

Write your name here

Surname

Other names

**Pearson Edexcel  
International GCSE**

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

# Mathematics B

## Paper 2



Monday 12 January 2015 – Afternoon  
**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.

Turn over ►

P44616A

©2015 Pearson Education Ltd.

5/1/1/



P 4 4 6 1 6 A 0 1 3 2

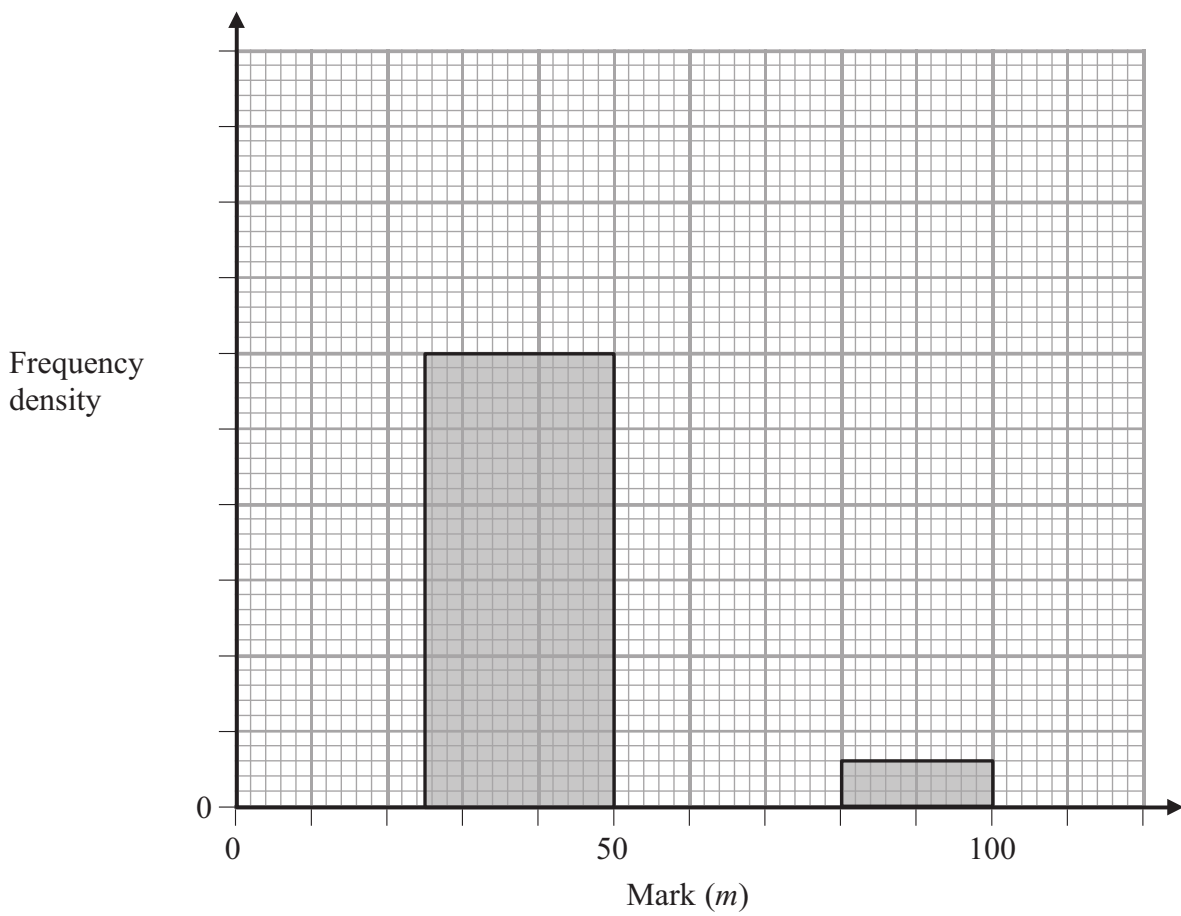
**PEARSON**







Question 2 continued



(Total for Question 2 is 5 marks)











