

Write your name here

Surname

Other names

**Pearson Edexcel
International GCSE**

Centre Number

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Candidate Number

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Mathematics B

Paper 2R



Thursday 8 June 2017 – Morning
Time: 2 hours 30 minutes

Paper Reference
4MB0/02R

You must have: Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

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Question 1 continued

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Area with horizontal dotted lines for writing.

(Total for Question 1 is 7 marks)



- 2 Rectangle A has length $(2x + 3)$ cm and width $(x + 1)$ cm.
Rectangle B has length $(3x - 5)$ cm and width $(x + 2)$ cm.
The area of rectangle A is equal to the area of rectangle B .

Calculate the value of x

Give your answer to 3 significant figures.

Show your working clearly.

$$\left[\text{Solutions of } ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$$



Question 2 continued

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(Total for Question 2 is 6 marks)



Diagram NOT accurately drawn

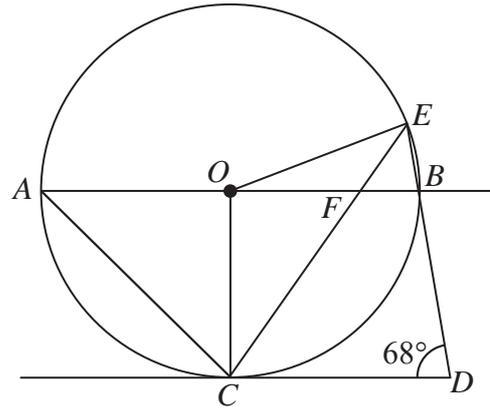


Figure 1

Figure 1 shows a circle with centre O . The points A , C , B and E lie on the circle. AOB is a diameter of the circle and DC is the tangent to the circle at C . CFE and DBE are straight lines. AB is parallel to CD and $\angle CDE = 68^\circ$

- (a) Write down the size of $\angle OCD$ (1)

- (b) Find the size of $\angle OAC$ (1)

- (c) Giving reasons, find the size in degrees of
 - (i) $\angle FBE$ (2)
 - (ii) $\angle CEB$ (2)
 - (iii) $\angle EFB$ (2)

- (d) Find the size, in degrees, of the obtuse angle AOE . (1)

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Question 3 continued

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(Total for Question 3 is 9 marks)



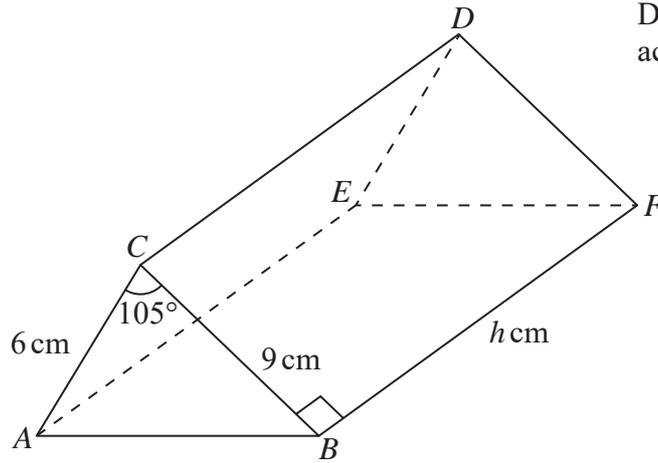


Diagram NOT accurately drawn

Figure 2

Figure 2 shows a solid triangular prism $ABCDEF$.
 $AC = 6 \text{ cm}$, $BC = 9 \text{ cm}$ and angle $ACB = 105^\circ$

(a) Calculate the length, in cm to 3 significant figures, of AB . (3)

(b) Calculate the area, in cm^2 to 3 significant figures, of triangle ABC . (2)

$BF = h \text{ cm}$ and angle $CBF = 90^\circ$
 The volume of the prism is 352 cm^3

(c) Calculate the value, to 3 significant figures, of h . (2)

(d) Calculate the total surface area, in cm^2 to 3 significant figures, of the prism. (2)

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$$\left[\begin{array}{l} \text{Area of triangle} = \frac{1}{2} ab \sin C \\ \text{Cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A \end{array} \right]$$

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Question 4 continued

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Handwriting practice area consisting of 25 horizontal dotted lines.



