GradeMax

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

4146568411

MATHEMATICS **0580/33**

Paper 3 (Core) **October/November 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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[Turn over

1 **(a)** List all the factors of 68.

..... [2]

(b) Put **one** pair of brackets into each calculation to make it correct.

(i) $7 + 3 \times 5 - 1 = 19$

[1]

(ii) $12 + 16 \div 2 + 5 = 19$

[1]

(c) Find

(i) the reciprocal of $\frac{2}{7}$,

..... [1]

(ii) the value of 10^0.

..... [1]

(d) Calculate.

(i) $3^2 + 3^4$

..... [1]

(ii) $\sqrt{3} \times \sqrt{12}$

..... [1]

(iii) 5^{-3}

..... [1]

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(e) Write these numbers in order of size, starting with the smallest.

$\sqrt{10}$ 3.142 1.8^2 π $\frac{22}{7}$

..... < ..... < ..... < ..... < ..... [2]

smallest

(f) By writing each number in the calculation correct to 1 significant figure, work out an estimate for the value of

$$\frac{136+47.2}{62.9\div 18.1}.$$

You must show all your working.

..... [2]

(g) Write 4.73×10^6 as an ordinary number.

..... [1]

(h) Write down a prime number between 30 and 40.

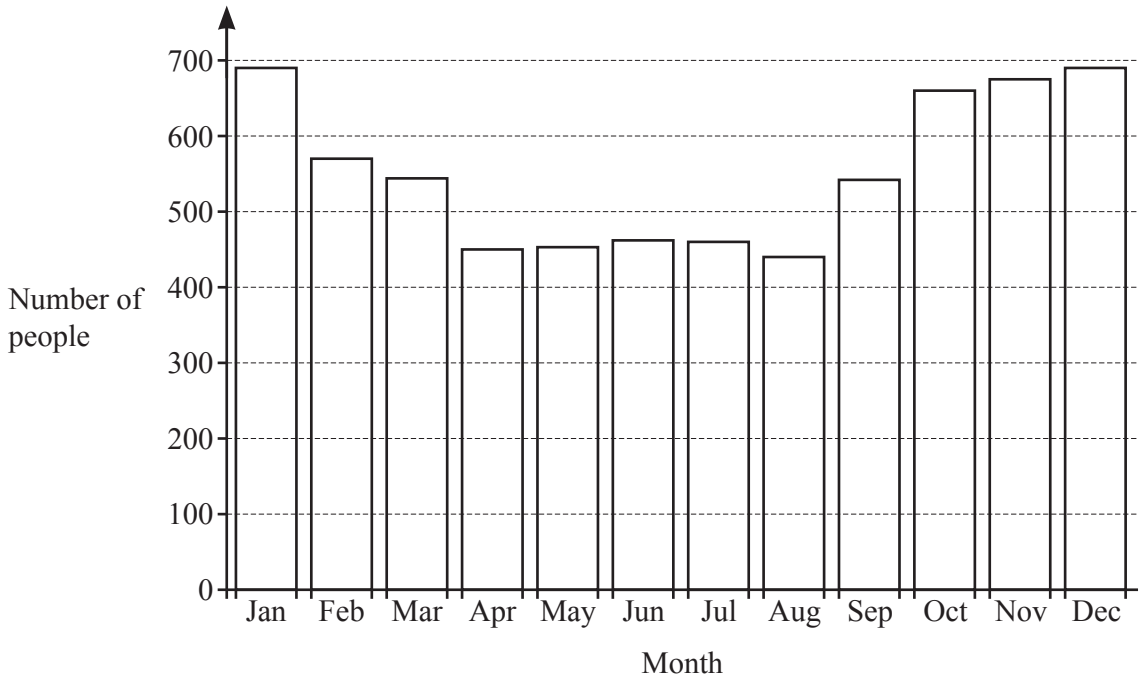
..... [1]

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[Turn over

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2 **(a)** The bar chart shows the number of people who visit a beach in each month in one year.



(i) Estimate the number of people who visit the beach in November.

