

Write your name here

Surname	Other names
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Centre Number

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Candidate Number

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**Pearson Edexcel
International GCSE**

Mathematics B

Paper 2R



Tuesday 19 January 2016 – 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 3 continued

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(Total for Question 3 is 6 marks)



Question 4 continued

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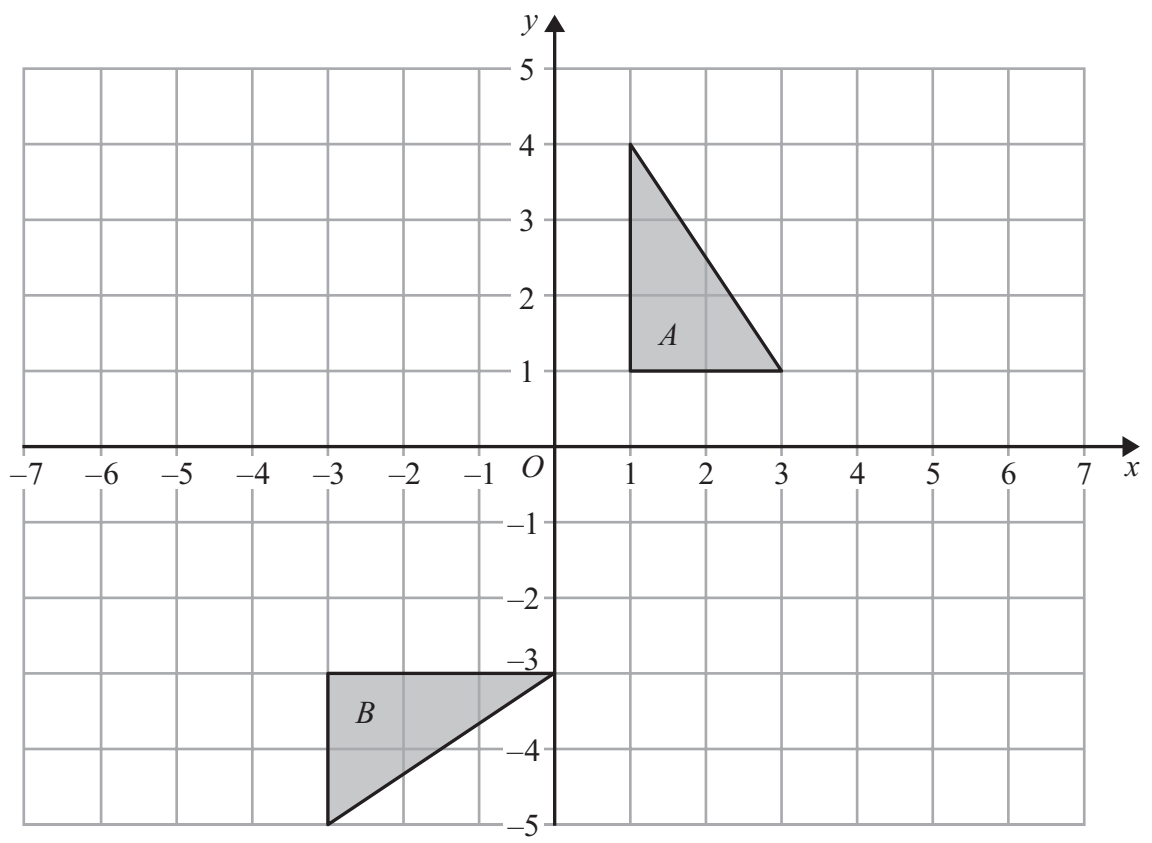
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(Total for Question 4 is 6 marks)



5



On the grid, triangle *B* is the image of triangle *A* under a single transformation.

- (a) Describe fully this single transformation. (3)

Triangle *B* is transformed to triangle *C* under the transformation with matrix *N* where

$$N = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$$

- (b) On the grid, draw and label triangle *C*. (3)

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8



Question 5 continued

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(Total for Question 5 is 6 marks)



Question 6 continued

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Area with horizontal dotted lines for writing answers.

(Total for Question 6 is 8 marks)



