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Surname

Other names

**Pearson Edexcel  
International GCSE**

Centre Number

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Candidate Number

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# Mathematics B

## Paper 2



Thursday 8 June 2017 – Morning

**Time: 2 hours 30 minutes**

Paper Reference

**4MB0/02**

**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.

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**Question 3 continued**

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**(Total for Question 3 is 6 marks)**



4 Given that  $x > 0$  and  $y > 0$  and that

$$\begin{pmatrix} x & y \\ y & z \end{pmatrix} \begin{pmatrix} \frac{1}{x} & x \\ y & x \end{pmatrix} = \begin{pmatrix} 17 & 9 + 4x \\ \frac{y}{x} - 20 & -3 \end{pmatrix}$$

find the value of  $x$ , the value of  $y$  and the value of  $z$ .

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**Question 4 continued**

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**(Total for Question 4 is 6 marks)**







**Question 5 continued**

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**(Total for Question 5 is 7 marks)**





**Question 6 continued**

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**(Total for Question 6 is 8 marks)**



7 The points (1, 1), (3, 1) and (3, 4) are the vertices of triangle A.

(a) On the grid, draw and label triangle A.

(1)

Triangle B is the image of triangle A under the enlargement with centre (-1, 2) and scale factor -2

(b) On the grid, draw and label triangle B.

(3)

Triangle C is the image of triangle B under the transformation with matrix  $\begin{pmatrix} -\frac{1}{2} & 0 \\ 0 & -\frac{1}{2} \end{pmatrix}$

(c) On the grid, draw and label triangle C.

(3)

(d) Describe fully the **single** transformation that maps triangle C onto triangle A.

(3)

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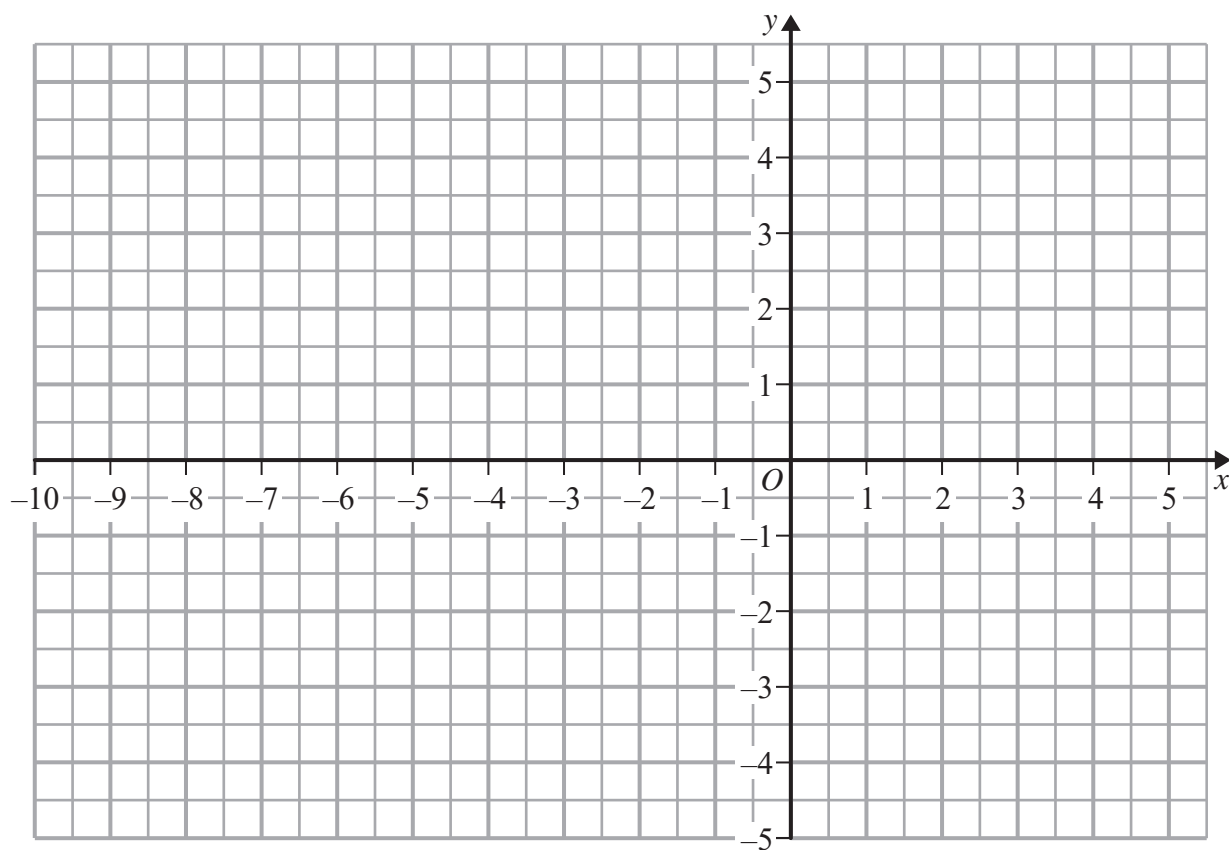
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Question 7 continued