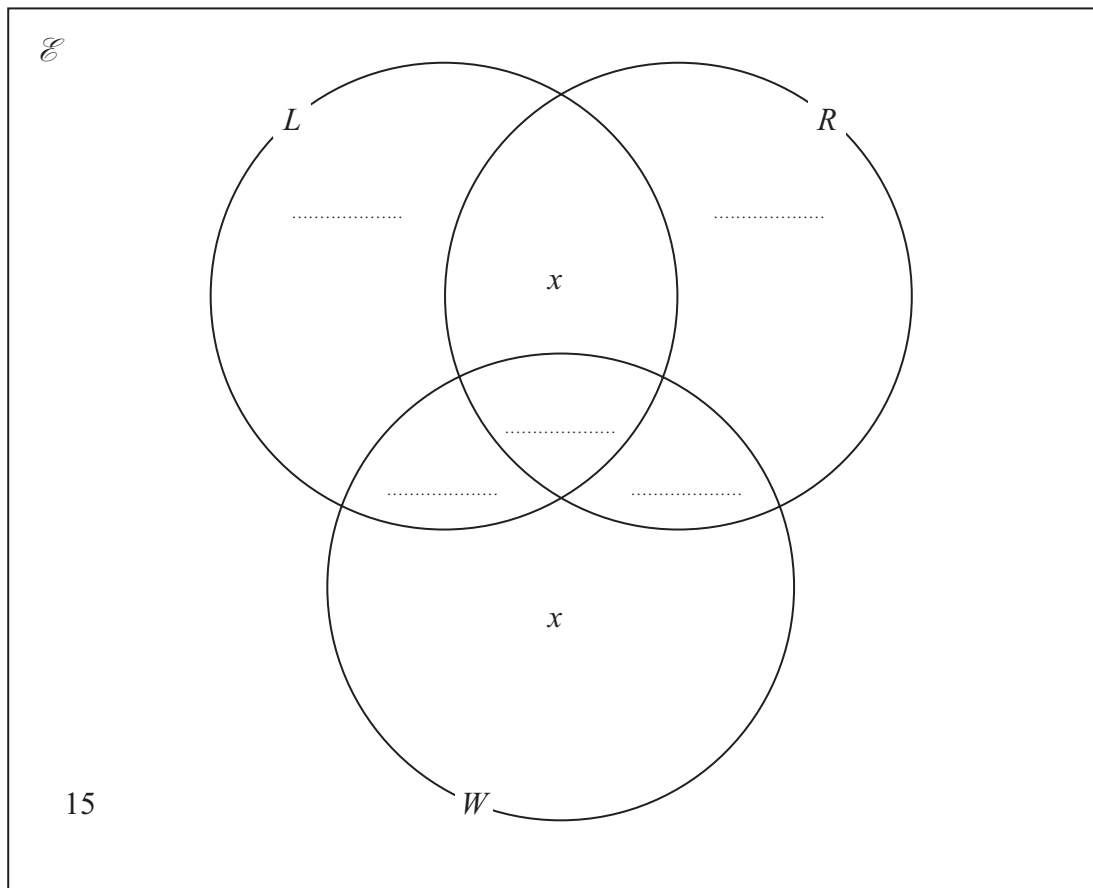


- 5 In a survey, 100 people were asked to say which of three activities they enjoyed doing. The three activities were listening to music ( $L$ ), reading ( $R$ ) and walking ( $W$ ).

The results showed that

$$\begin{aligned} n(L \cap R \cap W) &= 7, n(W \cap R \cap L') = 25, n(W \cap L \cap R') = 20, \\ n(R \cap L' \cap W') &= 4, n(L \cap [R \cup W]') = 9, \\ n(R \cap L \cap W') &= x = n(W \cap [R \cup L]'). \end{aligned}$$

The information from the survey is to be shown in a Venn diagram. The Venn diagram has been started below.



- (a) Explain what the number 15 in the Venn diagram represents. (1)
- (b) Complete the Venn diagram. (2)
- (c) Work out the value of  $x$ . (2)
- (d) Find the number of people in the survey who
- enjoy reading,
  - enjoy only one of the three activities,
  - enjoy reading and walking but do not enjoy listening to music. (3)













**Question 7 continued**

A series of horizontal dotted lines for writing.







8 The points (2, 1), (6, 3) and (6, 1) are the vertices of triangle *A*.

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

(1)

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

$$\mathbf{N} = \begin{pmatrix} \frac{1}{2} & -2 \\ -\frac{1}{2} & 1 \end{pmatrix}$$

(b) Find the coordinates of the vertices of *B*.

(2)

(c) On the grid, draw and label *B*.

(1)

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

$$\mathbf{M} = \begin{pmatrix} 1 & 1 \\ 2 & 4 \end{pmatrix}$$

(d) Find the coordinates of the vertices of *C*.

(2)

(e) On the grid, draw and label *C*.

(1)

(f) Describe fully the single transformation which maps triangle *A* onto triangle *C*.