Question 4 continued

Handwriting practice area consisting of 25 horizontal dotted lines for writing.

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Question 4 continued

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Area with horizontal dotted lines for writing.

(Total for Question 4 is 9 marks)



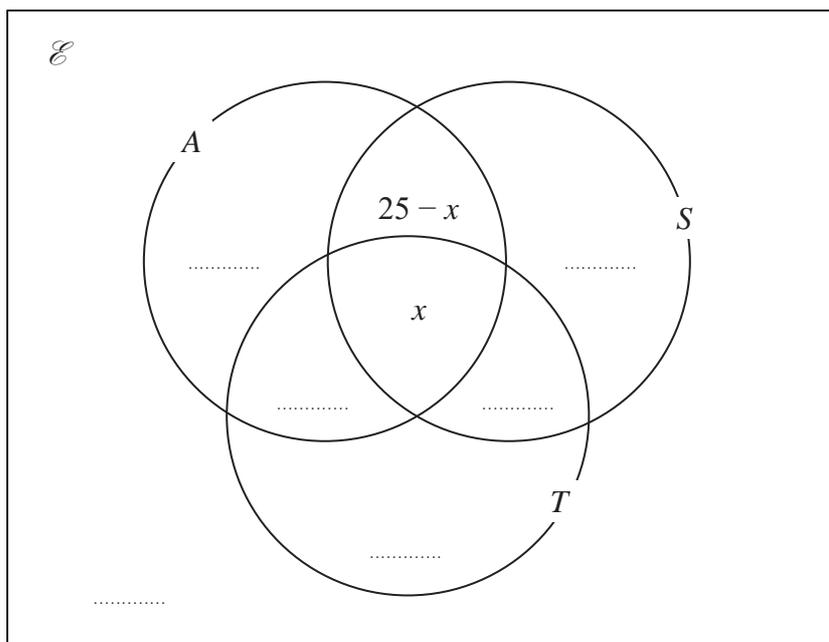
- 5 A travel agent asked each person in a random sample of 100 people if they have visited any of Australia (A), Sri Lanka (S) and Thailand (T).

Here is some information about their answers.

$$n(\mathcal{E}) = 100, n(A) = 55, n(S) = 48, n(T) = 43, n(A \cap S) = 25, n(S \cap T) = 21,$$

$$n(A \cap T) = 23, n([A \cup S \cup T]') = 7, n(A \cap S \cap T) = x$$

This information is to be shown in a Venn diagram. The Venn diagram has been started below.



- (a) Complete the Venn diagram to show the number of elements in each appropriate subset. (3)
- (b) Calculate the value of x (2)
- (c) Find $n([A \cup S] \cap T)$ (2)

One person is selected at random from the 100 people in the sample.
Given that this person has visited Australia,

- (d) find the probability that this person has also visited Sri Lanka. (1)

