Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Wednesday 11 June 2025

Morning (Time: 2 hours 30 minutes)

Paper reference **4MB1/02**

Mathematics B
PAPER 2

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 8 9 5 3 A 0 1 4 0

Pearson

Answer ALL TWELVE questions.

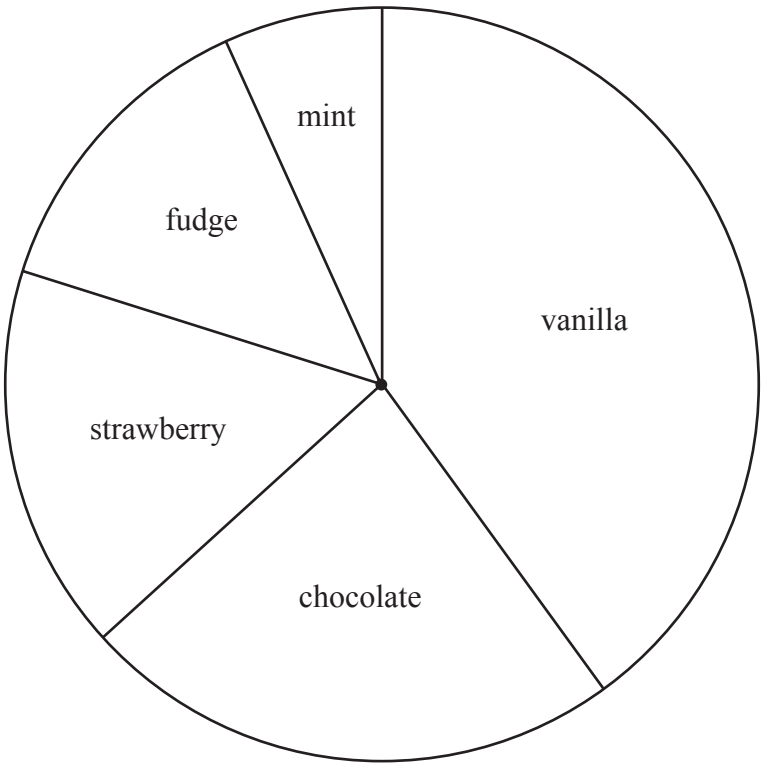
Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Charles asks each of the students in his class which flavour of ice cream they prefer.

There are 30 students in his class.

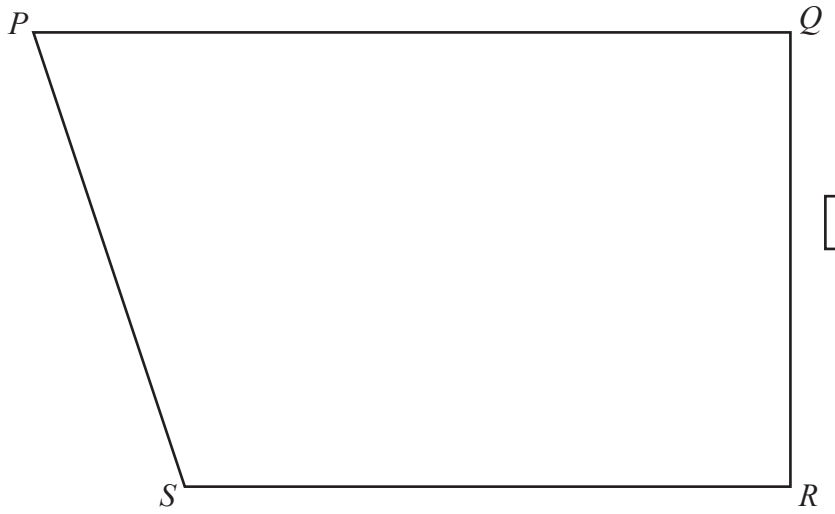
He uses the information he collects to draw this accurate pie chart.



Find how many of the 30 students prefer chocolate ice cream.

(Total for Question 1 is 3 marks)

2



Scale: 1 cm represents 2 metres

The trapezium *PQRS* is a scale drawing of Abdul's garden.

(a) Construct the locus of all points inside the trapezium that are 6 metres from *P*

(1)

(b) Construct the locus of all points inside the trapezium that are 12 metres from *QR*

(1)

(c) Using ruler and compasses only and **showing all your construction lines**, construct the locus of all points inside the trapezium that are equidistant from *PS* and *RS*

(2)

Abdul is going to put a fountain in his garden.

The fountain must be

greater than 6 metres from *P*
greater than 12 metres from *QR*
closer to *PS* than to *RS*

(d) Show, by shading, the region in which Abdul can place the fountain.
Label the region **R**

(1)

(Total for Question 2 is 5 marks)

3 (a) Write 34 700 000 in standard form.

(1)

(b) Write 9.8×10^{-3} as an ordinary number.

(1)

$x = 5.4\times10^{121}$

$y = 2\times10^{120}$

(c) (i) Calculate xy
Give your answer in standard form.

(2)

(ii) Calculate $x + y$
Give your answer in standard form.