..... [1]

(ii) The table shows the average daytime temperature, in °C, in each month at the beach in the same year.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	32.5	32	29.7	25.5	24.6	20.8	19.5	19.2	23.4	24.8	32.1	32.5

Mario says that more people visit the beach when the temperature is warmer.

Is he correct?
Explain your answer by comparing the bar chart and the table.

..... because .....

..... [1]

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(b) The scale drawing shows the positions of two lifeguards, L and M, on a beach.
The scale is 1 centimetre represents 50 metres.





Scale: 1 cm to 50 m

(i) Find the actual distance between L and M.

..... m [2]

(ii) Measure the bearing of M from L.

..... [1]

(iii) A boat, B, is 300 metres from M on a bearing of 068°.

On the scale drawing, mark the position of B.

[2]

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3 **(a)** The population of Alaska is 735 720.

(i) Write this number in words.

.....

..... [1]

(ii) The land area of Alaska is 1 477 300 square kilometres.

Work out the average number of people per square kilometre.

..... [1]

(iii) In Alaska, the city with the highest population is Anchorage with 291 830 people.

What percentage of the population of Alaska live in Anchorage?

..... % [1]

(b) The length, L km, of a race is 1569 km, correct to the nearest kilometre.

Complete this statement about the value of L.

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

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(c) The table gives some information about two mountains.
The temperatures are taken at the top of each mountain on the same day.

		Height in metres	Maximum temperature	Minimum temperature
Denali	Highest mountain in Alaska	6190	−9 °C	−20 °C
Everest	Highest mountain in the world	8849	..... °C	−38 °C

(i) Find the difference between the height of Denali and the height of Everest.

..... m [1]

(ii) Find the difference between the maximum temperature and the minimum temperature at the top of Denali.

..... °C [1]

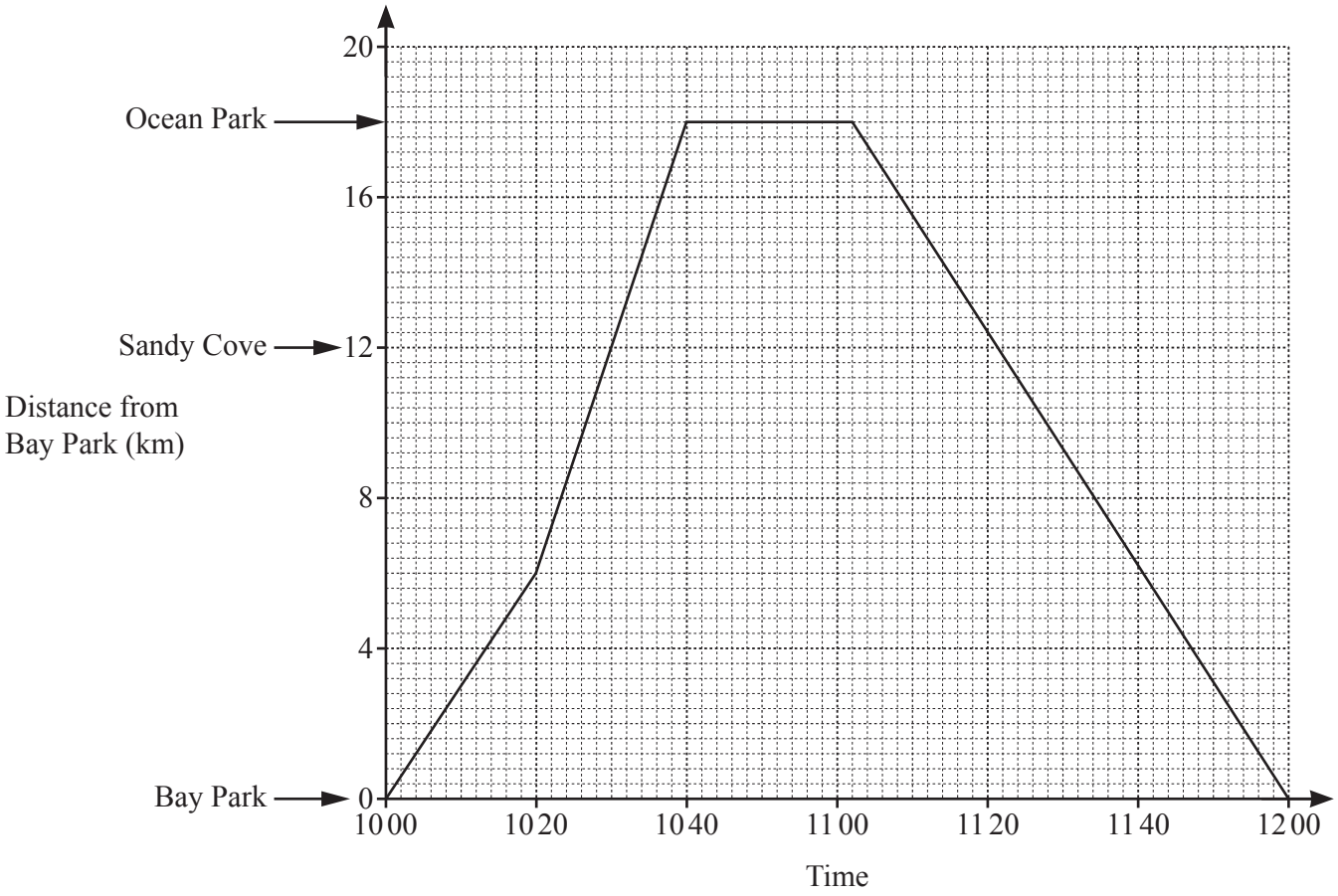
(iii) The maximum temperature at the top of Everest was 27 °C colder than the maximum temperature at the top of Denali.

