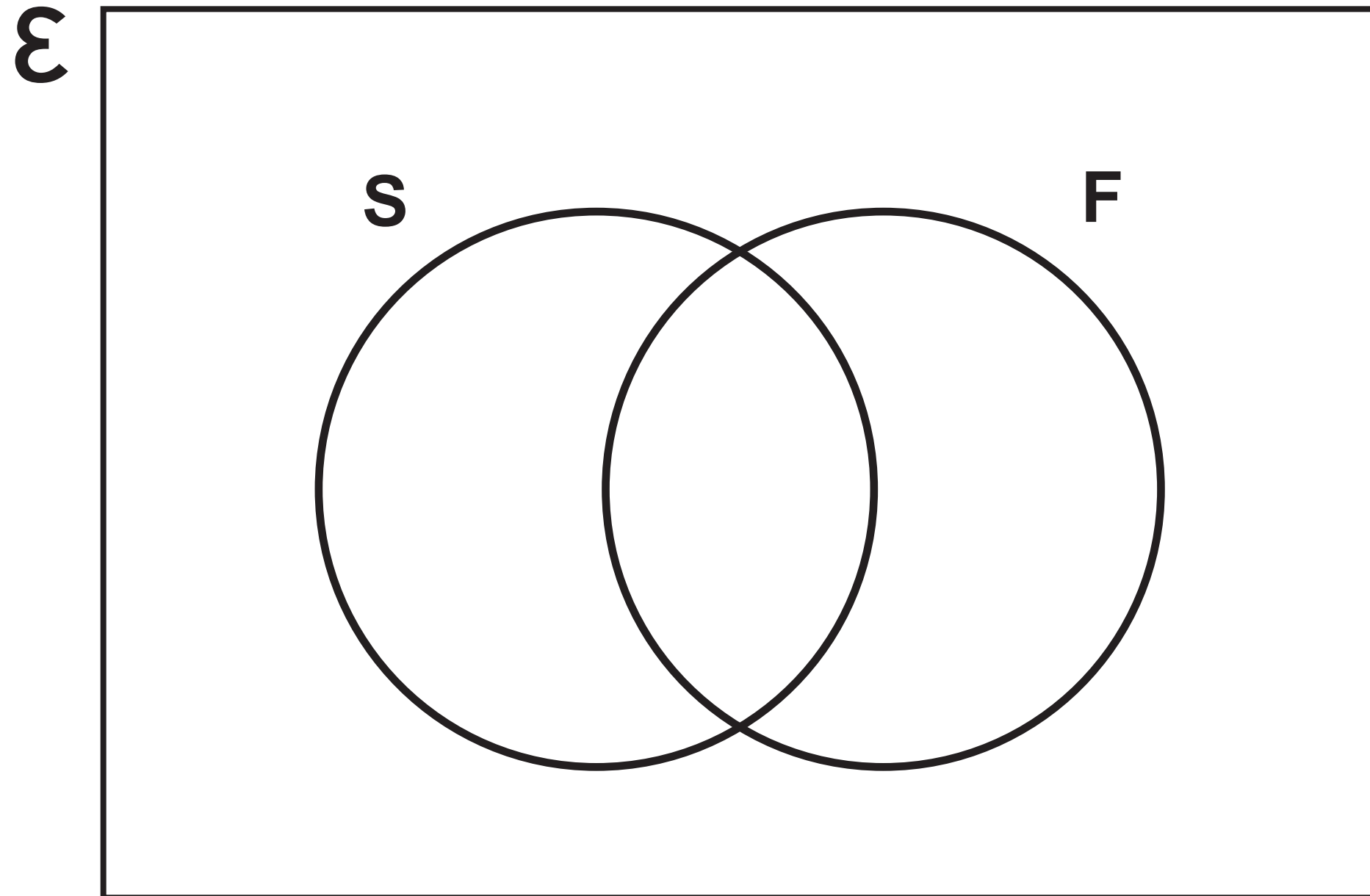
Question 15



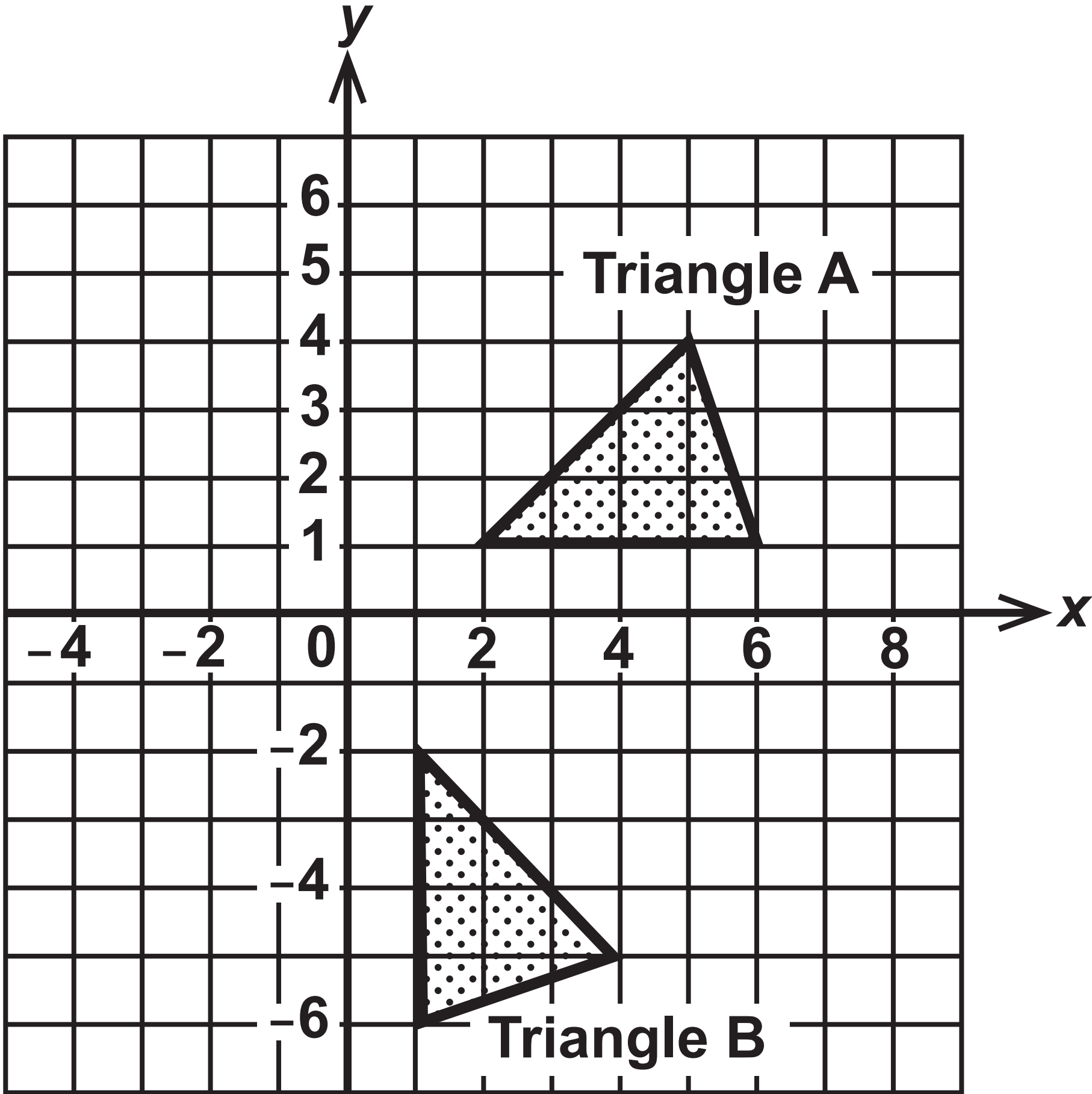
Question 16



Question 17



Question 18



Question 21

Table

Length, L (centimetres)	Number of fish
$60 \leq L < 65$	19
$65 \leq L < 70$	17
$70 \leq L < 75$	23
$75 \leq L < 80$	10
$80 \leq L < 85$	1

