

Please check the examination details below before entering your candidate information

Candidate surname	Other names
Centre Number	Candidate Number
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Pearson Edexcel International GCSE

Monday 10 June 2024

Morning (Time: 2 hours 30 minutes)

Paper reference

4MB1/02R

Mathematics B

PAPER 2R



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of 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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P 7 3 4 9 7 A 0 1 3 2



Pearson

Answer all TWELVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Gary buys furniture and sells it in a shop.

In the shop on Monday, Gary has tables and chairs such that

$$\text{number of tables} : \text{number of chairs} = 2 : 7$$

Gary has 42 chairs in the shop on Monday.

- (a) Calculate the number of tables Gary has in the shop on Monday.

(2)

Gary buys a table for \$240 and sells it for \$276

- (b) Calculate the percentage profit from the sale of the table.

(2)

Gary buys some chairs and sells them for \$513

Gary's percentage profit from the sale of the chairs is 35%

- (c) Calculate the price at which Gary bought the chairs.

(2)

The cost of a table that Gary buys is \$732

An identical table costs 684 euros in France.

Using the exchange rate $\$1 = 0.95$ euros

- (d) find the difference in the costs of the tables.

State whether your answer is in euros or \$.

(3)



Question 1 continued

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(Total for Question 1 is 9 marks)



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2

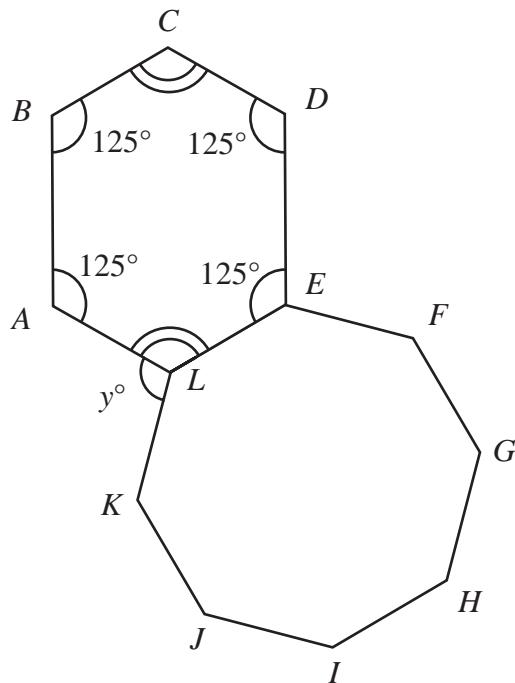


Diagram **NOT**
accurately drawn

Figure 1

Figure 1 shows a hexagon $ABCDEL$ and a regular octagon $EFGHIJKL$

$$\angle BAL = \angle ABC = \angle CDE = \angle DEL = 125^\circ$$

$$\angle BCD = \angle ALE \quad \angle ALK = y^\circ$$

(a) Calculate the value of y

(5)

A different regular polygon has T sides and is such that

$$\text{an interior angle} = (10x + 25)^\circ \quad \text{an exterior angle} = (7x - 83)^\circ$$

(b) Calculate the value of T

(4)

[Sum of interior angles of polygon $= (2n - 4)$ right angles]



Question 2 continued

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(Total for Question 2 is 9 marks)



P 7 3 4 9 7 A 0 5 3 2

3 Triangle A and triangle B are drawn on the grid opposite.

(a) Describe fully the single transformation that maps triangle A onto triangle B

(3)

Triangle A is transformed to triangle C by a reflection in the line with equation $y = -1$

(b) On the grid, draw and label triangle C

(2)

Triangle A is transformed to triangle D by an enlargement with centre (0, 3) and scale factor 2

(c) On the grid, draw and label triangle D

(2)