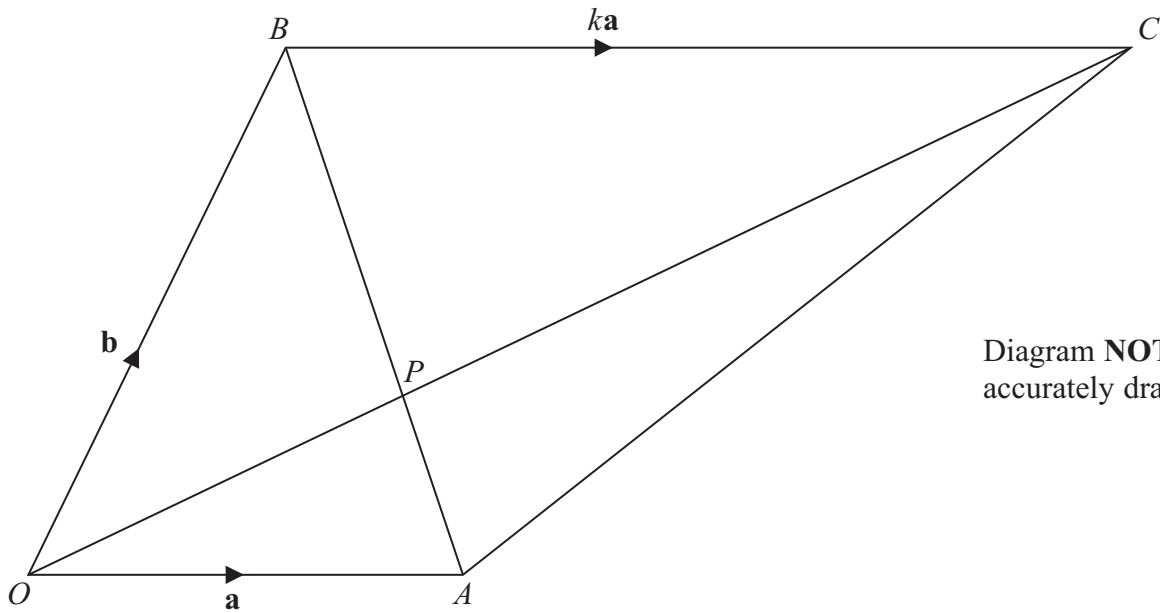


Diagram NOT accurately drawn

Figure 1

Figure 1 shows trapezium $OBCA$ in which $\vec{OA} = \mathbf{a}$, $\vec{OB} = \mathbf{b}$ and $\vec{BC} = k\mathbf{a}$ where k is a constant.

OC and AB intersect at P .

(a) Write down in terms of \mathbf{a} and \mathbf{b} and where necessary k ,

- (i) \vec{AB} (ii) \vec{AC} (iii) \vec{OC} (3)

Given that $OP : OC = 1 : m$,

(b) write down an expression for \vec{OP} in terms of \mathbf{a} , \mathbf{b} , k and m . (1)

Given that $AP : AB = 1 : n$,

(c) write down and simplify an expression for \vec{OP} in terms of \mathbf{a} , \mathbf{b} , and n . (2)

(d) Show that $m = n$. (2)

(e) Hence, find k in terms of n . (2)

Given that $OBCA$ is a parallelogram,

(f) write down the value of n . (1)

Question 7 continued

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Question 7 continued

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Question 7 continued

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(Total for Question 7 is 11 marks)



Question 8 continued

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Handwriting practice area with horizontal dotted lines.



Question 8 continued

Area with horizontal dotted lines for writing.

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Question 8 continued

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(Total for Question 8 is 11 marks)



Question 9 continued

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Question 9 continued

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(Total for Question 9 is 13 marks)