(2)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

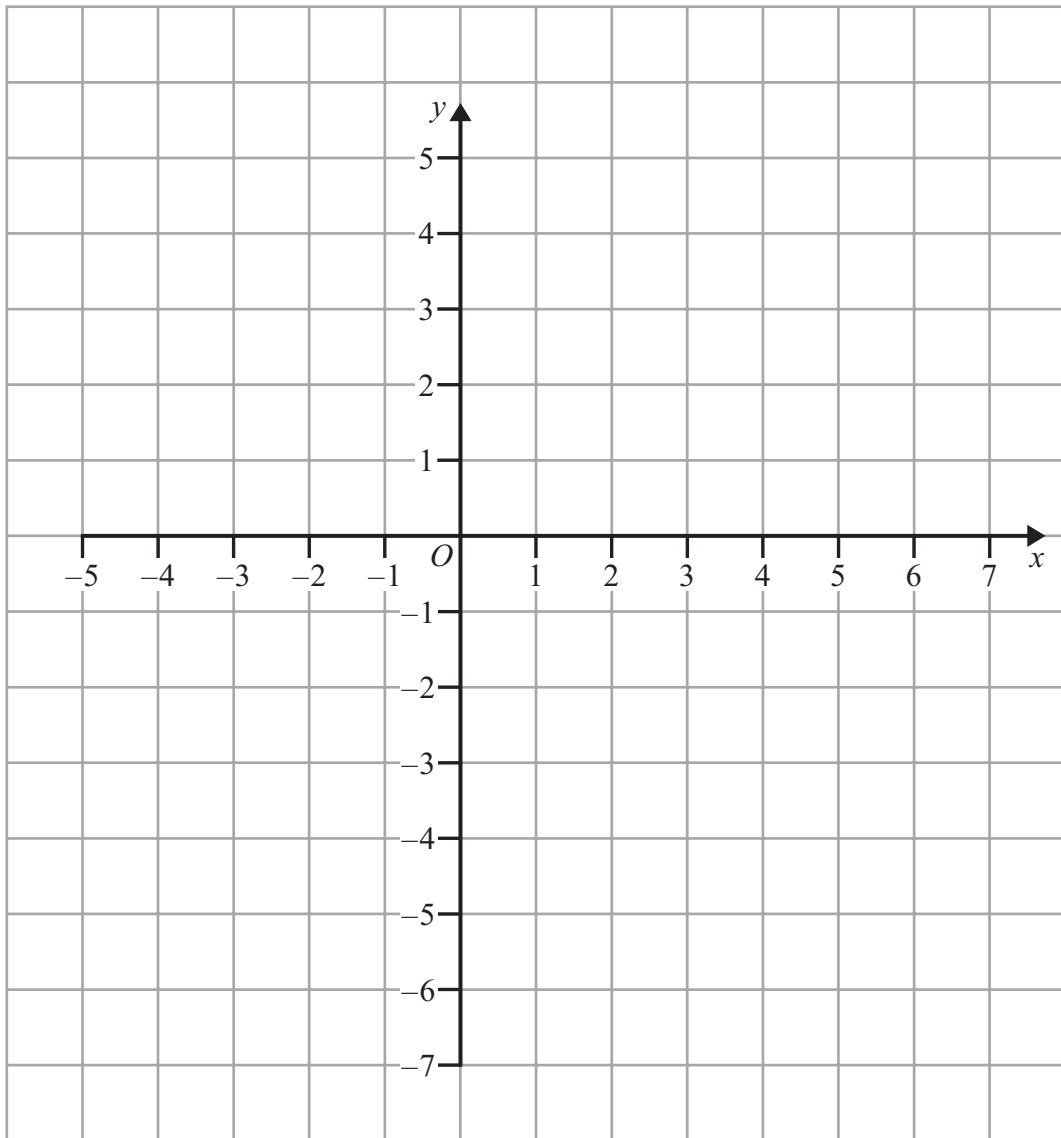
.....

.....

.....



Question 8 continued



.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



**Question 8 continued**

A series of horizontal dotted lines for writing.