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

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

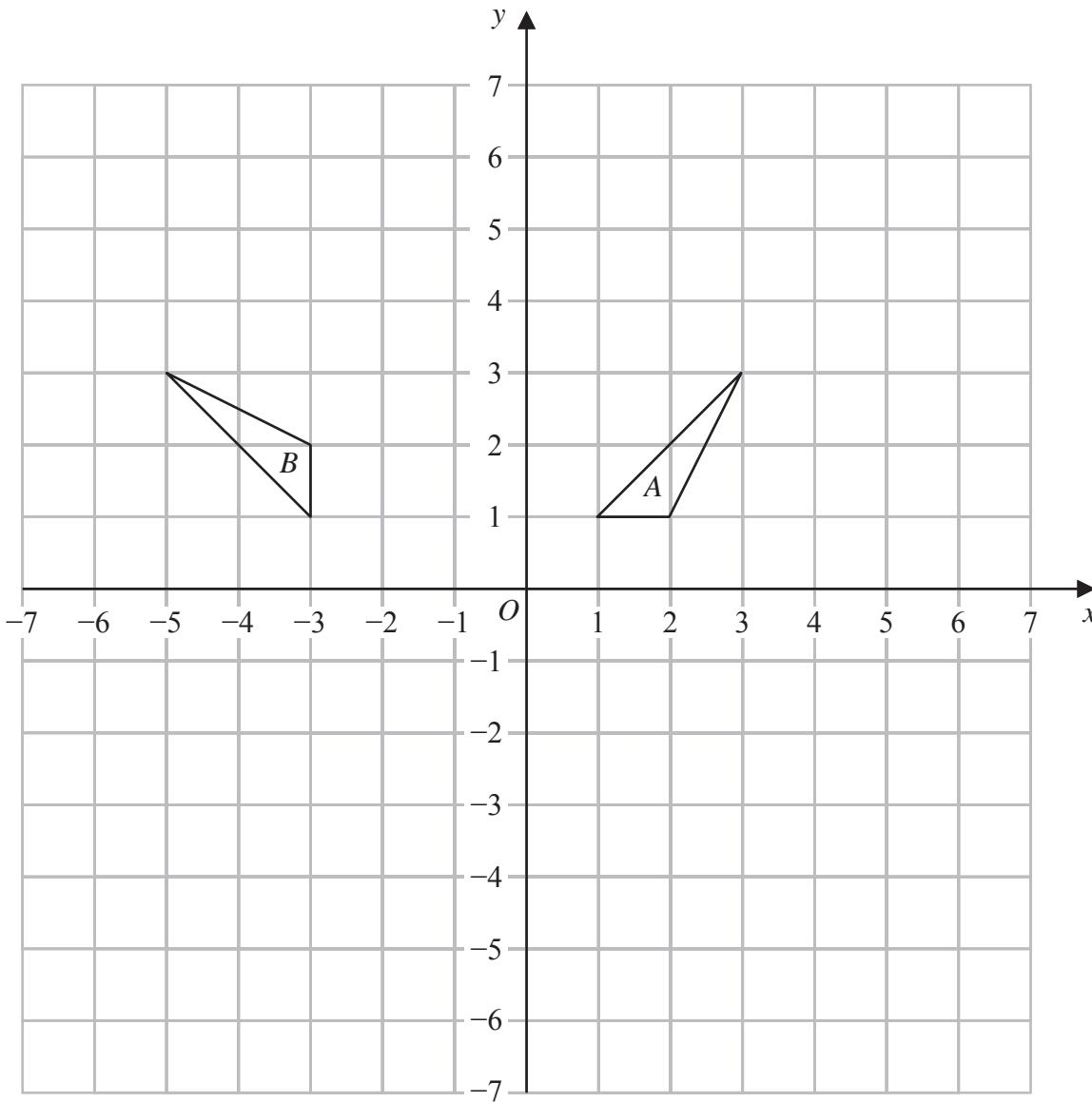
(d) On the grid, draw and label triangle E

(3)

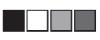
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Question 3 continued

