Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1247634260

MATHEMATICS **0580/32**

Paper 3 (Core) **February/March 2022**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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1 **(a)** One day, Mahika records the number of teachers and students who cycle to school.

	Tally	Frequency
Teachers	𝍸	
Students	𝍸 𝍸 𝍸 𝍸 |||	

(i) Complete the frequency column in the table. [1]

(ii) Work out the percentage of people who cycle that are students.

..... % [2]

(b) Mahika records how 120 students from Year 1 and Year 2 travel to school.
Each student walks, cycles or travels by bus.

- 48 students are in Year 1.
- 77 students walk.
- 5 students in Year 2 cycle.
- 36 students travel by bus.
- $\frac{4}{9}$ of the students who travel by bus are in Year 1.

(i) Complete the table.

	Walk	Cycle	Bus	Total
Year 1				
Year 2				
Total				120

[3]

(ii) One of the 120 students is chosen at random.

Work out the probability that this student does not travel by bus to school.

..... [2]

(c) There have been 24 complaints about one of the buses.

The complaints are:

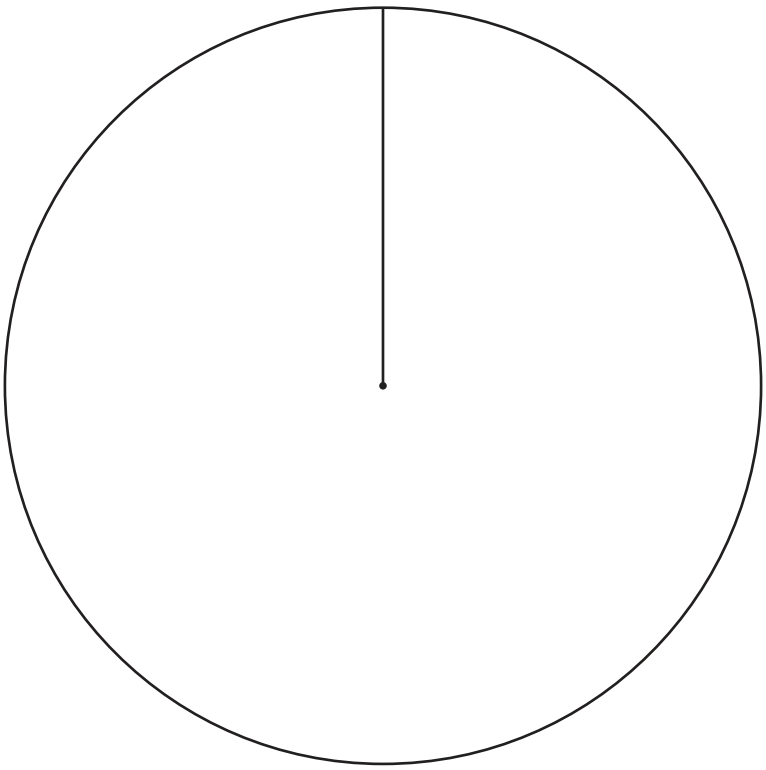
- The bus is late.
- The price is too high.
- The bus is crowded.

(i) Complete the table.

Complaint	Frequency	Pie chart sector angle
Late	10	
Price	6	
Crowded	8	

[2]

(ii) Complete the pie chart.