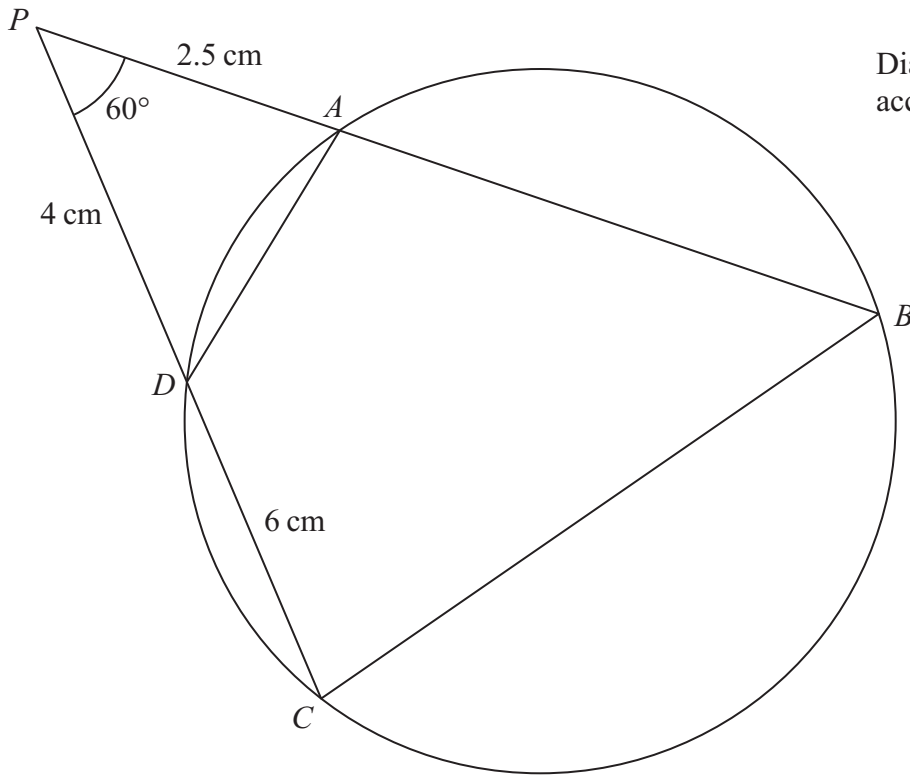


Diagram NOT accurately drawn

Figure 2

In Figure 2, $ABCD$ is a circle. The point P , outside the circle, is such that PAB and PDC are straight lines so that $PA = 2.5$ cm, $PD = 4$ cm, $DC = 6$ cm and $\angle BPC = 60^\circ$

- (a) Show that $AB = 13.5$ cm. (3)
- (b) Find the length, in cm, of BC . (3)
- (c) Find the size, in degrees to 3 significant figures, of $\angle ABC$. (3)
- (d) Giving reasons, find the size, in degrees to 3 significant figures, of $\angle PAD$. (3)
- (e) Find the area, in cm^2 to 3 significant figures, of $ABCD$. (4)

[Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$

Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Area of triangle = $\frac{1}{2}bc \sin A$]



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Question 10 continued

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Question 10 continued

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Question 10 continued

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(Total for Question 10 is 16 marks)



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Question 11 continued

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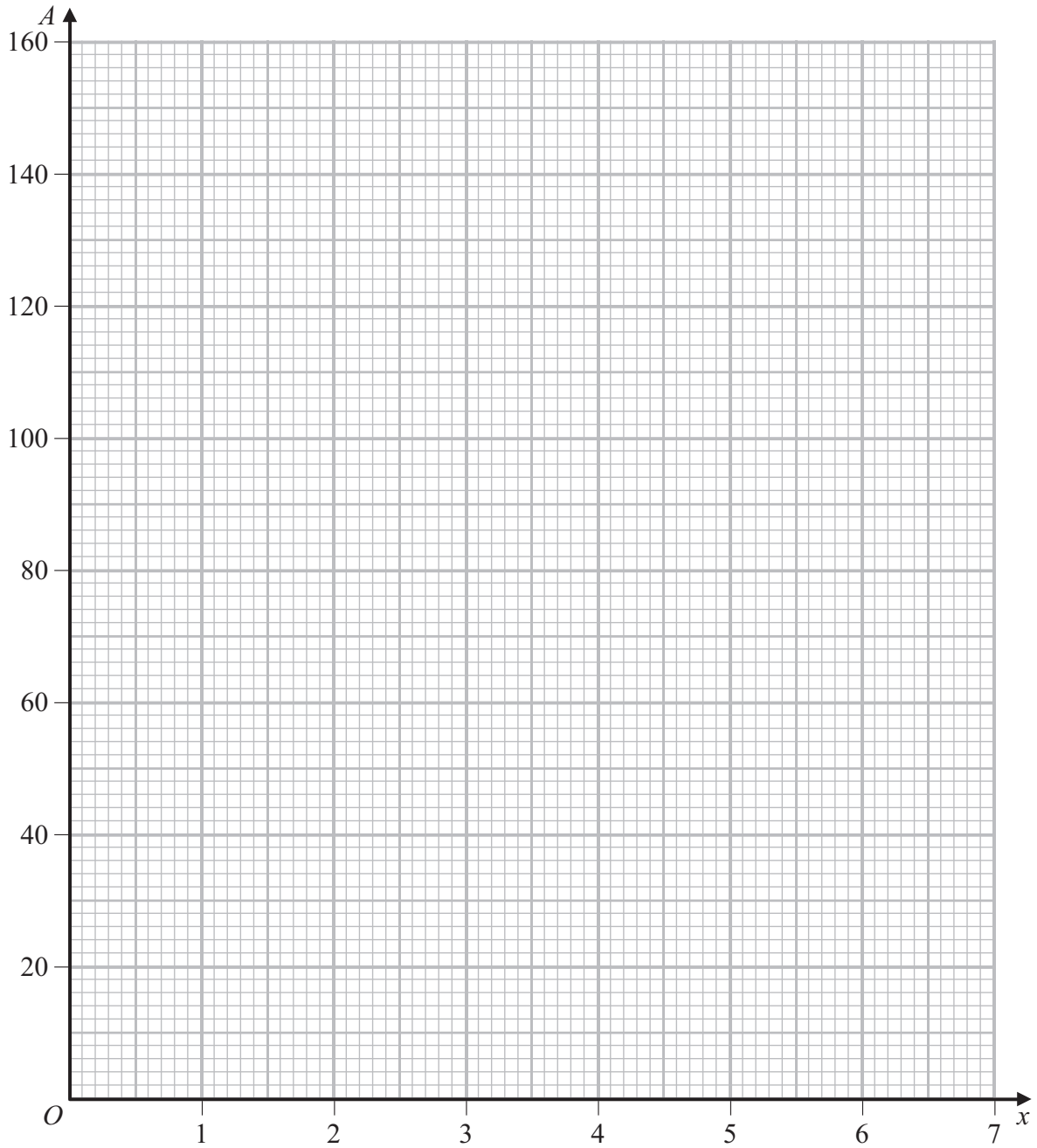