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



Question 3 continued

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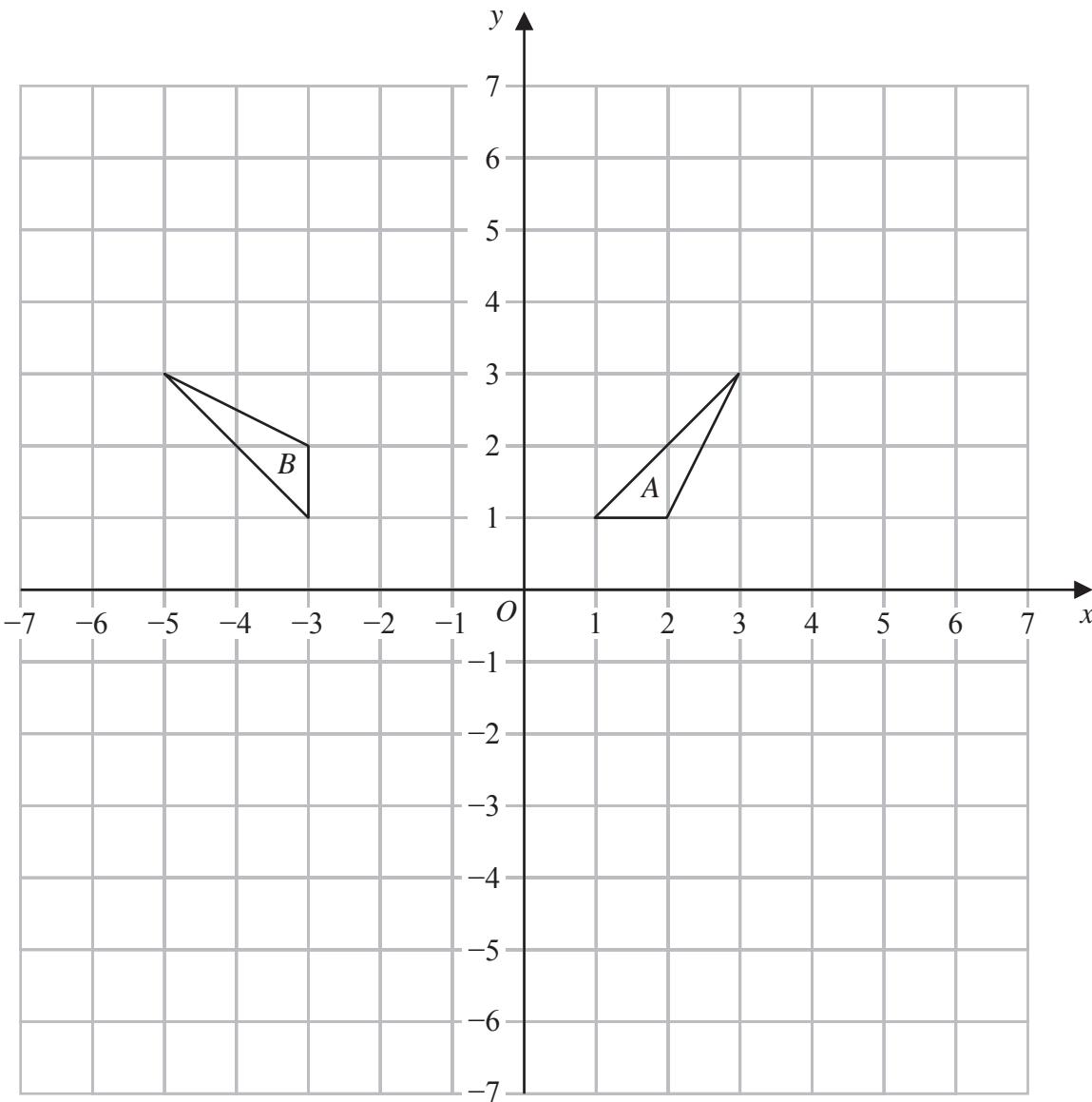
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Question 3 continued

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



(Total for Question 3 is 10 marks)



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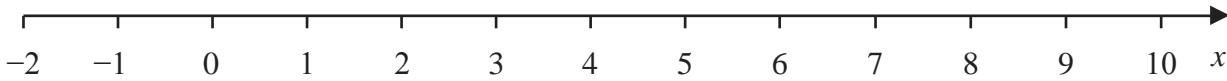
4 (a) Solve the inequality $4x+3 \leqslant 31$ (2)