Diagram NOT accurately drawn

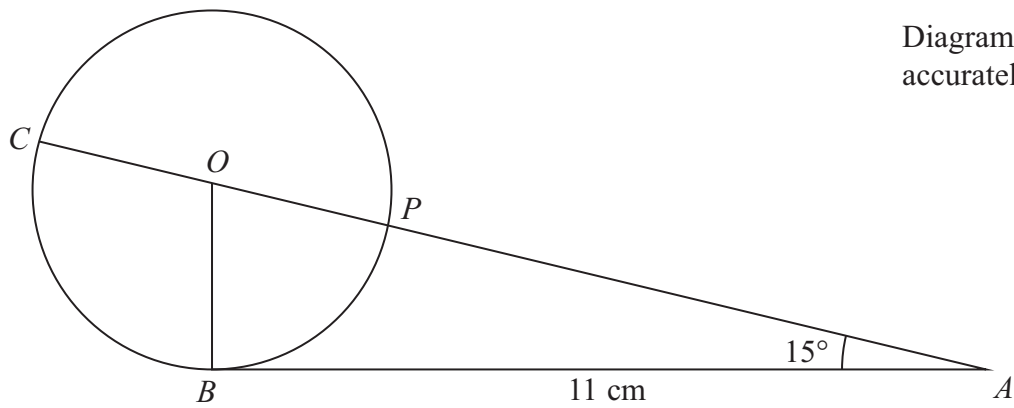


Figure 3

Figure 3 shows a circle  $PBC$  with centre  $O$  and diameter  $CP$ .

The point  $A$  is such that  $AB = 11$  cm and  $AB$  is a tangent to the circle.

$APOC$  is a straight line and  $\angle OAB = 15^\circ$

Calculate the length, in cm to 3 significant figures, of

- (a)  $OA$ , (2)
- (b)  $AP$ , (3)
- (c)  $BC$ . (3)

The tangent to the circle  $PBC$  at  $P$  intersects  $AB$  at the point  $Q$ .

- (d) Calculate the area, in  $\text{cm}^2$  to 3 significant figures, of  $BCPQ$ . (5)

[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 a triangle =  $\frac{1}{2}bc \sin A$ ]

.....

.....

.....

.....

.....



**Question 9 continued**

Ruled writing area with horizontal dotted lines.



**Question 9 continued**

A series of horizontal dotted lines for writing.