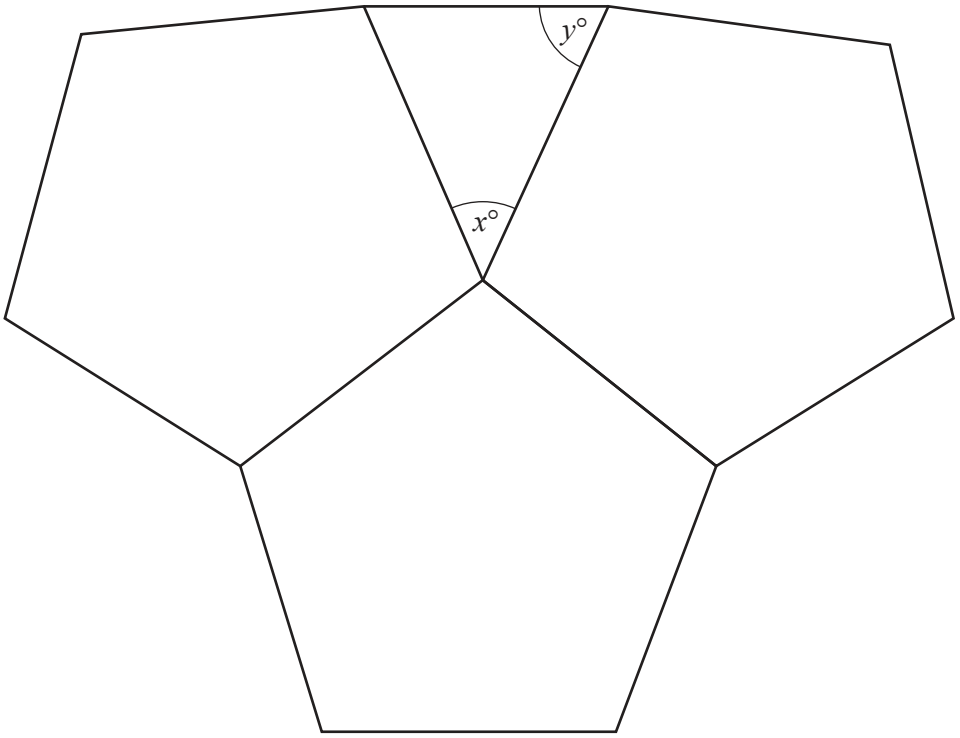


[2]

2 **(a)** Calculate the interior angle of a regular pentagon.

..... [2]

(b) The diagram shows three congruent regular pentagons and a triangle.



NOT TO SCALE

(i) Work out the value of x.
Give a geometrical reason for your answer.

x = ... because .....

..... [2]

(ii) Work out the value of y.
Give a geometrical reason for your answer.

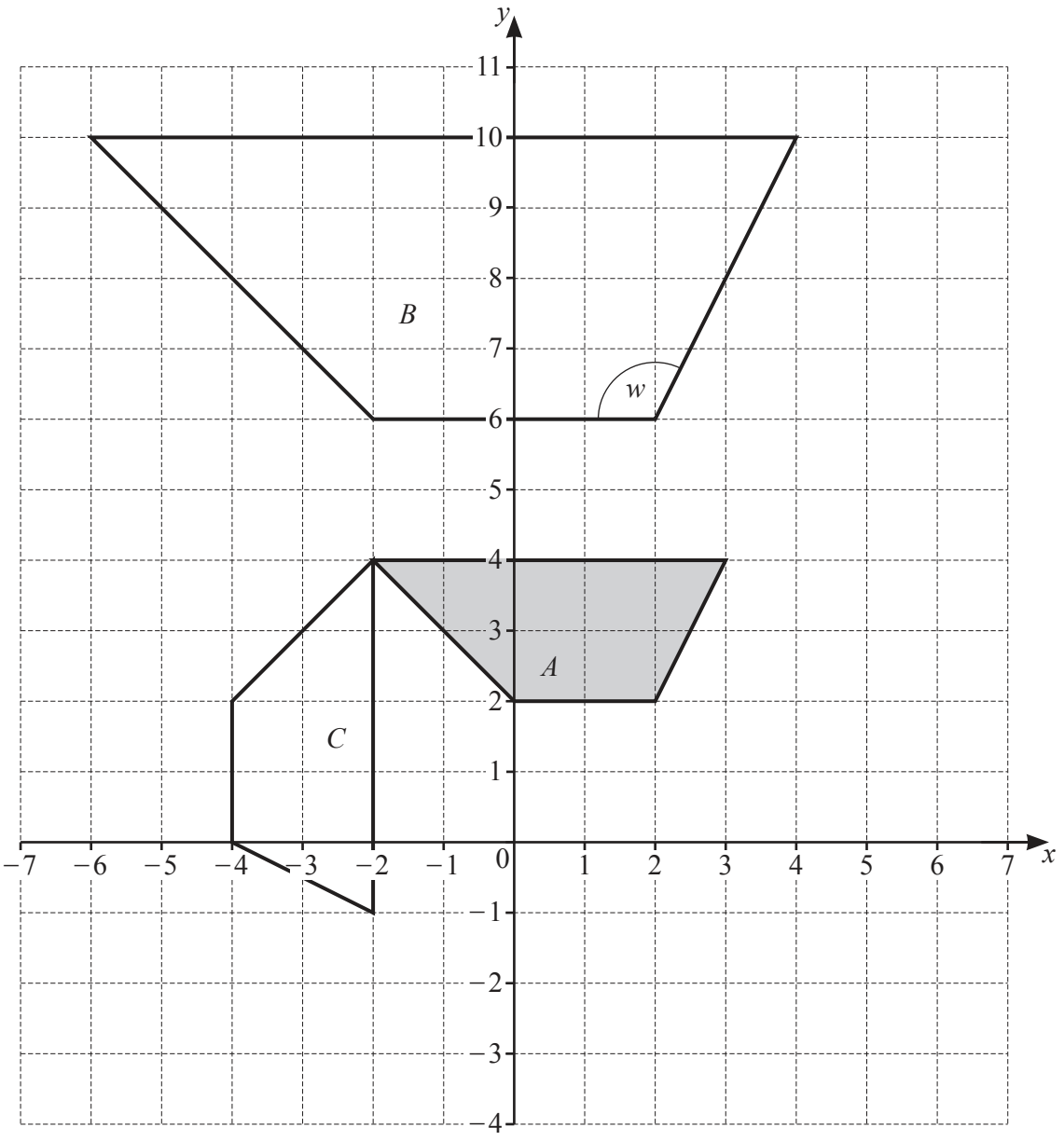
$y =$ ..... because .....