(b) Solve the inequality $1 < 2x + 3 < 21$ (2)

(c) Hence represent on the number line opposite, the set of values of x for which

$$4x+3 \leq 31 \quad \text{and} \quad 1 < 2x+3 < 21 \quad (2)$$



Question 4 continued

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(Total for Question 4 is 6 marks)



P 7 3 4 9 7 A 0 1 1 3 2

- 5** (a) Complete the table of values for $y = 2x^3 - 5x + 3$

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y		3.75	6	5.25	3	0.75		2.25	

(2)

- (b) On the grid opposite, plot the points from your completed table and join them to form a smooth curve.

(2)

- (c) By drawing a suitable straight line on your grid, find estimates to one decimal place, for the solutions of the equation $2x^3 - 5x + 3 = 2$ in the range $-2 \leq x \leq 2$

(2)

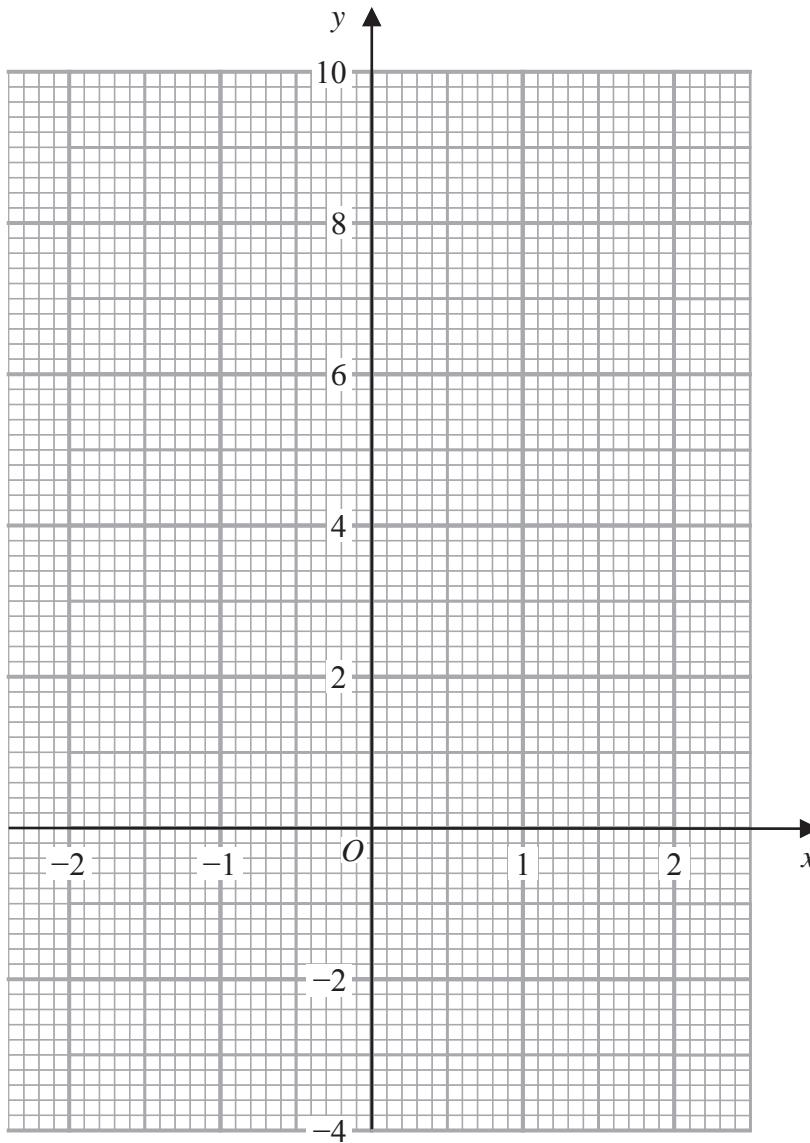


Question 5 continued

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**(Total for Question 5 is 6 marks)**