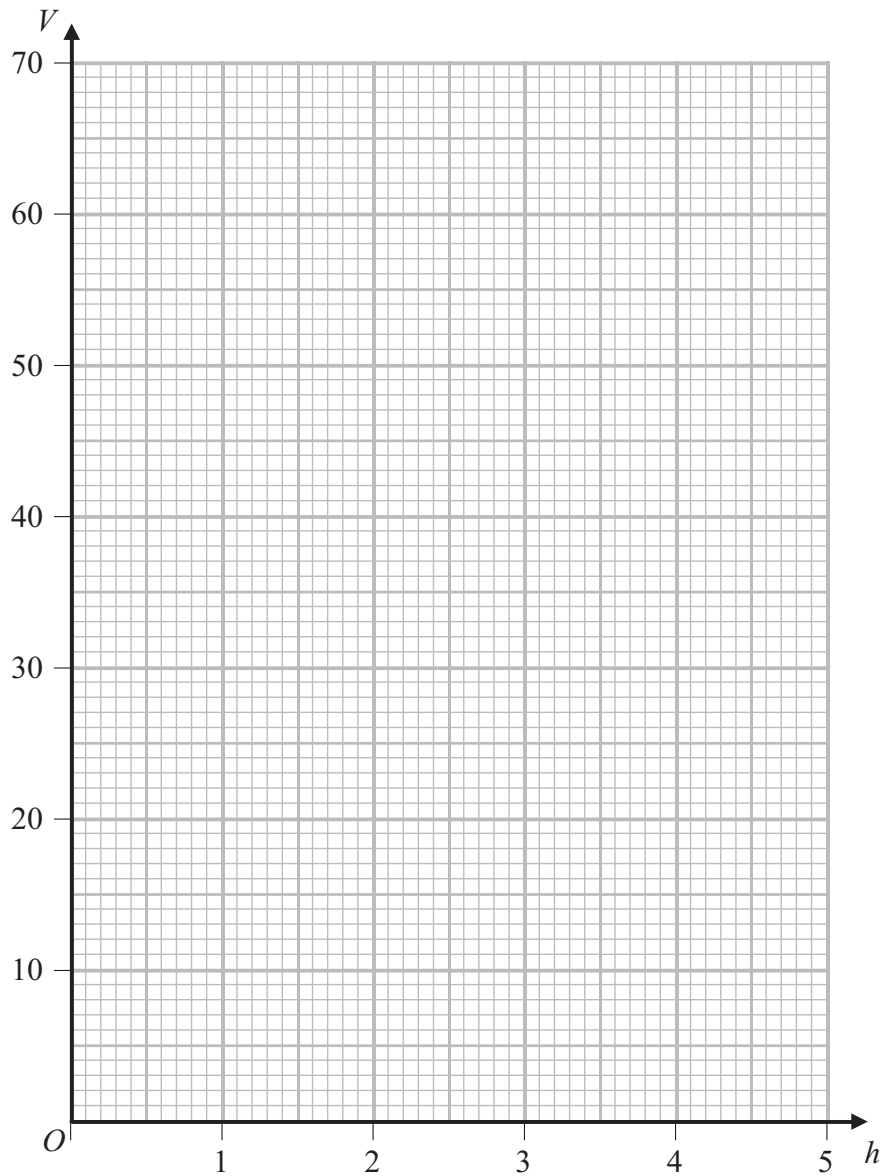








**Question 10 continued**



.....

.....

.....

.....

.....

.....

.....

.....

.....

**(Total for Question 10 is 16 marks)**



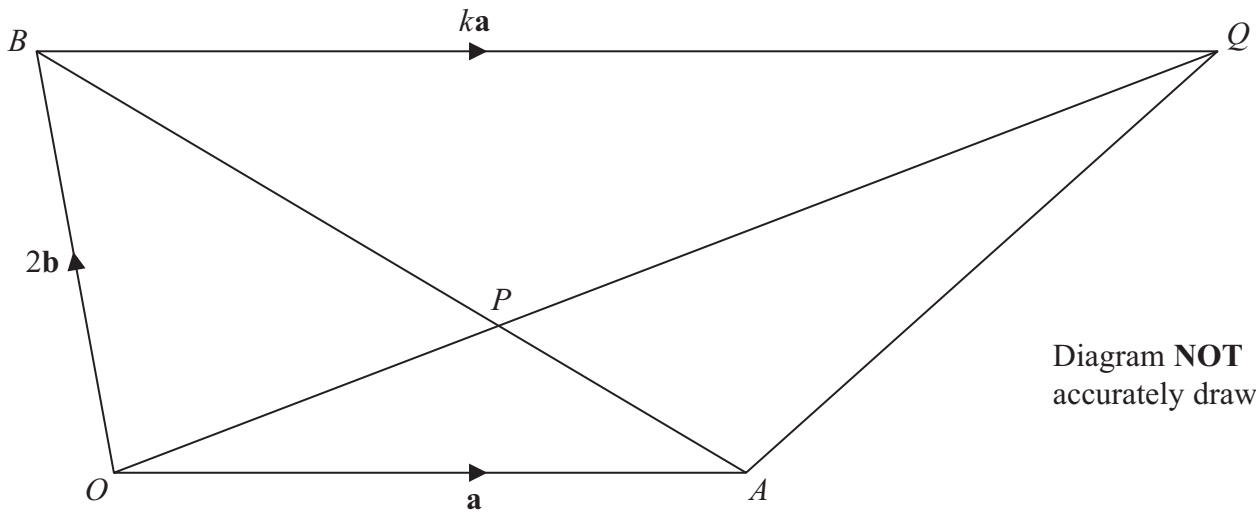


Diagram NOT accurately drawn

Figure 5

In Figure 5,  $OAQB$  is a trapezium with  $\vec{OA} = \mathbf{a}$  and  $\vec{OB} = 2\mathbf{b}$  and  $\vec{BQ} = k\mathbf{a}$ , where  $k$  is a positive constant.

The diagonals  $AB$  and  $OQ$  of the trapezium intersect at the point  $P$ .

- (a) (i) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ ,  $\vec{AB}$ .
- (ii) Find, in terms of  $\mathbf{a}$ ,  $\mathbf{b}$  and  $k$ ,  $\vec{OQ}$ . (2)

The point  $P$  is such that  $AP : AB = 1 : 3$

- (b) Write down an expression for  $\vec{AP}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ . (1)

The point  $P$  is such that  $OP : OQ = 1 : \mu$

- (c) (i) Write down an expression for  $\vec{OA}$  in terms of  $\mathbf{a}$ ,  $\mathbf{b}$ ,  $\mu$  and  $k$ .
- (ii) Hence find the value of  $\mu$  and the value of  $k$ . (6)

- (d) Given that the area of  $\triangle BPQ$  is  $12 \text{ cm}^2$ , find the area, in  $\text{cm}^2$ , of  $\triangle OPA$ . (2)

.....

.....

.....

.....

.....

.....

.....





**Question 11 continued**

Dotted lines for writing.

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

**TOTAL FOR PAPER IS 100 MARKS**