Question 22

Diagrams NOT drawn to scale

Diagram 1

96 cm

60 cm



Diagram 2

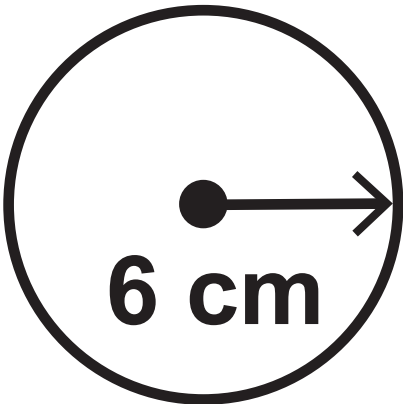
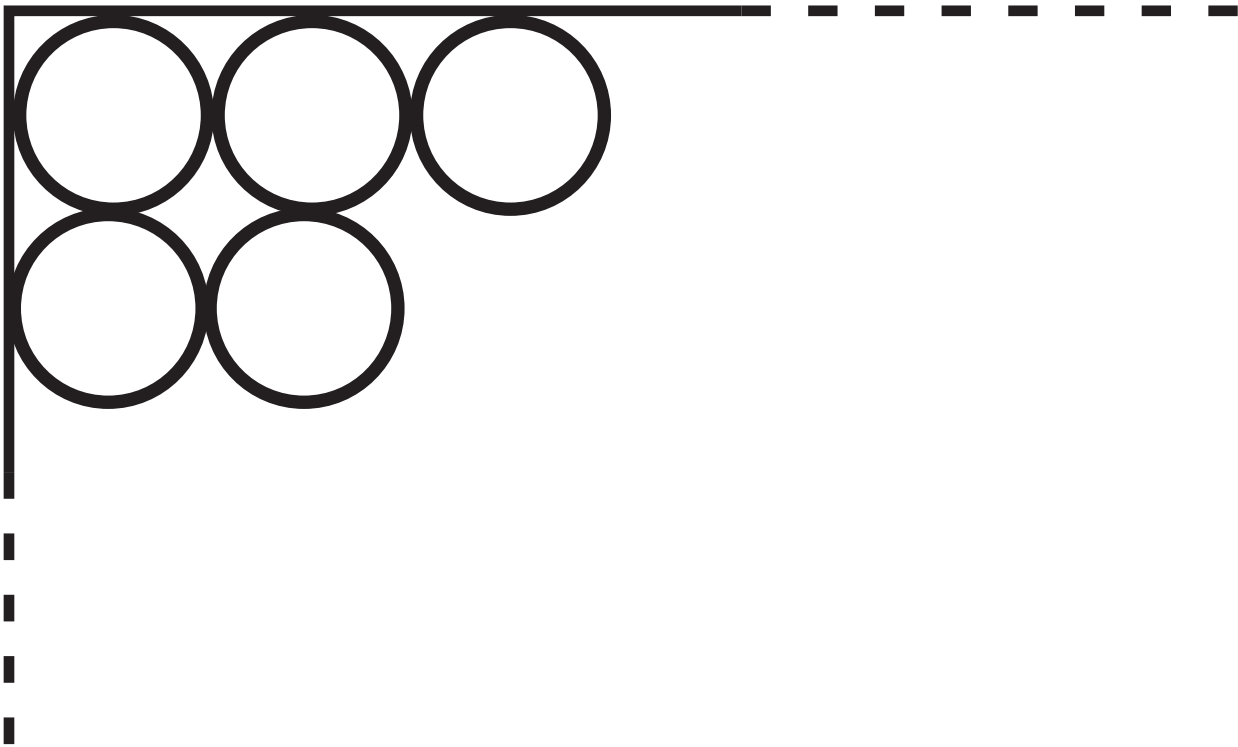
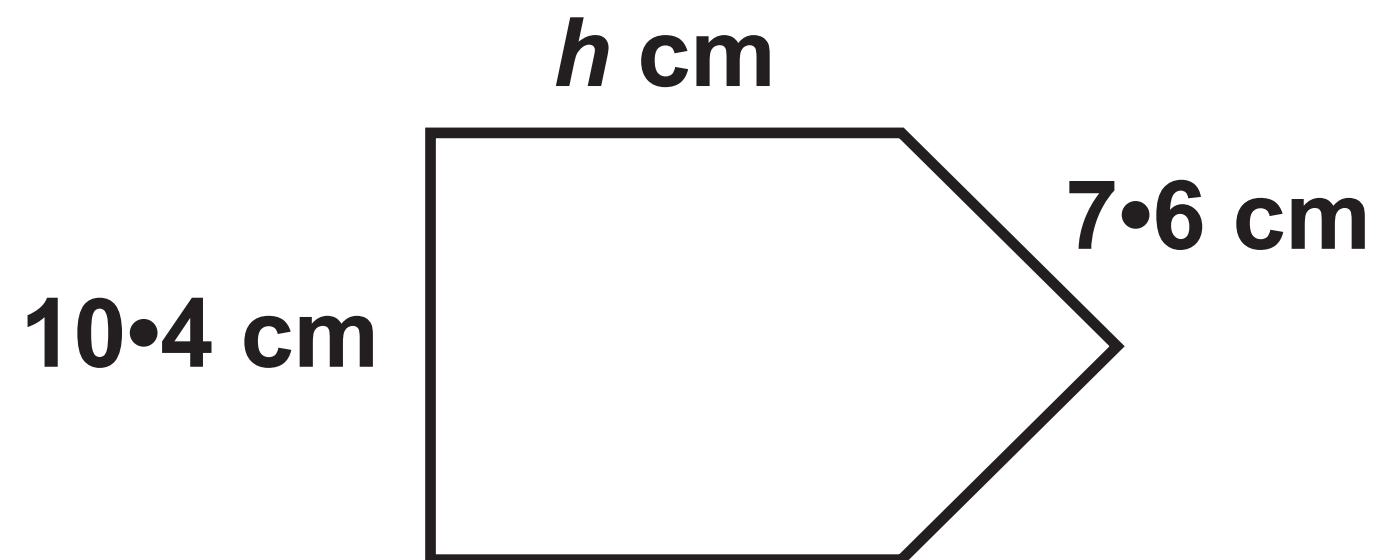
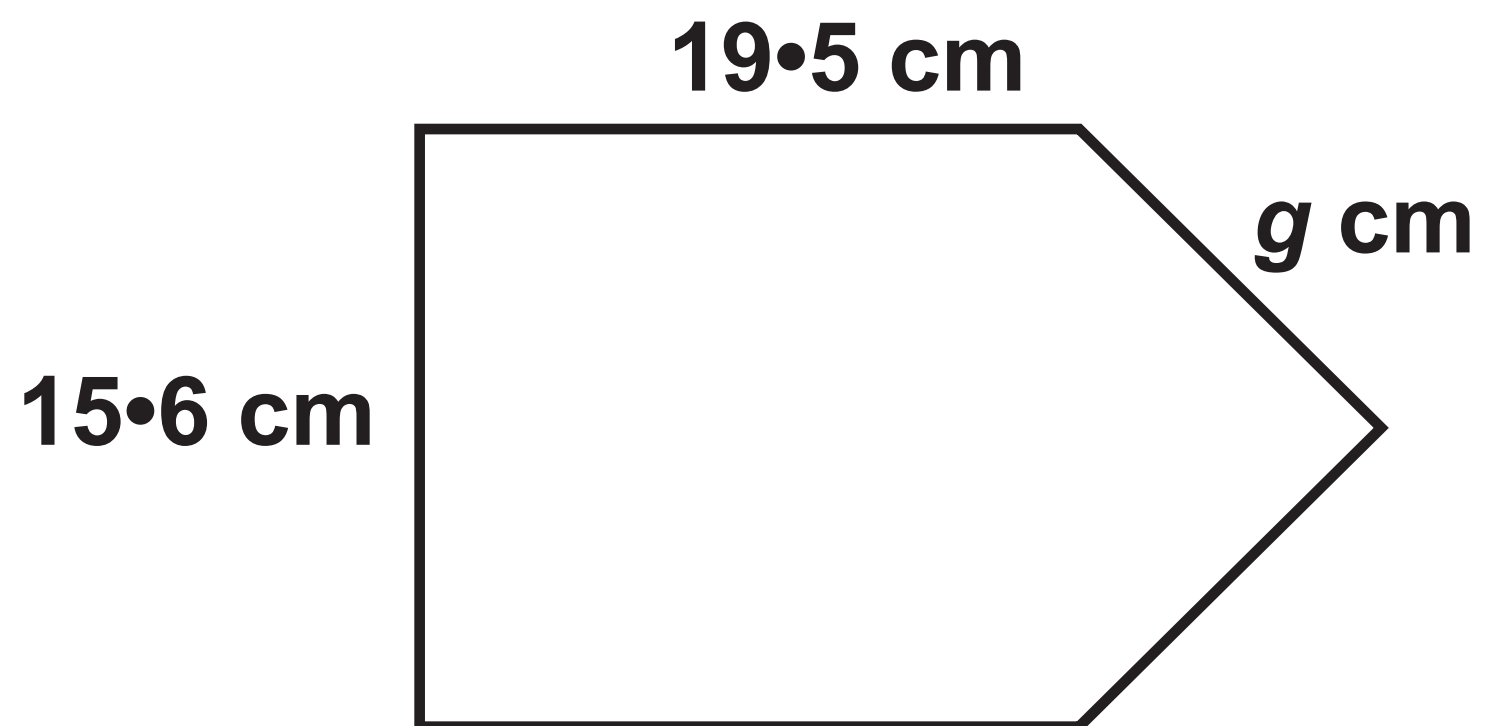