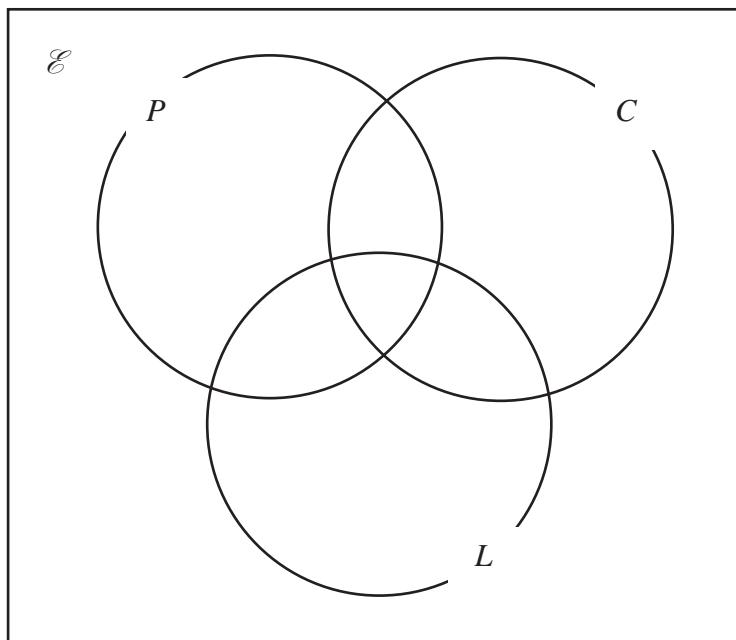
P 7 3 4 9 7 A 0 1 3 3 2

- 6 80 gardeners were asked if they grow potatoes (P), carrots (C) or lettuce (L)

Of these gardeners

- 9 grow potatoes, carrots and lettuce
- 17 grow potatoes and carrots
- 23 grow carrots and lettuce
- 19 grow potatoes and lettuce
- 48 grow carrots
- 49 grow lettuce
- 2 grow none of these three crops

- (a) Using this information, complete the Venn diagram below to show the number of gardeners in each subset.



(3)

- (b) Find $n(C \cap L')$

(1)

One of the gardeners is chosen at random.

Given that this gardener grows carrots,

- (c) find the probability that this gardener also grows lettuce.

(2)



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Question 6 continued

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(Total for Question 6 is 6 marks)



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7 $\mathbf{A} = \begin{pmatrix} 10 & -6 \\ -8 & 5 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} -15 & 10 \\ 14 & -5 \end{pmatrix}$ $\mathbf{C} = \begin{pmatrix} 1 & -3 & 1 \\ 2 & -4 & -2 \end{pmatrix}$

(a) Find $4\mathbf{A} + 2\mathbf{B}$ (2)

(b) Find \mathbf{AC} (3)

(c) Find the matrix \mathbf{D} such that $\mathbf{A}^{-1} + \mathbf{D} = 2\mathbf{I}$ where $\mathbf{I} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (4)

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[The inverse of matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $\frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$]



Question 7 continued

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(Total for Question 7 is 9 marks)



P 7 3 4 9 7 A 0 1 7 3 2

8 Aalia delivers letters and parcels.

- (a) Last week Aalia worked for 5 days and wrote down 5 integers that represent the distance, in miles, she drove each day.

For these integers

the mode is 15
the median is 16
the largest – the smallest = 7

Find 5 integers that Aalia could have written down.

(3)

- (b) Aalia has 8 letters to deliver to Tom.

The mean weight of the 8 letters is 104 grams.