Complete the table. [1]

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4 A path from Bay Park to Ocean Park passes through Sandy Cove.

(a) Tia cycles along the path.
The diagram shows the travel graph of Tia's journey.



(i) Between which two times is Tia cycling the fastest?

..... and ..... [1]

(ii) Andy leaves Bay Park at 1020 and runs to Sandy Cove at a constant speed of 8 km/h.
He then stops to rest until 1200.

On the travel graph, draw Andy's journey.

[2]

(iii) Write down the time and the distance from Bay Park when Tia and Andy pass each other.

Time .....

Distance ..... km [2]

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(b) In June, the number of cyclists using the path is 3546.
In July, the number of cyclists using the path is 4067.

Work out the percentage increase in the number of cyclists from June to July.

..... % [2]

(c) In one week, 432 walkers and 528 runners use the path.

(i) Write the ratio walkers : runners in its simplest form.

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

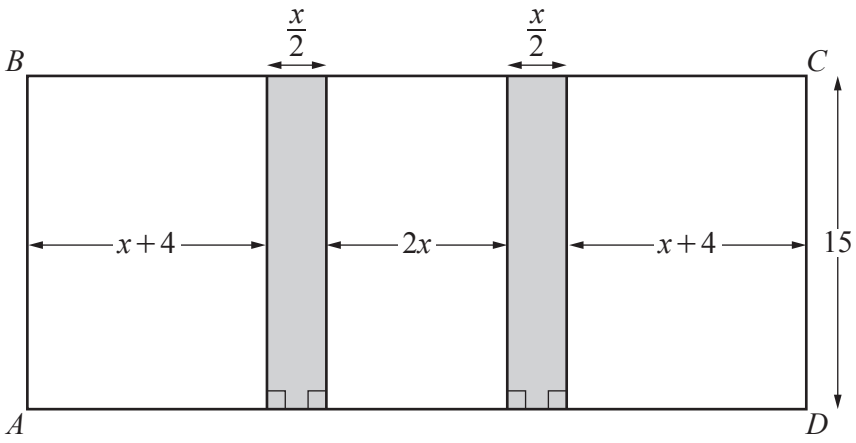
(ii) In the same week, the ratio of cyclists and walkers using the path is

cyclists : walkers = 14 : 3.

Find the total of the number of cyclists, walkers and runners using the path in this week.

..... [3]

5 **(a)** In this part, all measurements are in centimetres.



NOT TO SCALE

The diagram shows a rectangle, $ABCD$.

(i) Show that the length AD is $5x+8$.

[1]

(ii) The area of $ABCD$ is $360\,\text{cm}^2$.