Diagram 3



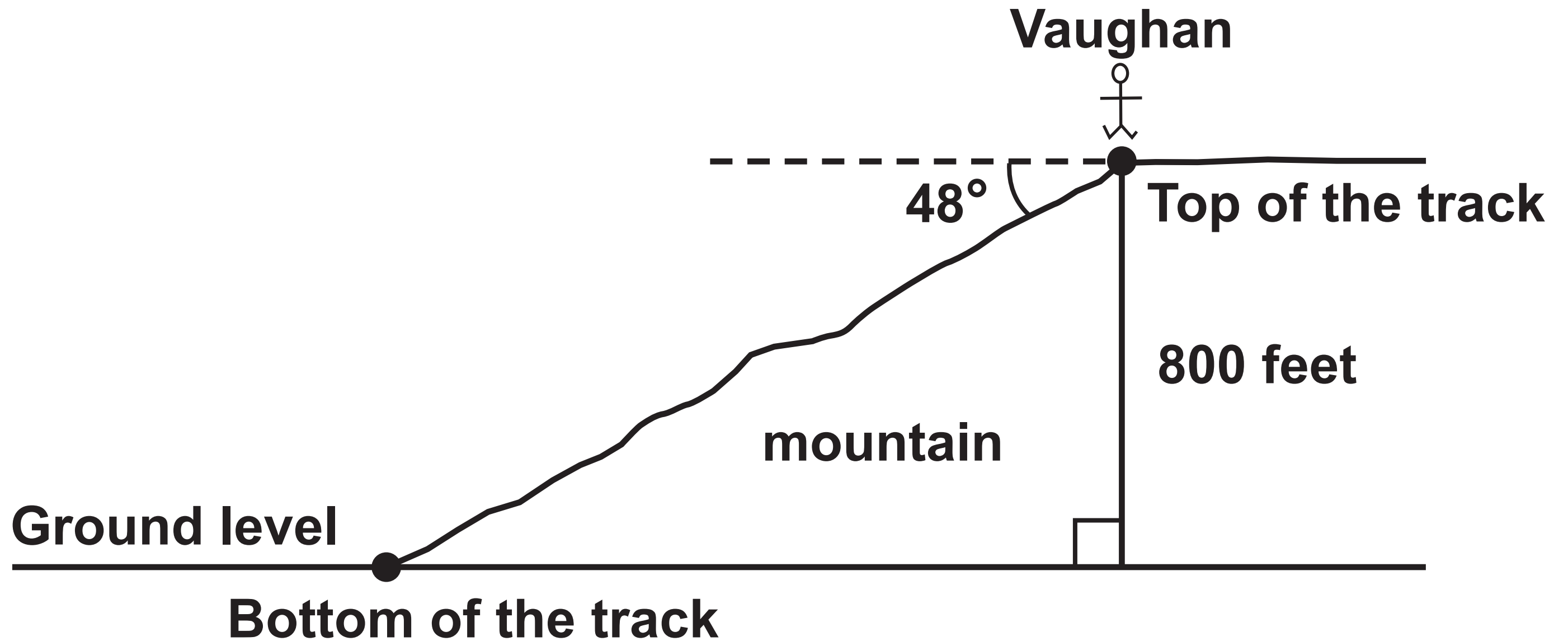
Question 24

Diagram NOT drawn to scale



Question 25

Diagram NOT drawn to scale



**FORMULA LIST
FOUNDATION TIER
AND HIGHER TIER
GCSE**

You must not write on these formulae pages.

Anything you write on these formulae pages will gain NO credit.

AREA AND VOLUME FORMULAE

Where r is the radius of the sphere or cone,
 l is the slant height of a cone and
 h is the perpendicular height of a cone:

Curved surface area of a cone = $\pi r l$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

KINEMATICS FORMULAE

Where a is constant acceleration,
 u is initial velocity, v is final velocity,
 s is displacement from the position
when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$