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**Question 7 continued**

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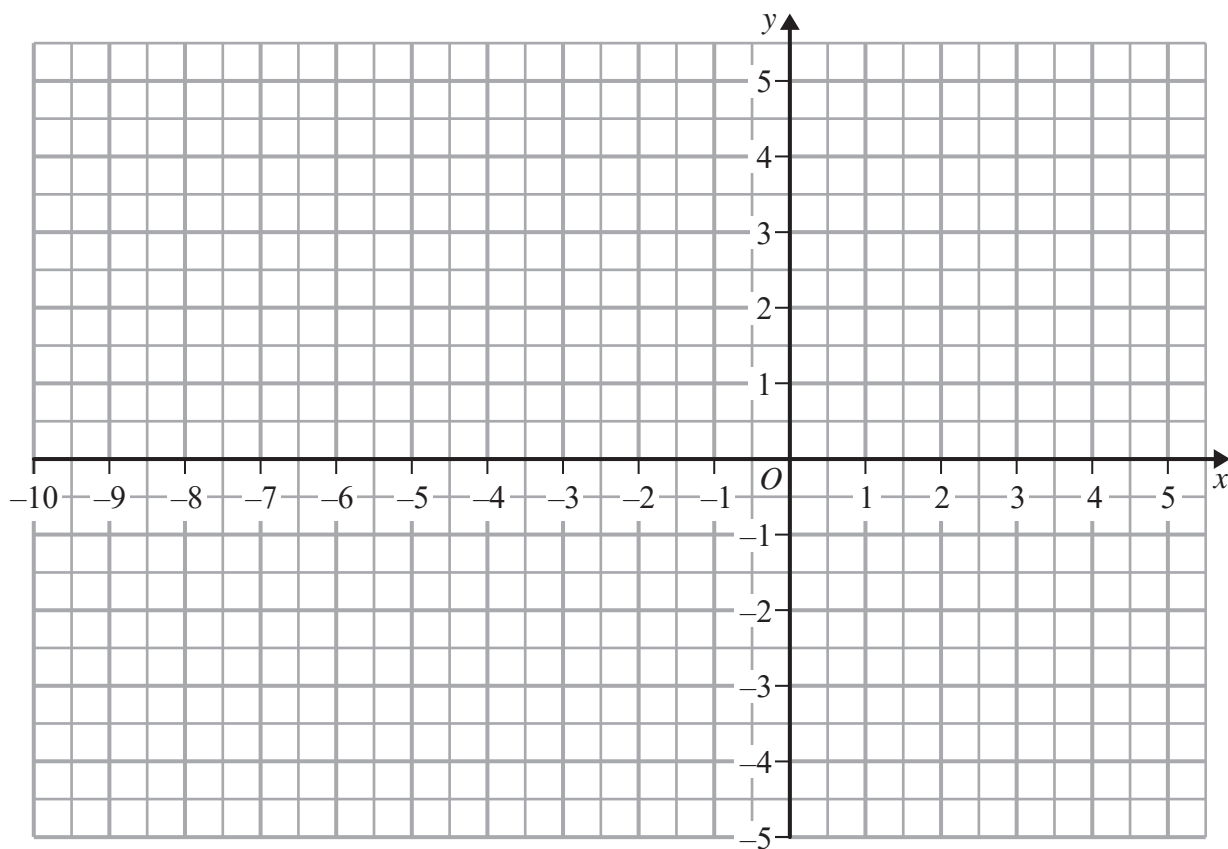
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Question 7 continued