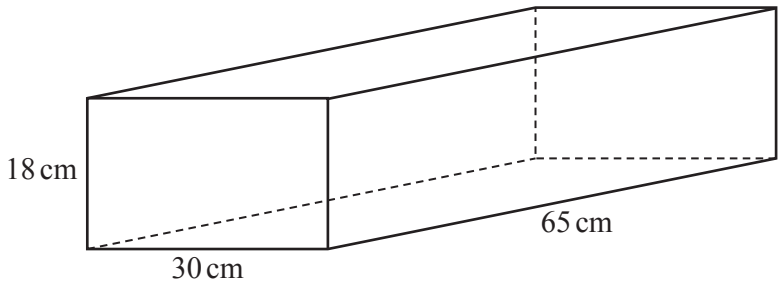
Work out the value of x.

$x =$ ..... [4]

(iii) Find the total shaded area.

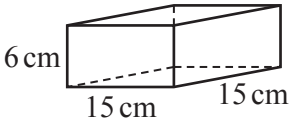
..... cm^2 [1]

(b)



Rectangular box

NOT TO SCALE



Cuboid

The diagram shows an open rectangular box and a solid cuboid.

(i) Show that a maximum of 24 of these cuboids will fit inside the box.

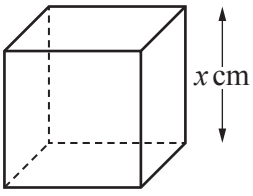
[1]

(ii) 24 of these cuboids are placed inside the box.

Calculate the volume of empty space in the box.
Give the units of your answer.

.... [4]

(c)



NOT TO SCALE

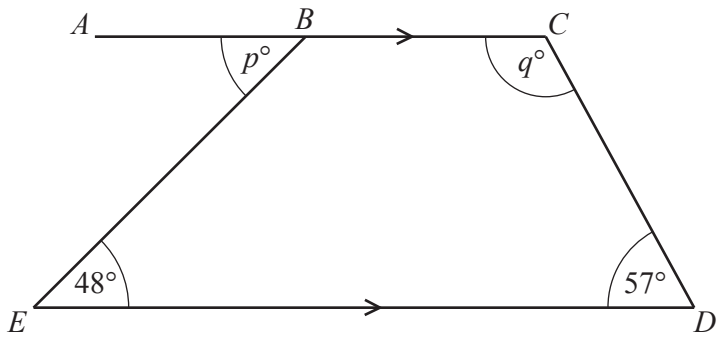
The diagram shows a solid cube with side x cm.
The total surface area of the cube is 486 cm^2.

Calculate the value of x.

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

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6 (a)



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In the diagram, ABC is parallel to ED.

(i) Find the value of p.
Give a geometrical reason for your answer.

p = ... because .....

..... [2]

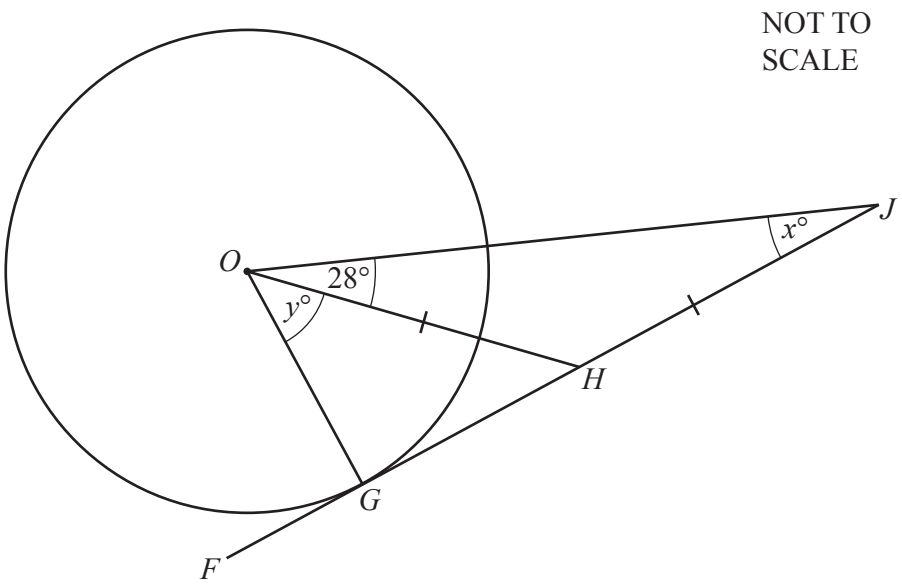
(ii) Find the value of q.
Give a geometrical reason for your answer.

q = ... because .....