..... [3]

(iii) Find the ratio $x : y$.
Give your answer in its simplest form.

..... : ..... [1]

3 **(a)** The diagram shows three quadrilaterals, A, B and C, on a 1cm^2 grid.



(i) **(a)** Write down the mathematical name for quadrilateral B.

..... [1]

(b) Work out the area of quadrilateral B.
Give the units of your answer.

.... [3]

(ii) Measure angle w.

Angle w = ... [1]

(iii) Describe fully the **single** transformation that maps

(a) quadrilateral A onto quadrilateral B,

.....

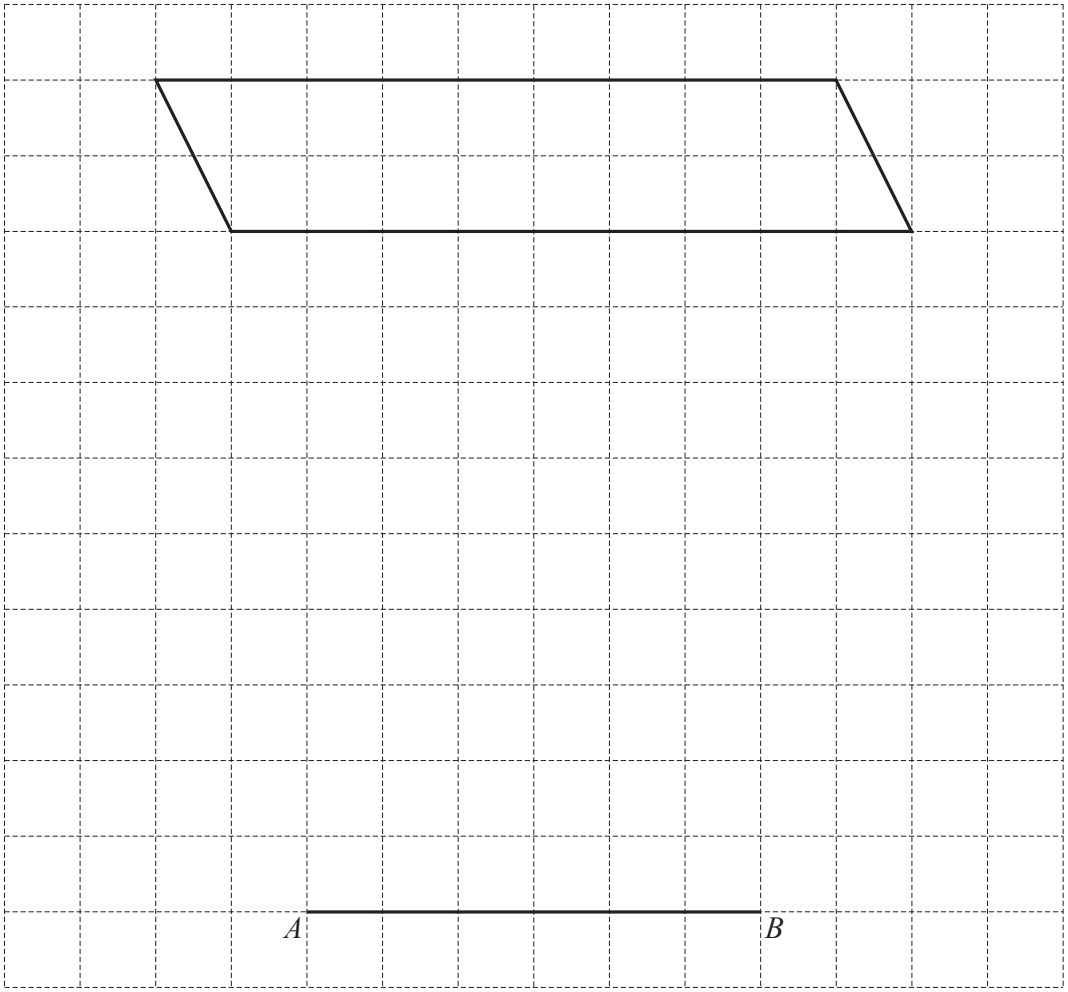
..... [3]