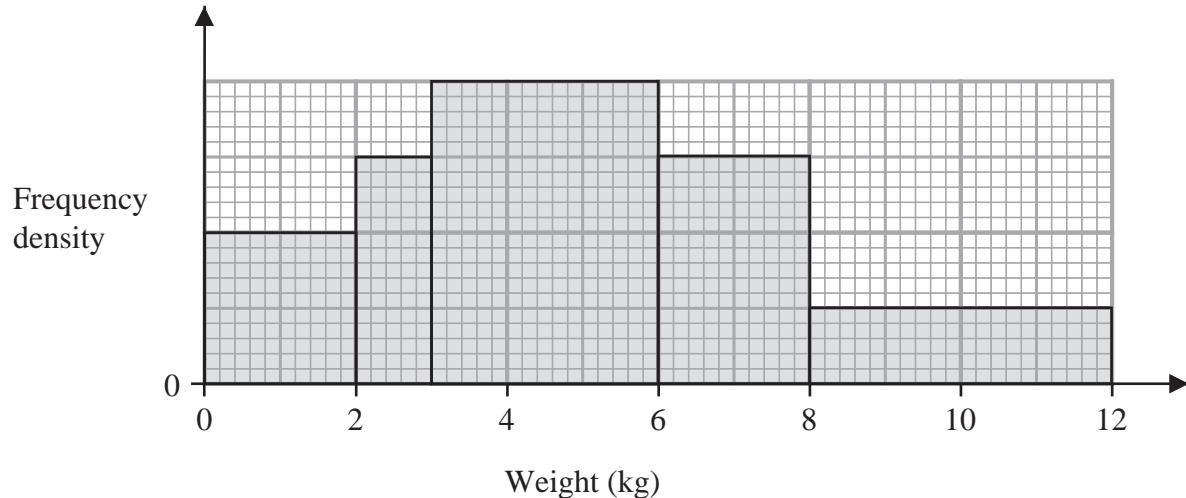
5 of the letters are each of weight 89 grams.

The mean weight of the remaining letters is A grams.

Work out the value of A

(3)

The histogram shows information about the weights of all the parcels Aalia has in her delivery van on Friday.



75 of the parcels in the van each have a weight between 2 kg and 6 kg.

Aalia takes 2 parcels at random from the van.

- (c) Find an estimate for the probability that both parcels weigh more than 4 kg.

(5)

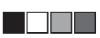


Question 8 continued

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Question 8 continued

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Question 8 continued

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(Total for Question 8 is 11 marks)



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9

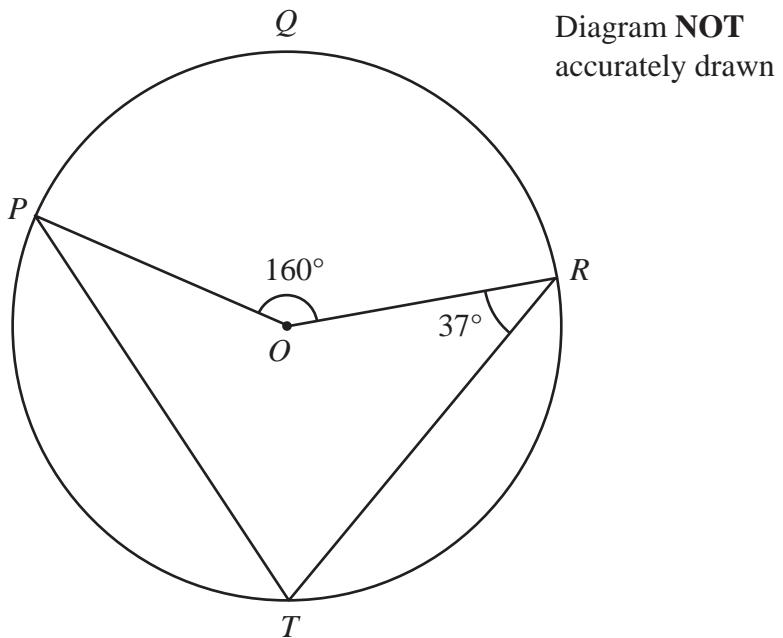
**Figure 2**

Figure 2 shows the points P , Q , R and T on a circle centre O

$$\angle POR = 160^\circ \quad \angle ORT = 37^\circ$$

- (a) (i) Work out the size, in degrees, of $\angle PTR$ (1)
 (ii) Give a reason for your answer. (1)
- (b) Work out the size, in degrees, of $\angle TPO$ (2)