..... [2]

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(b)



G is a point on the circle, centre *O*.
FHJ is a tangent to the circle at *G* and *OH* = *HJ*.

(i) Write down the mathematical name for triangle *OHJ*.

..... [1]

(ii) Find the value of *x*.

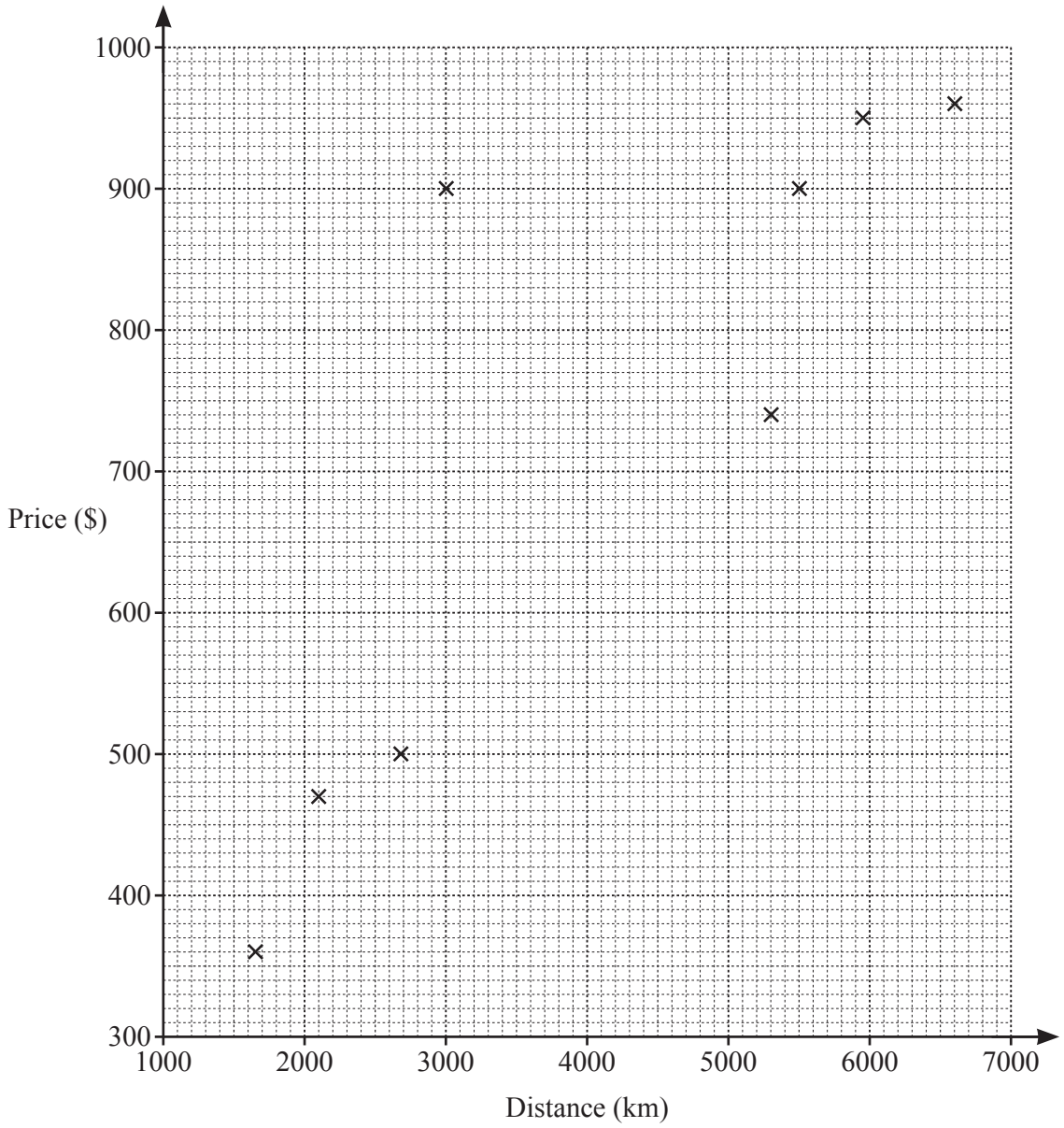
x = ... [1]