(b) quadrilateral A onto quadrilateral C.

.....

..... [3]

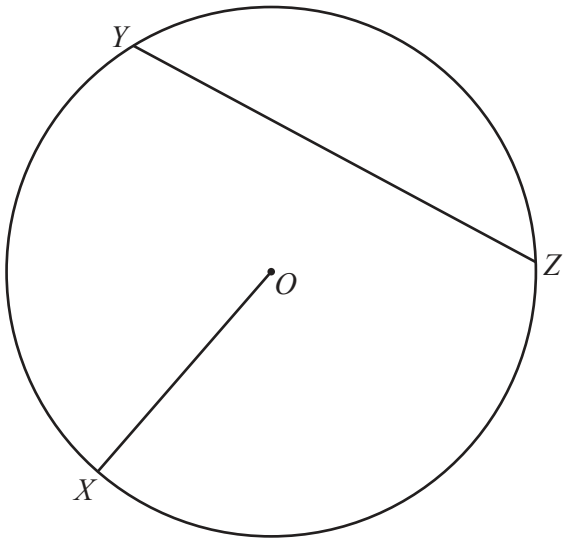
(b) The diagram shows a parallelogram and a line AB on a 1cm^2 grid.



On the grid, complete a triangle, ABC, that has the same area as the parallelogram.

[2]

4 **(a)**



X, *Y* and *Z* lie on a circle, centre *O*.

(i) Write down the mathematical name of the line

(a) *OX*,

..... [1]

(b) *YZ*.

..... [1]

(ii) Measure the length of *OX*.

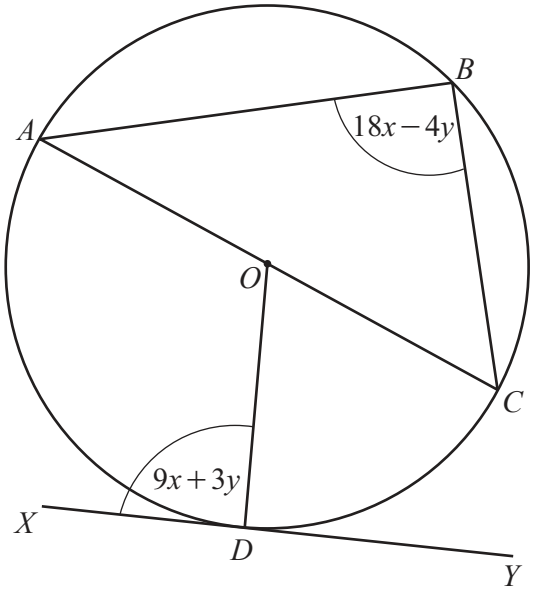
..... cm [1]

(b) Another circle has a radius of 18 cm.