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(Total for Question 7 is 10 marks)

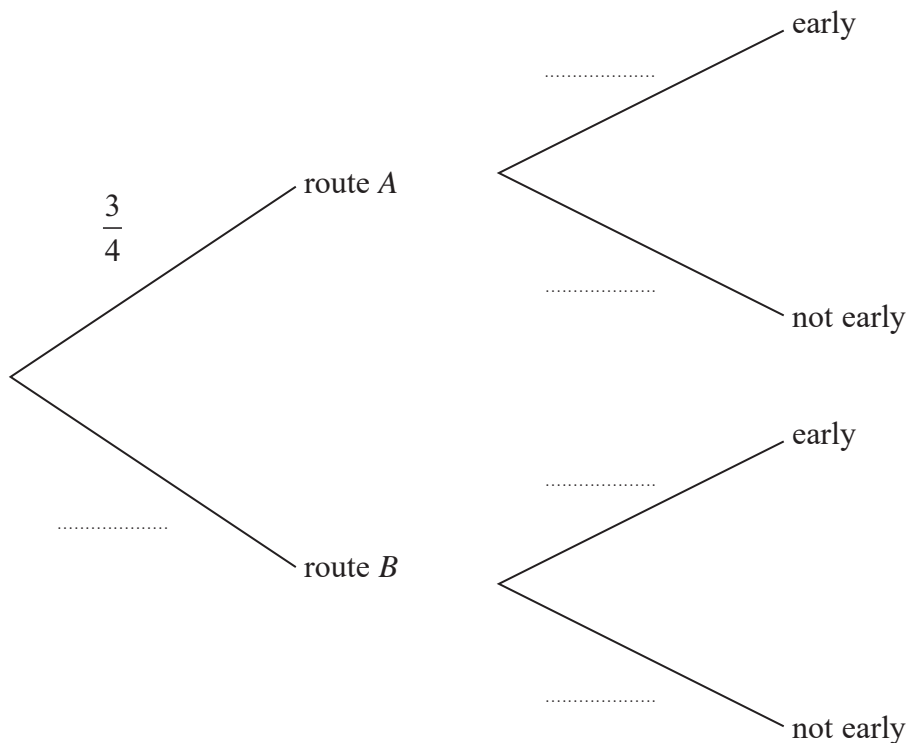


8 When James travels to work, he can take two routes, route *A* and route *B*.

The probability that on any work day he takes route *A* is  $\frac{3}{4}$

When James takes route *A*, the probability of his arriving early at work is  $x$ .  
 When James takes route *B*, the probability of his arriving early at work is  $kx$ ,  
 where  $k$  is a constant.

(a) Complete the probability tree diagram to show this information.



(3)

(b) Write down an expression in terms of  $x$  for the probability that James takes route *A* to work and arrives early.

(1)

The probability that James takes route *A* to work and arrives early is  $\frac{1}{8}$

(c) Find the value of  $x$ .

(2)

The probability that James takes route *B* to work and does **not** arrive early is  $\frac{1}{10}$

(d) Find the value of  $k$ .

(3)

(e) Calculate the probability that on any day James goes to work, he does **not** arrive early.

(3)

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**Question 8 continued**

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**Question 8 continued**

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**Question 8 continued**

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**(Total for Question 8 is 12 marks)**



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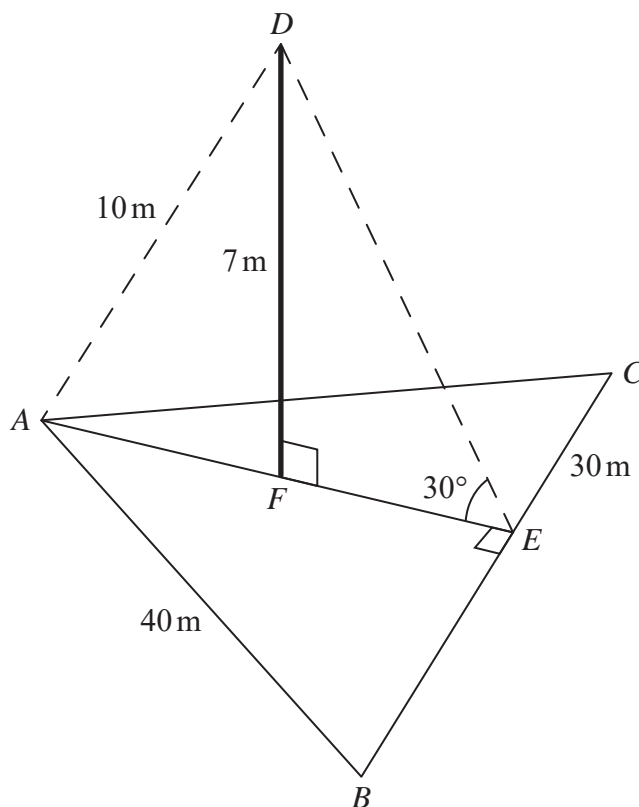