Question 11 continued

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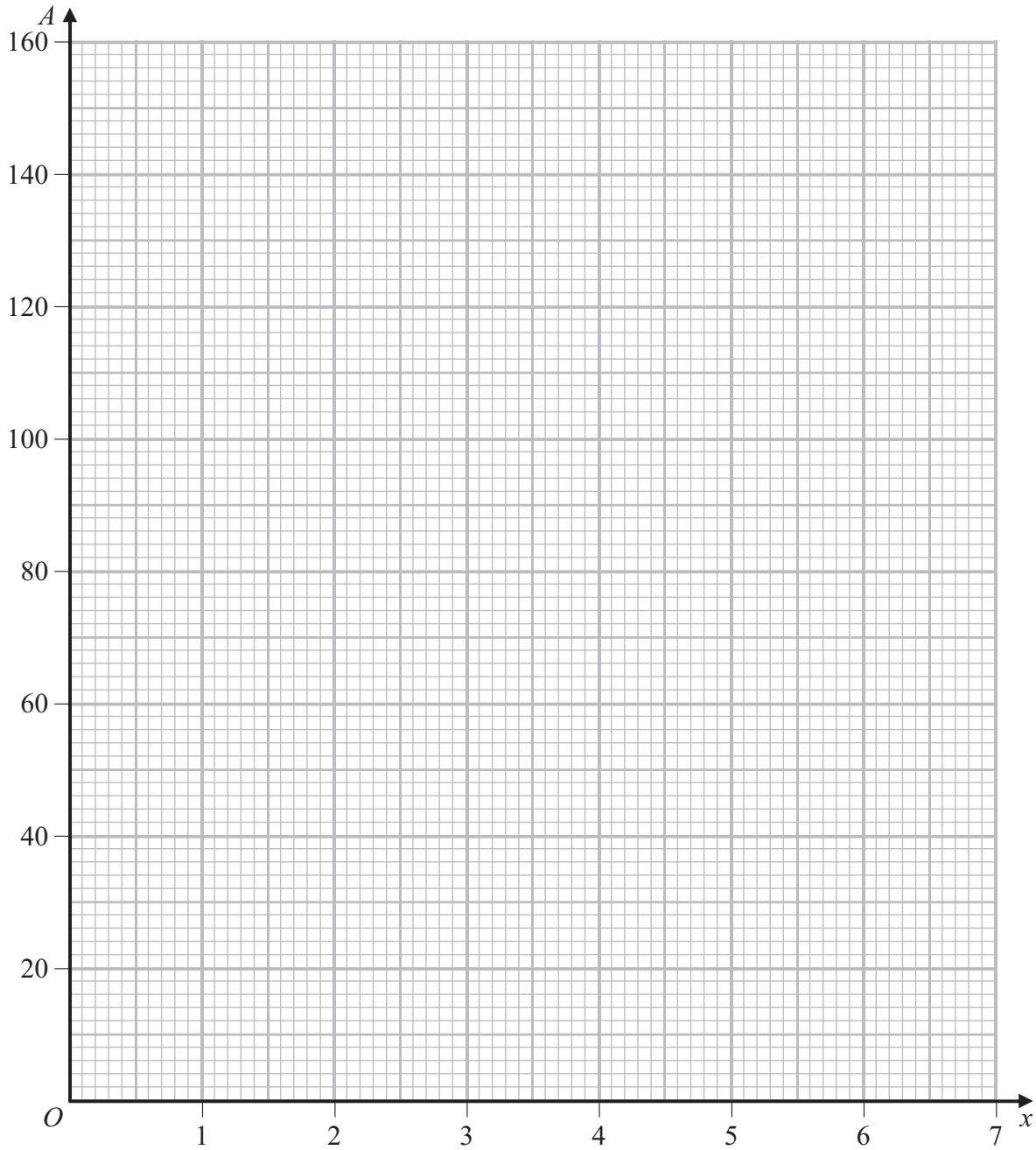


Turn over for a spare grid if you need to redraw your graph.



Question 11 continued

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



(Total for Question 11 is 15 marks)

TOTAL FOR PAPER IS 100 MARKS

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