(iii) Find the value of *y*.

y = ... [3]

7 **(a)** The table shows the distance, in km, a plane travels and the ticket price, in dollars, for each of 10 flights.

Distance (km)	1650	2675	3000	5300	6600	2100	5500	5950	3850	2900
Price ($)	360	500	900	740	960	470	900	950	715	530



(i) Complete the scatter diagram.
The first eight points have been plotted for you. [1]

(ii) What type of correlation is shown on the scatter diagram?

..... [1]

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(iii) On one flight, the ticket price is much more expensive per kilometre travelled than on all of the other flights.

Draw a ring around this point on the scatter diagram. [1]

(iv) Draw a line of best fit on the scatter diagram. [1]

(v) Another plane travels 4500 km.

Use your line of best fit to estimate the ticket price for this flight.

$ ..... [1]

(b) The ticket price for a flight is $522.
The exchange rate is 1 euro = $1.16 .

Find the ticket price in euros.

..... euros [1]

(c) A plane travels 939 km from London to Copenhagen.

(i) This flight takes 1 hour 24 minutes.

Work out the average speed in kilometres per hour.

..... km/h [2]

(ii) For this flight, the amount of fuel used is 3.89 kg per kilometre travelled.
Carbon emissions are 3.15 kg for each kilogram of fuel used.

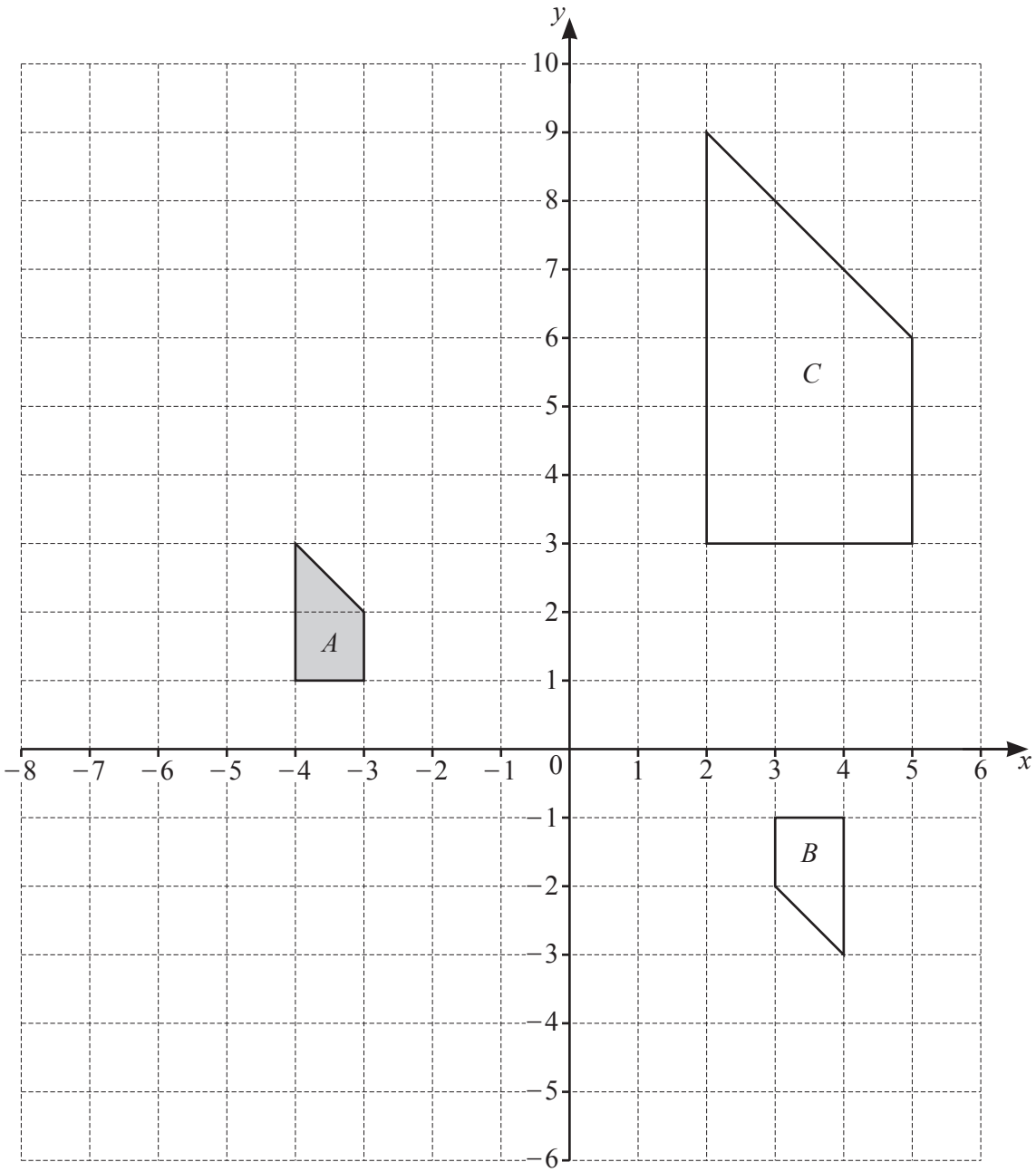
Work out the carbon emissions, in kilograms, for this flight.