Diagram **NOT**  
accurately drawn

**Figure 1**

Figure 1 shows a horizontal triangular field  $ABC$  in which  $AB = 40$  metres.

The point  $E$  lies on  $BC$  so that  $AE$  is perpendicular to  $BC$  and  $EC = 30$  metres.  
The point  $F$  on  $AE$  is the bottom of a vertical flagpole,  $FD$ , of height 7 metres.  
In  $\triangle ADE$ ,  $AD = 10$  metres and  $\angle AED = 30^\circ$

(a) Calculate the length, in metres to 3 significant figures, of

- (i)  $FE$ ,
- (ii)  $AE$ ,
- (iii)  $EB$ .

(7)

The point  $X$  lies on  $AB$  so that  $CFX$  is a straight line.

(b) Calculate the length, in metres to 3 significant figures, of  $CX$ .

(6)

$$\left[ \text{Sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \right]$$



**Question 9 continued**

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**Question 9 continued**

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**Question 9 continued**

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**(Total for Question 9 is 13 marks)**



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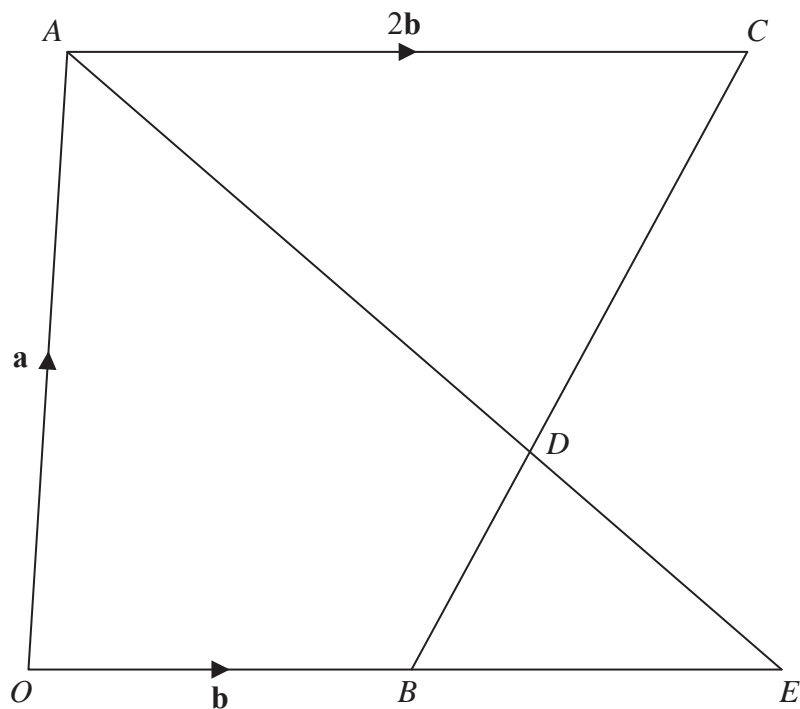
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Figure 2

In Figure 2,  $OACB$  is a quadrilateral such that  $\vec{OA} = \mathbf{a}$ ,  $\vec{OB} = \mathbf{b}$  and  $\vec{AC} = 2\mathbf{b}$ .  
 $D$  is the point on  $BC$  such that  $BD:BC = 1:3$

(a) Express in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , simplifying your answers where possible,

- (i)  $\vec{OC}$ ,      (ii)  $\vec{BC}$ ,      (iii)  $\vec{AD}$ .

(5)

$E$  is the point such that  $OBE$  and  $ADE$  are straight lines.