Calculate the circumference of this circle.

..... cm [2]

(c) In this part, all angles are in degrees.



NOT TO SCALE

A, B, C and D lie on a circle, centre O, diameter AC.
XY is a tangent to the circle at D.

(i) Use the information in the diagram to complete these two simultaneous equations.

$9x + 3y =$ .....

$18x - 4y =$ .....

[2]

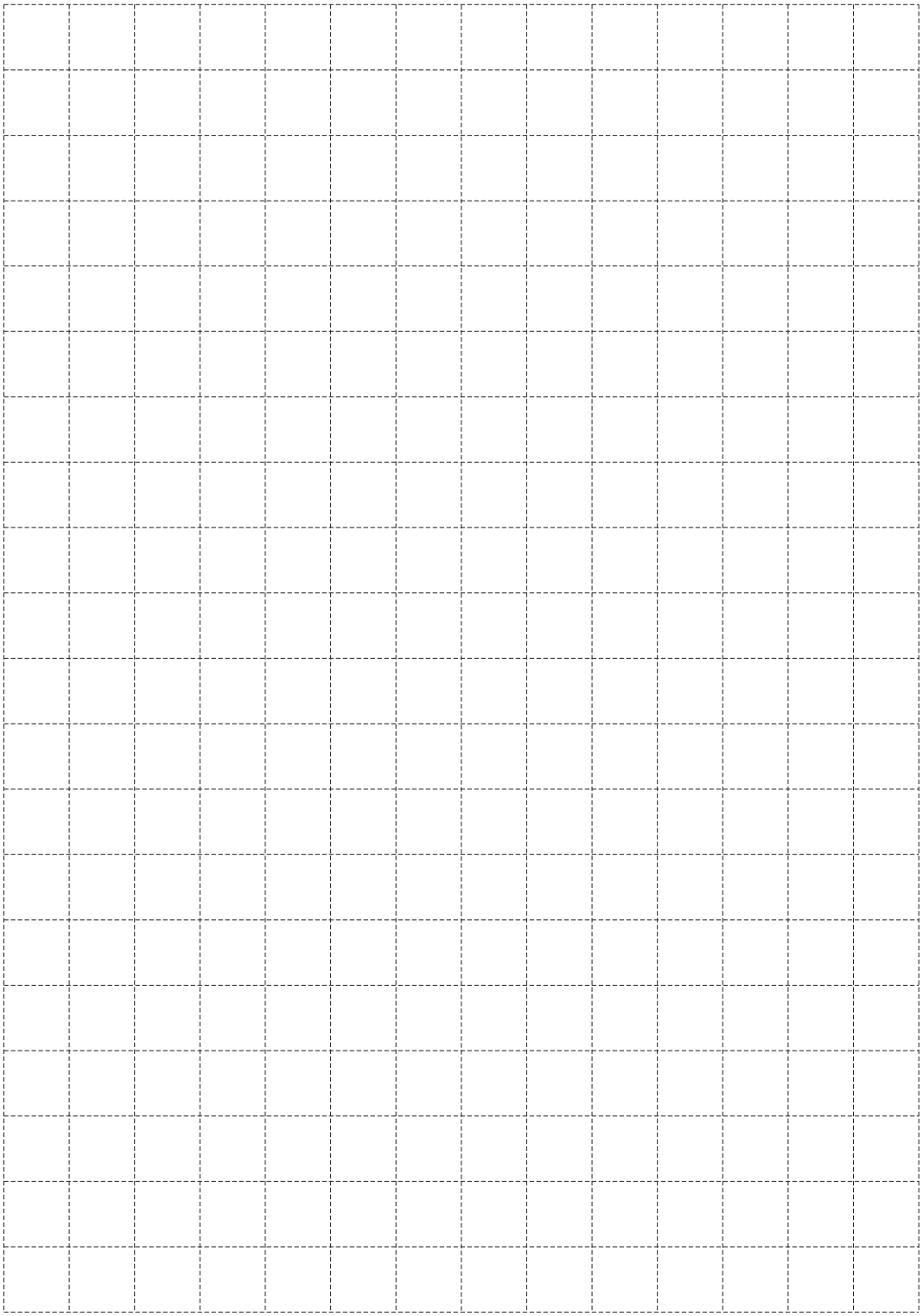
(ii) Solve your simultaneous equations.
You must show all your working.