Question 5 continued

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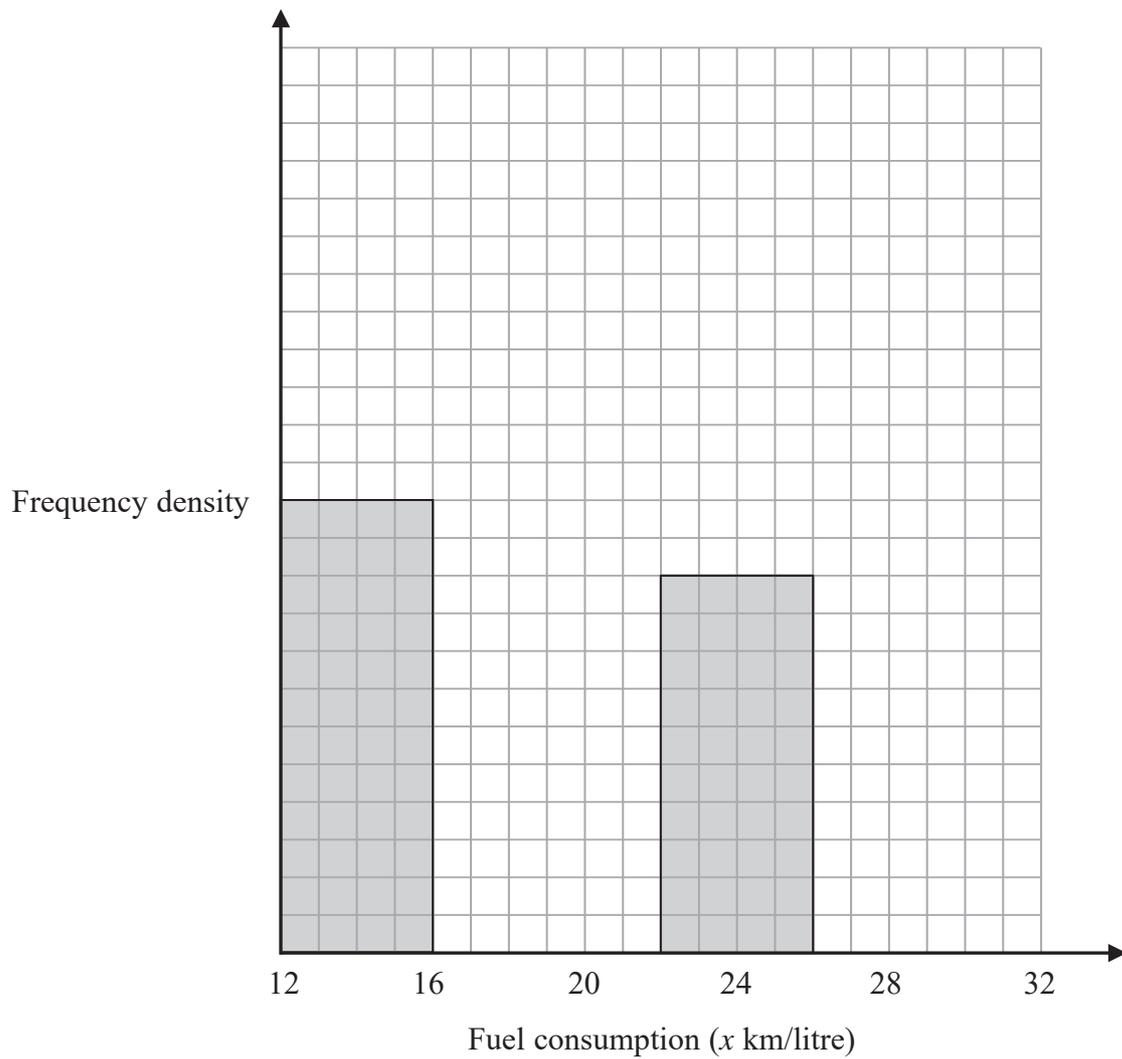
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(Total for Question 5 is 8 marks)



Question 6 continued



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Turn over for a spare grid if you need to redraw your histogram.