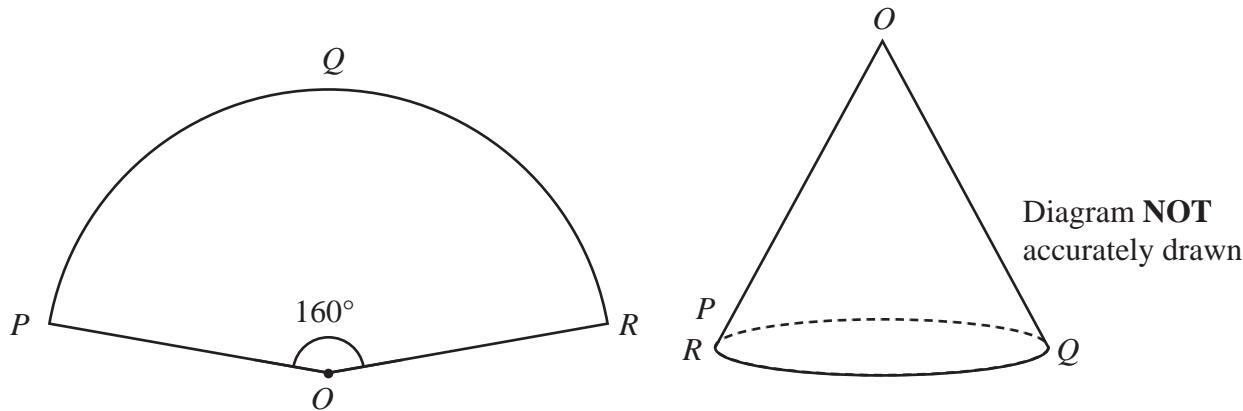


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Question 9 continued

The sector, $OPQR$, is cut out from the circle in Figure 2

A hollow right circular cone is formed by joining OP and OR together as shown in Figure 3

**Figure 3**

The curved surface area of the cone is $\frac{196}{25}\pi \text{ cm}^2$

- (c) Calculate the volume, in cm^3 to 3 significant figures, of the cone.

(6)

$$\left(\begin{array}{l} \text{Volume of cone} = \frac{1}{3}\pi r^2 h \\ \text{Curved surface area of cone} = \pi r l \end{array} \right)$$



P 7 3 4 9 7 A 0 2 3 3 2

Question 9 continued

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Question 9 continued

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(Total for Question 9 is 10 marks)



P 7 3 4 9 7 A 0 2 5 3 2

10 f and g are two functions such that

$$f : x \mapsto x^2 + 2x \quad \text{where } x > -1$$

$$g : x \mapsto \frac{13}{x+2}$$

- (a) State the value of x that must be excluded from any domain of g

(1)

- (b) Find $f(3)$

(1)

- (c) Find the value of x for which $g(x) = 5$

(2)

- (d) Find $fg(24)$

(2)

- (e) Find the value of x for which $gf(x) = 4$

Show your working clearly.

(4)

The function h is such that $h : x \mapsto 5x^2 - 10x - 4 \quad \text{where } x \geqslant 1$

- (f) Find the inverse of $h(x)$ in the form $h^{-1} : x \mapsto \dots$

(4)

[The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]

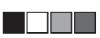


Question 10 continued

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Question 10 continued

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Question 10 continued

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(Total for Question 10 is 14 marks)



P 7 3 4 9 7 A 0 2 9 3 2

11 Solve the simultaneous equations

$$\begin{aligned}x - y &= 5 \\2x^2 + y^2 + 2xy &= 85\end{aligned}$$

Show clear algebraic working.

(6)

[The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]



Question 11 continued

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P 7 3 4 9 7 A 0 3 1 3 2

31

Turn over

$$12 \quad \frac{35 \times (\sqrt[3]{25})^{6(2a-3)}}{7 \times 25^{2a+1}} = 5^w$$

Find an expression for w in terms of a
Give your answer in the form $na + m$ where n and m are integers.

(4)

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(Total for Question 12 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