$x =$ .....

$y =$ ..... [3]

5 **(a)** A closed box, in the shape of a cuboid, has length 5 cm, width 4 cm and height 2 cm.

(i) Draw a net of the box on the 1cm^2 grid.



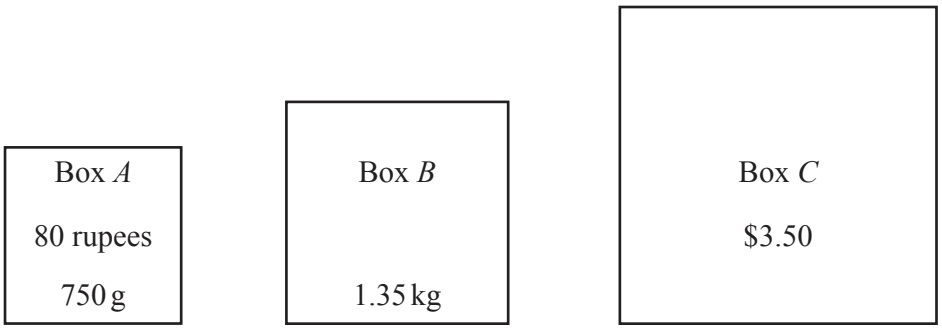
[3]

(ii) A container is a cube with volume $1\,m^3$.

Work out the maximum number of these boxes that can be packed into this container.

..... [3]

(b) A shop sells three different sized boxes of rice.
The boxes all have the same cost per kilogram.



(i) Work out the cost in rupees of box *B*.

..... rupees [2]

(ii) $1 = 64$ rupees.

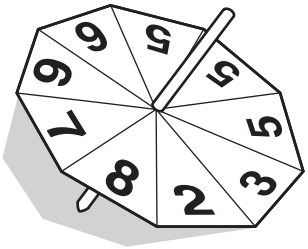
Calculate the mass of box *C*.
Give your answer in kilograms.

..... kg [3]

(c) Change $75\,cm^3$ into litres.
Give your answer in standard form.

..... litres [2]

6 (a)



The diagram shows a fair 9-sided spinner.
The numbers on the spinner are 2, 3, 5, 5, 5, 6, 6, 7 and 8.

(i) The spinner is spun once.

Write down the probability that the spinner lands on

(a) the number 8,

..... [1]

(b) a number less than 7.

..... [1]

(ii) The spinner is spun 135 times.

Work out the expected number of times the spinner lands on the number 6.

..... [1]

(b) Hitesh throws a dice 80 times.
The results are shown in the table.

Number thrown	Frequency
1	15
2	16
3	14
4	11
5	9
6	15

(i) Write down the mode.

..... [1]

(ii) Work out the range.

..... [1]

(iii) Work out the median.

..... [1]

(iv) Calculate the mean.

..... [3]

7 **(a)** 1 mile = 1.609344 kilometres

Change 6 miles into **metres**.
Give your answer correct to the nearest metre.

..... m [3]

(b) **(i)** The bearing of a boat from a harbour is 322°.

Work out the bearing of the harbour from the boat.