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Question 6 continued

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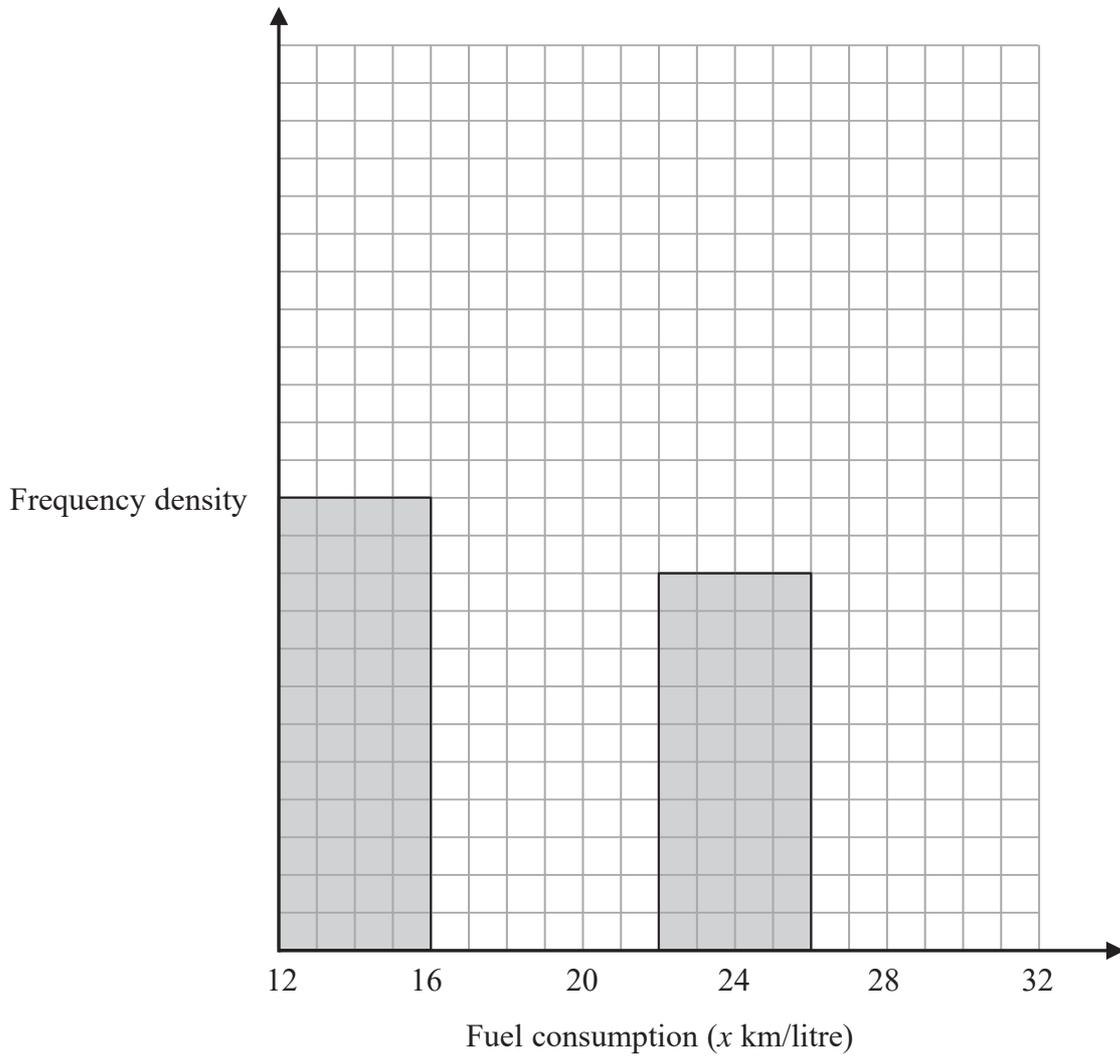
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Question 6 continued

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(Total for Question 6 is 9 marks)



Question 7 continued

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Question 7 continued

Handwriting practice area consisting of 25 horizontal dotted lines.