Given that  $OB:OE = 1:n$ , where  $n$  is a constant,

(b) find an expression, in terms of  $\mathbf{a}$ ,  $\mathbf{b}$  and  $n$ , for  $\vec{AE}$ .

(1)

Given also that  $\vec{AD} = \lambda \vec{AE}$ , where  $\lambda$  is a constant,

(c) find the value of  $\lambda$  and the value of  $n$ .

(5)

(d) Explain why  $OACE$  is a parallelogram.

(1)

The area of triangle  $ACD$  is  $30 \text{ cm}^2$

(e) Calculate the area, in  $\text{cm}^2$ , of triangle  $BDE$ .

(2)

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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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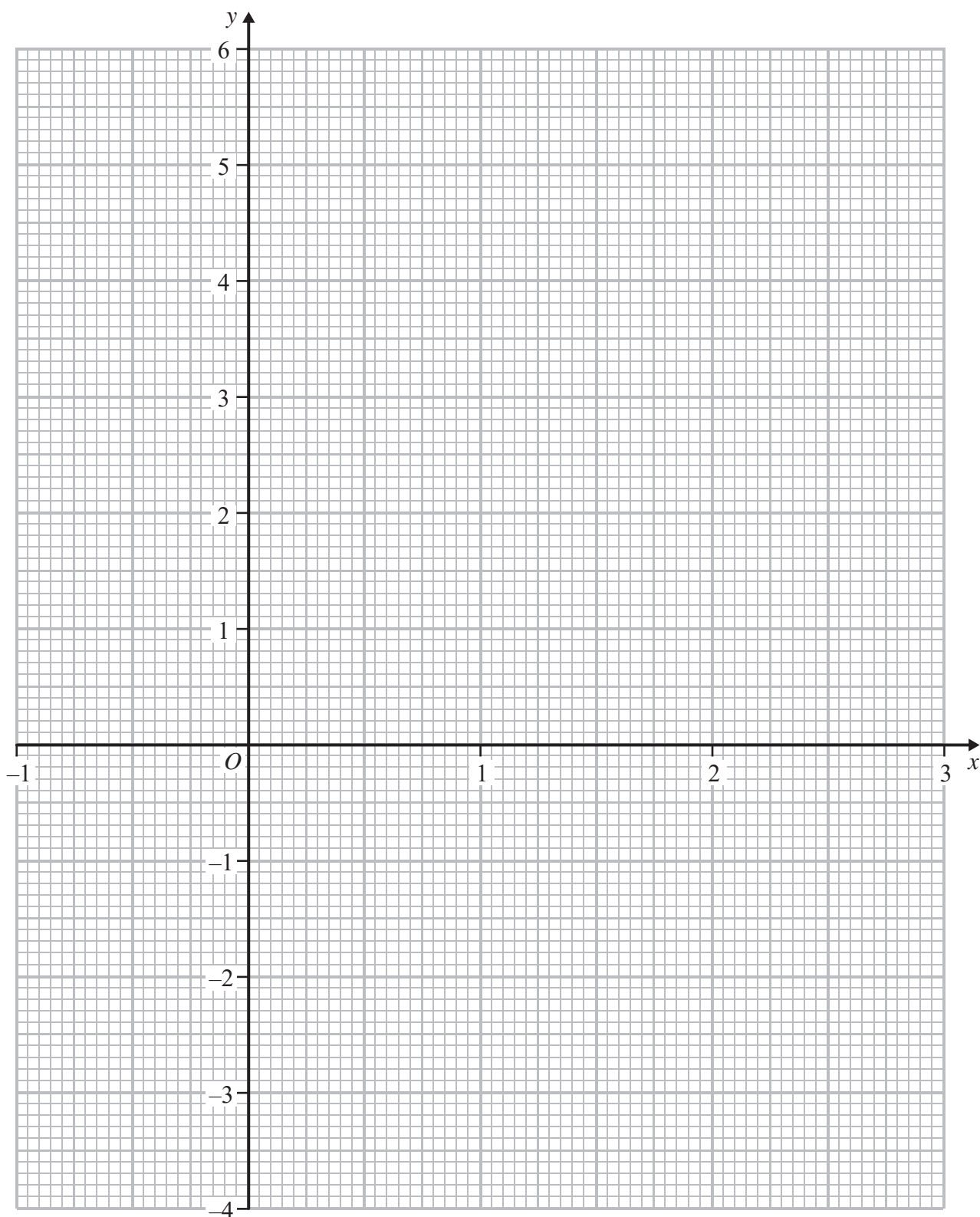
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Question 11 continued