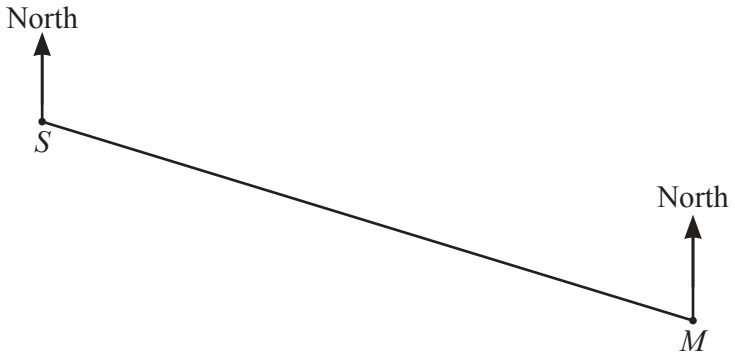
..... [2]

(ii) The boat is 12 km from the harbour.
At 2.30 pm the boat starts to sail to the harbour.
The speed of the boat is 5 km/h.

Work out the time the boat arrives at the harbour.

..... [3]

(c) The scale drawing shows the positions of Shakti's house, *S*, and Mairi's house, *M*, on a map.
The scale is 1 cm represents 4 km.



Scale: 1 cm to 4 km

(i) Measure the bearing of *M* from *S*.

..... [1]

(ii)

Scale: 1 cm to 5 km

This scale drawing shows another map with Shakti's house, *S*, marked on it.
The scale of this map is 1 cm represents 5 km.

Mark the position of Mairi's house, *M*, on this map.

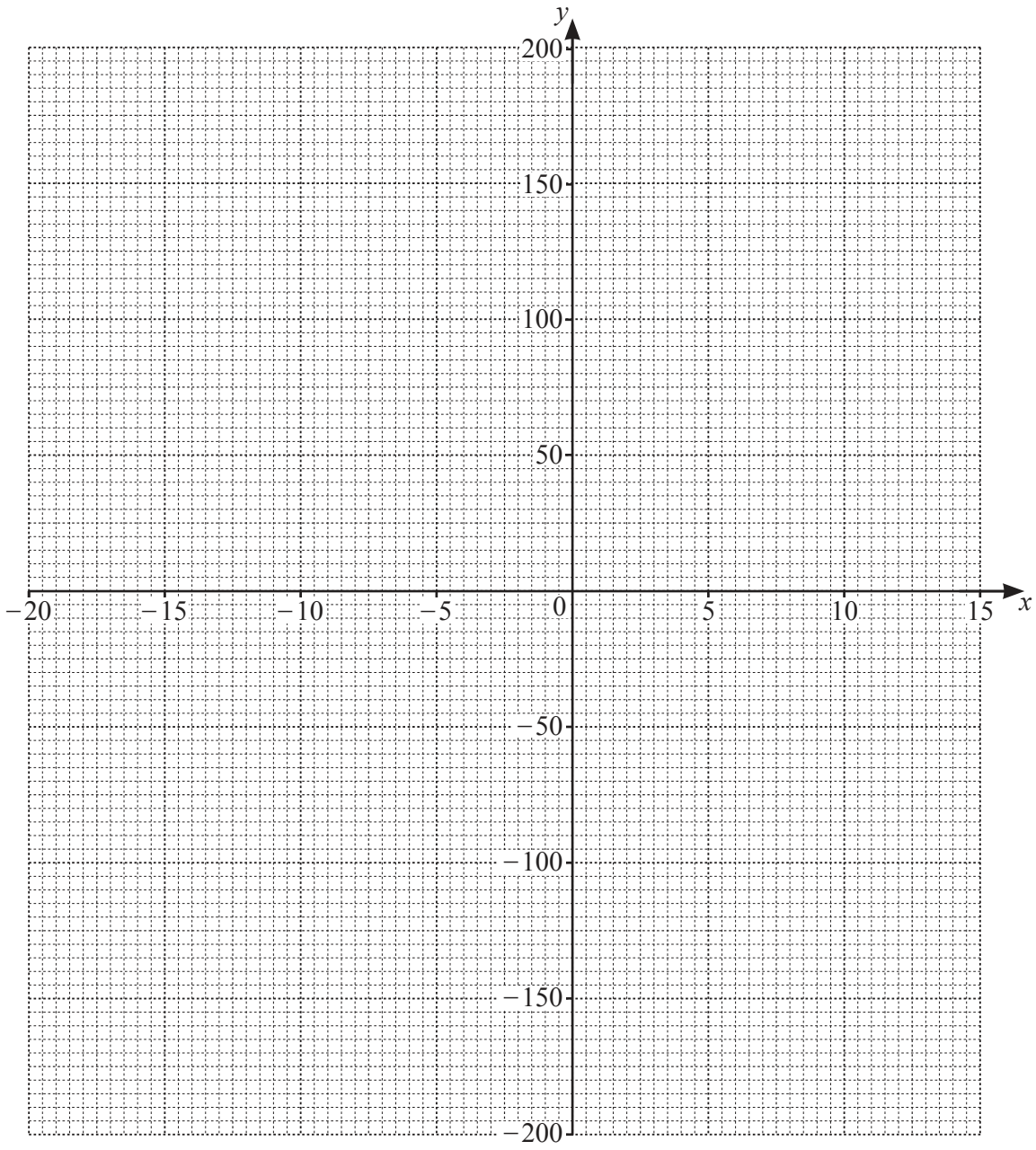
[4]