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Question 7 continued

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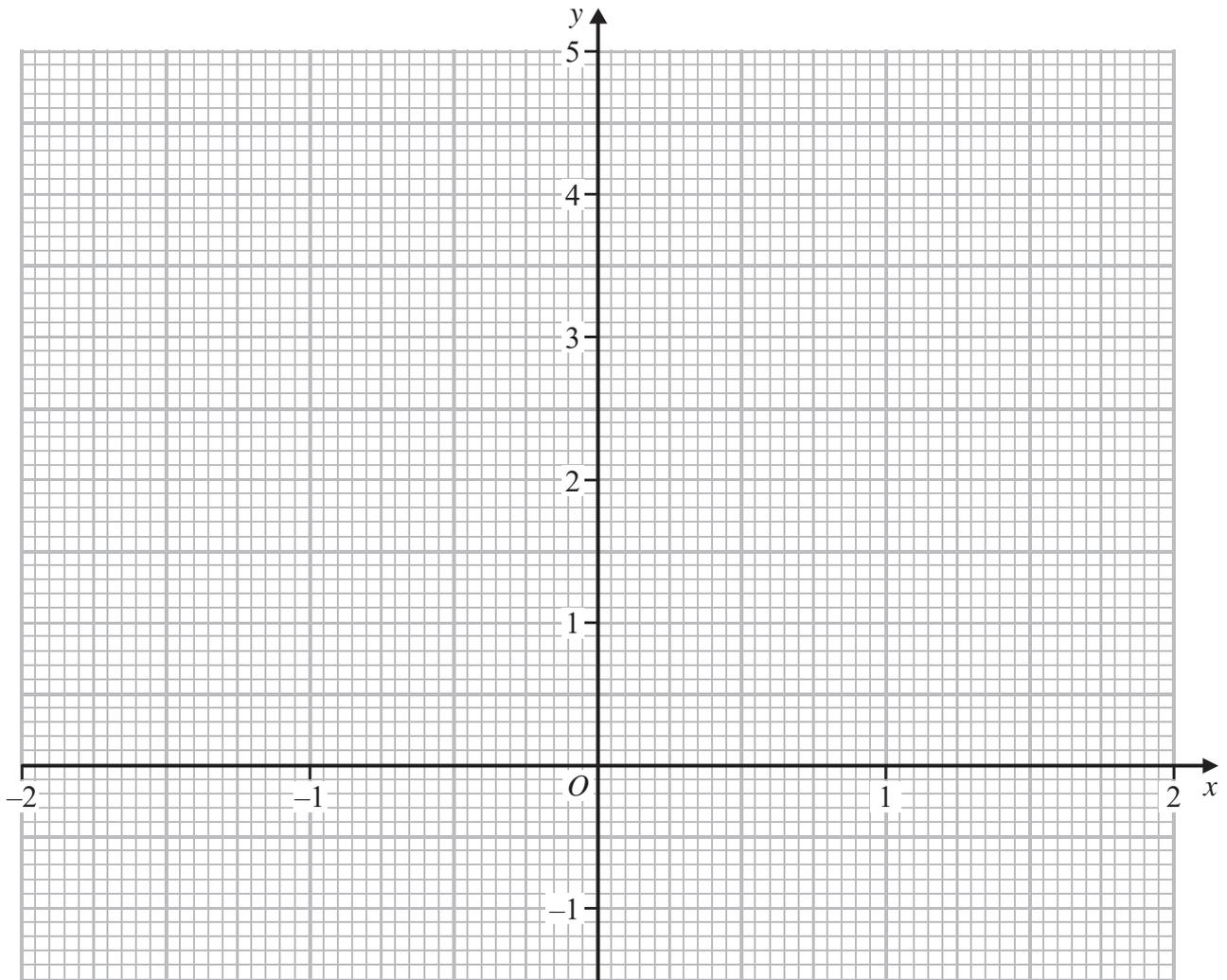
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(Total for Question 7 is 11 marks)