..... kg [2]

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8 (a)



(i) Draw the image of shape A after a reflection in the line $y = -1$. [2]

(ii) Describe fully the **single** transformation that maps shape A onto shape B.

.....

..... [3]

(iii) Describe fully the **single** transformation that maps shape A onto shape C.

.....

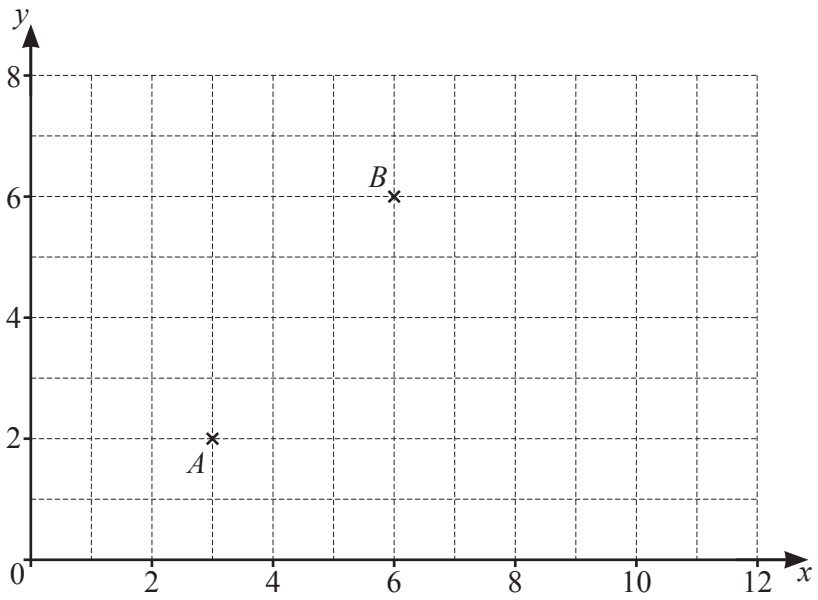
..... [3]

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(iv) Complete this statement.