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**Question 11 continued**

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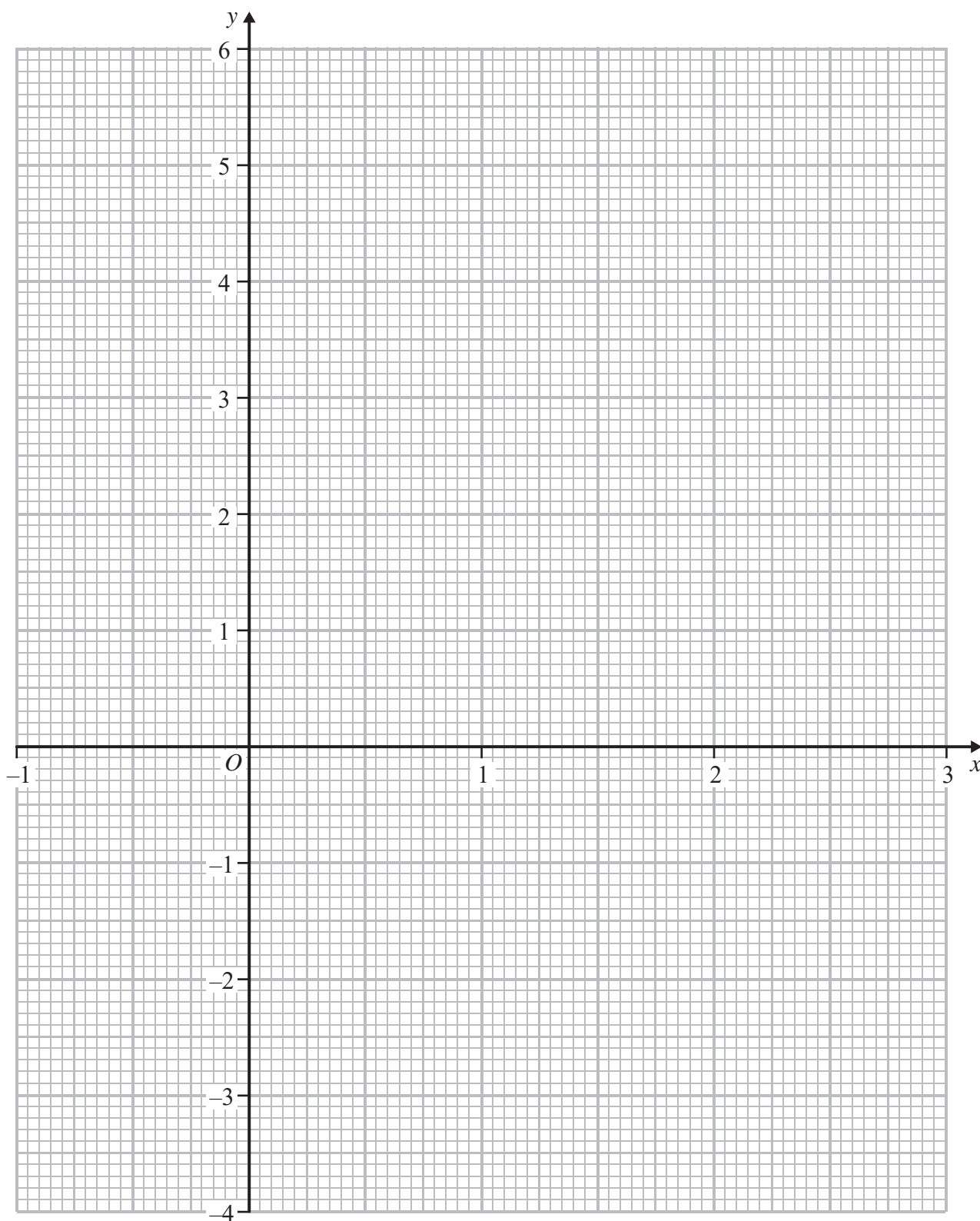
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Question 11 continued

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**Question 11 continued**

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**(Total for Question 11 is 14 marks)**

**TOTAL FOR PAPER IS 100 MARKS**