Question 8 continued



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Question 8 continued

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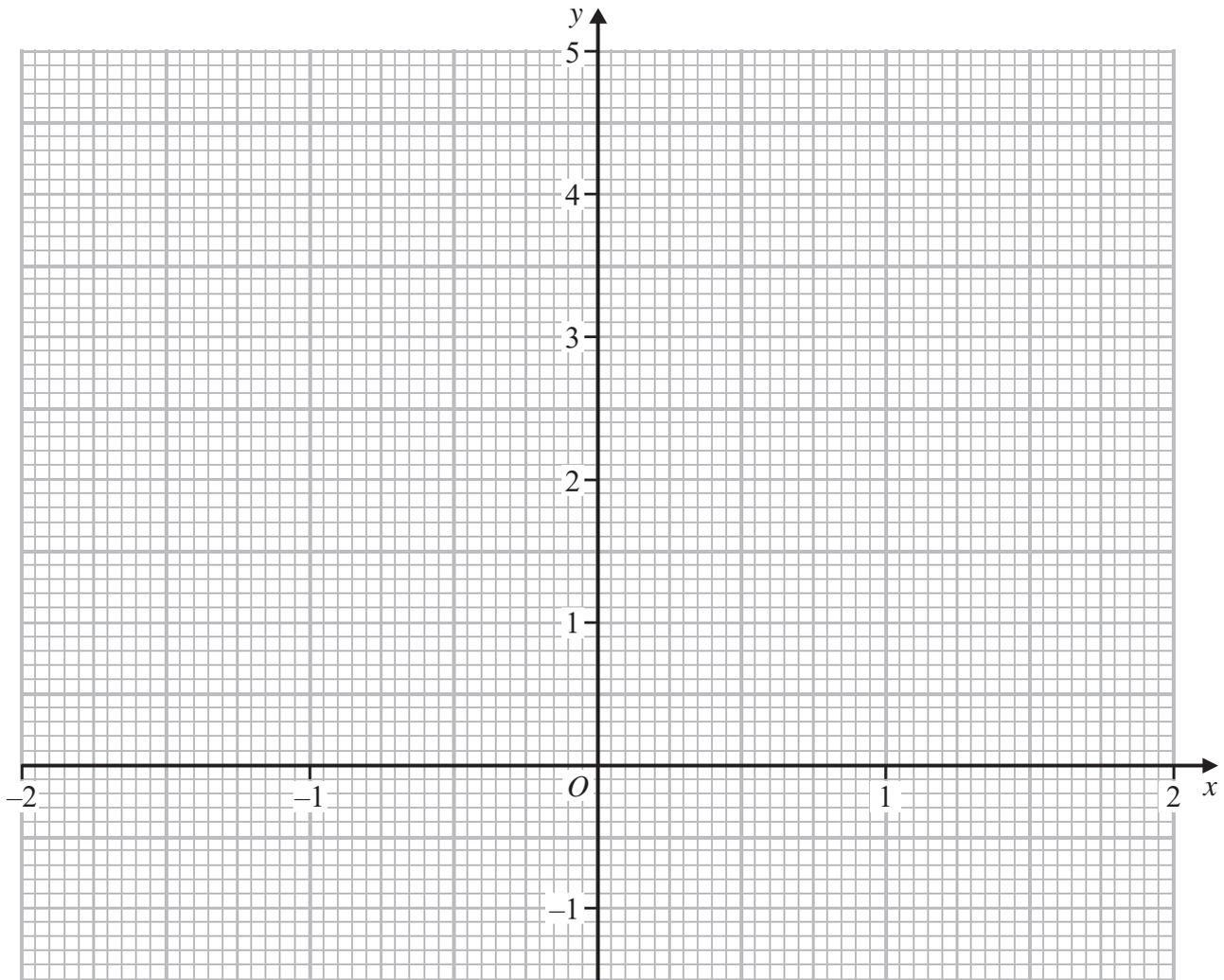
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Question 8 continued

Only use this grid if you need to redraw your curve.



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(Total for Question 8 is 12 marks)



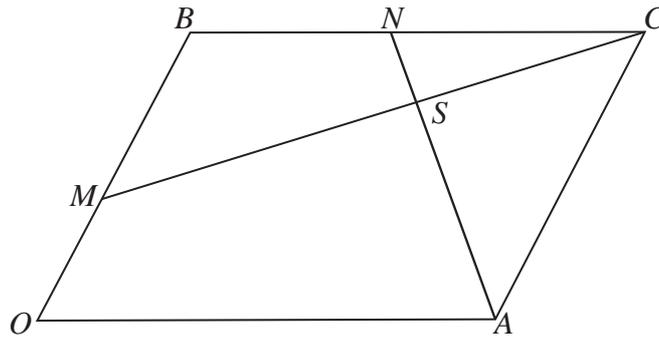


Diagram NOT accurately drawn

Figure 3

Figure 3 shows a parallelogram $OACB$ in which $\vec{OA} = 8\mathbf{a}$ and $\vec{OB} = 6\mathbf{b}$.
 The point M lies on OB such that $OM:MB = 1:2$.
 N is the midpoint of BC .