The area of shape C is ..... times bigger than the area of shape A. [2]

(b)



(i) Write $\overrightarrow{AB}$ as a column vector.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) $\overrightarrow{BC} = \begin{pmatrix} 4 \\ -5 \end{pmatrix}$

On the grid, plot point C. [1]

(c) $\mathbf{p} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$ $\mathbf{t} = \begin{pmatrix} 4 \\ 7 \end{pmatrix}$

Work out

(i) $3\mathbf{p}$,

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) $\mathbf{t} - \mathbf{p}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

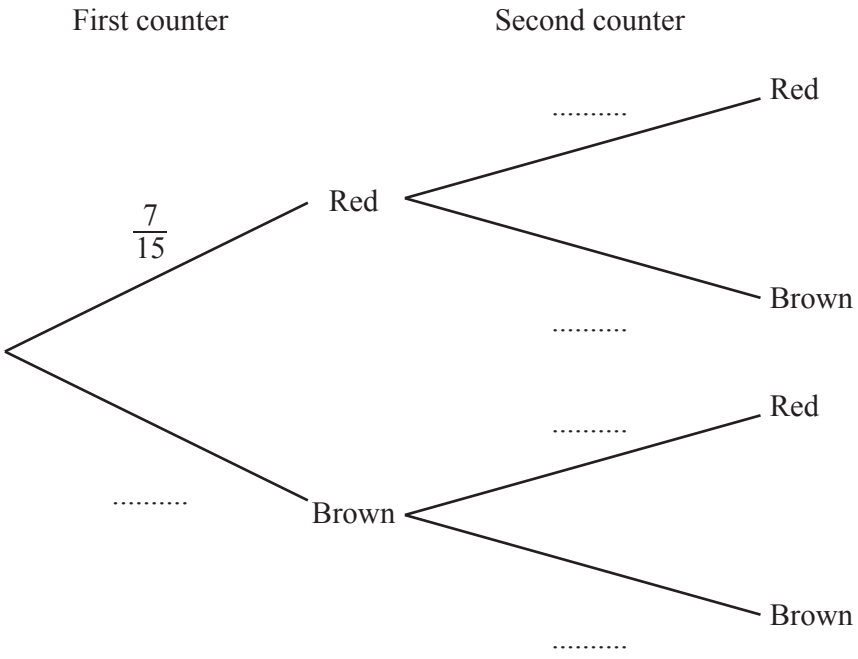
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9 **(a)** Alvian has a bag containing 35 counters.
6 are pink, 8 are blue and the rest are either green or yellow.
He picks one counter at random.
The probability that Alvian picks a green counter is $\frac{2}{7}$.

Find the number of yellow counters in the bag.

..... [3]

(b) Mateo has a box containing 15 counters, of which 7 are red and 8 are brown.
He picks one counter at random, notes the colour and replaces it in the box.
He then picks another counter at random.



(i) Complete the tree diagram. [2]

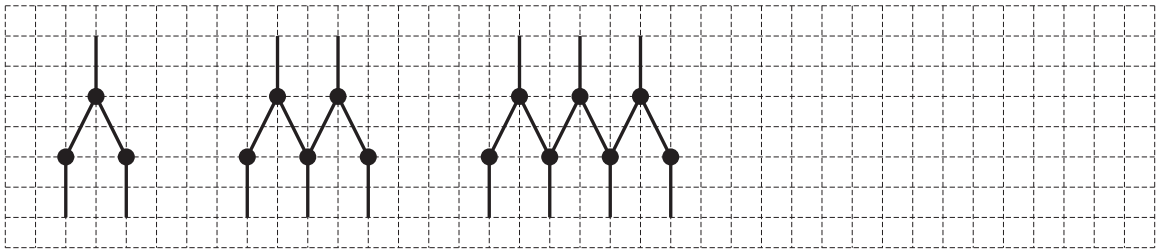
(ii) Calculate the probability that Mateo picks two brown counters.

..... [2]

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10 Meena makes these patterns using dots and lines.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

(a) Draw Pattern 4. [1]

(b) Complete the table.

Pattern	1	2	3	4
Number of dots	3	5	7	
Number of lines	5	9	13	

[2]

(c) **(i)** Write down the term to term rule for continuing the sequence for the number of dots.

..... [1]

(ii) Find an expression, in terms of n, for the number of dots in Pattern n.

..... [2]

(d) The number of lines in Pattern n is $4n + 1$.
Meena makes the pattern which has 129 lines.

Work out the number of dots she uses to make this pattern.

..... [4]

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