8 **(a)** **(i)** Complete the table of values for $y = x^2 + 6x - 160$.

x	-20	-15	-10	-5	0	5	10	15
y	120		-120	-165	-160	-105		

[3]

(ii) On the grid, draw the graph of $y = x^2 + 6x - 160$ for $-20 \leqslant x \leqslant 15$.



[4]

(iii) **(a)** Write down the equation of the line of symmetry of the graph.

..... [1]

(b) Find the coordinates of the lowest point on the graph.

(..... , ...) [1]

(iv) Use your graph to solve the equation $x^2 + 6x - 160 = 0$.

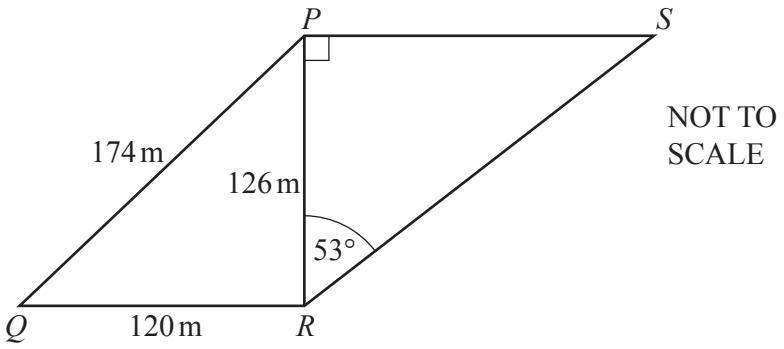
$x =$ ..... or $x =$ ..... [2]

(b) Rearrange the formula $y = mx + c$ to make x the subject.

$x =$ ..... [2]

9 Tarak has two fields.
He grows wheat, barley and corn in his fields.

(a)



The diagram shows Tarak's two triangular fields, PQR and PRS.
Angle $RPS = 90°$ and angle $PRS = 53°$.
$PQ = 174$ m, $QR = 120$ m and $PR = 126$ m.

(i) Show that angle $PRQ = 90°$.

[2]

(ii) Calculate the area of the quadrilateral $PQRS$.
Give your answer correct to 4 significant figures.

..... m^2 [5]

(b) (i) The mass, m tonnes, of wheat grown in 2021 is 4.3 tonnes, correct to 1 decimal place.

Complete this statement about the value of m.

..... $\leqslant m <$ ..... [2]

(ii) In 2020, 2.6 tonnes of barley is grown.
In 2021, 3.25 tonnes of barley is grown.

Show that the percentage increase in barley grown from 2020 to 2021 is 25%.

[1]

(iii) In 2019, 2.4 tonnes of corn is grown.
In 2020, 20% more corn is grown than in 2019.
In 2021, 20% less corn is grown than in 2020.

Calculate the amount of corn grown in 2021.

..... tonnes [3]

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