(a) Find, in terms of \mathbf{a} or \mathbf{b} , or \mathbf{a} and \mathbf{b} ,

- (i) \vec{MB}
- (ii) \vec{MC}
- (iii) \vec{NA}

(3)

The lines MC and AN intersect at the point S .

Given that $\vec{NS} = \lambda \vec{NA}$, where λ is a scalar,

(b) find, in terms of λ , \mathbf{a} and \mathbf{b} ,

- (i) \vec{NS}
- (ii) \vec{MS}

(2)

Given also that $\vec{MS} = \mu \vec{MC}$, where μ is a scalar,

(c) write down an expression for \vec{MS} in terms of μ , \mathbf{a} and \mathbf{b} .

(1)

(d) Hence find the value of λ and the value of μ

(5)

The area of parallelogram $OACB$ is 80 square units.

(e) Find the area of

- (i) triangle CAN ,
- (ii) triangle CNS .

(2)



Question 9 continued

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Question 9 continued

Handwriting practice area consisting of 25 horizontal dotted lines.

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Question 9 continued

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(Total for Question 9 is 13 marks)



Question 10 continued

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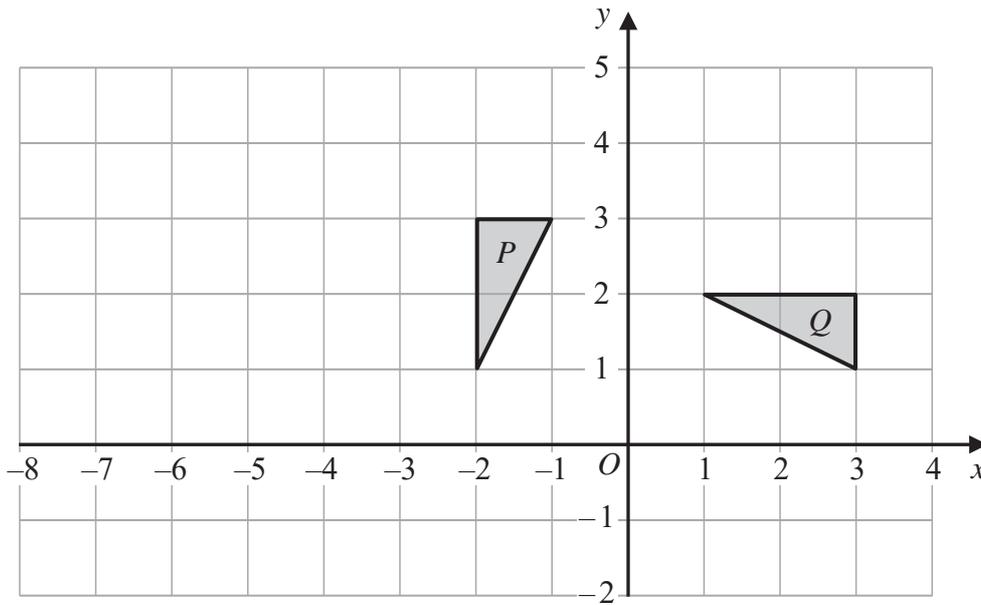
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(Total for Question 10 is 6 marks)





Triangles P and Q are shown on the grid.

- (a) Write down the coordinates of the vertices of triangle Q . (1)
- (b) Describe fully the **single** transformation that maps triangle P onto triangle Q . (3)
- (c) Find the matrix that represents the transformation that maps triangle P onto triangle Q . (1)

Triangle Q is transformed to triangle R under the transformation with matrix \mathbf{M} where

$$\mathbf{M} = \begin{pmatrix} -1 & -2 \\ 0 & 2 \end{pmatrix}$$

- (d) Find the coordinates of the vertices of R . (2)
- (e) Find the matrix of the transformation that maps triangle P onto triangle R . (3)

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Question 11 continued

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Question 11 continued

Handwriting practice area with 25 horizontal dotted lines.

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Question 11 continued

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