(2)

Question 3 continued

(Total for Question 3 is 6 marks)

4

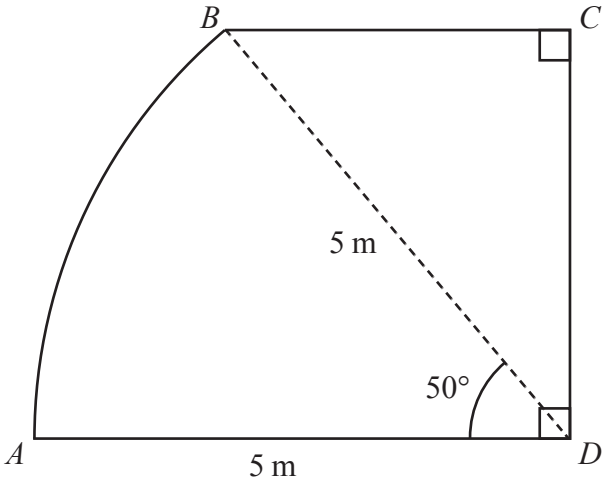


Diagram **NOT** accurately drawn

Figure 1

Figure 1 shows the section of a park, *ABCD*, where *ADB* is a sector of a circle centre *D*

$AD = BD = 5\,\text{m}$ $\angle ADB = 50°$ $\angle BCD = \angle CDA = 90°$

(a) Calculate the area, in m^2 to 3 significant figures, of the sector *ADB*

(2)

Grass is to be grown in this section *ABCD* of the park.
35 g of grass seed is needed for each $1\,\text{m}^2$

(b) Calculate, in g to the nearest g, the weight of grass seed needed to cover this section of the park.
Show all your working.

(4)

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Question 4 continued

(Total for Question 4 is 6 marks)

5 A company buys blankets, cushions and towels in the ratios

number of blankets : number of cushions : number of towels = 2 : 3 : 6

The company buys a total of 3850 of these items.

(a) Calculate the number of blankets that the company buys.

(2)

The company sells each cushion for £15.95
The company makes a profit of 16% on each cushion.

(b) Calculate, in £, how much the company pays for each cushion.

(2)

The company buys 1500 small towels for £7 each and 600 large towels for £11 each.

In January, it sells $\frac{3}{5}$ of the small towels for £15 each and 95% of the large towels for £18 each. The remaining towels were given away for free.

(c) Calculate the percentage profit that the company makes in January.
Give your answer to one decimal place.

(4)

The company buys some items from a new supplier.
The company spends $9460

Using the exchange rate of £1 = $1.23

(d) calculate the amount, in £ to the nearest £, that the company spends with this new supplier.

(1)

Question 5 continued

Question 5 continued

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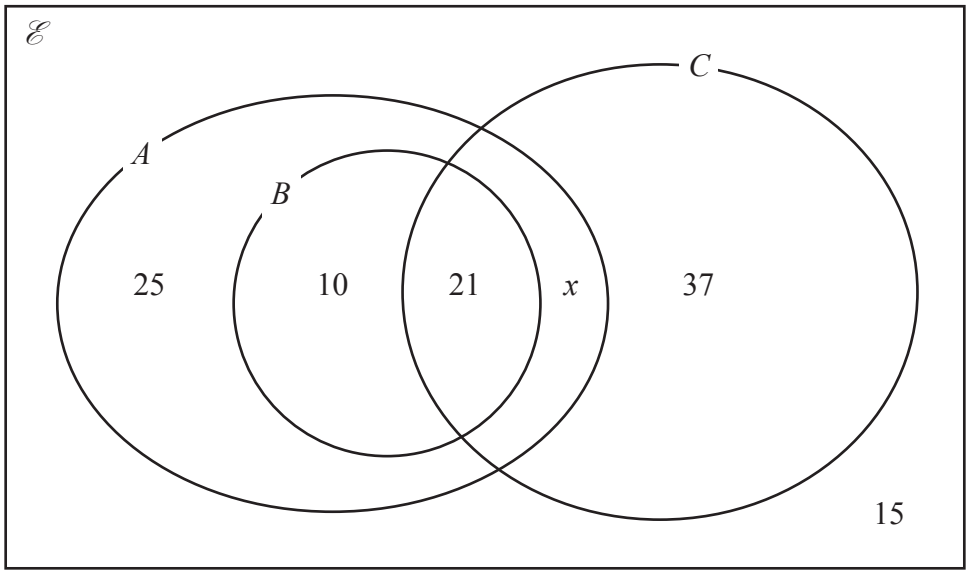
Question 5 continued

(Total for Question 5 is 9 marks)

6 The Venn diagram shows information about the number of students in a school who are members of the Athletics Club (A), the Brass Band (B) and the Chess Club (C)

15 students are not members of any of these clubs.



There are twice as many members of the Chess Club than there are members of the Brass Band.

(a) Find the value of x

(2)

(b) Find the number of these students who are **not** members of the Chess Club.

(1)

(c) Find the number of these students who are members of all three clubs.

(1)

(d) Find $\mathrm{n}(B \cup C')$

(1)

At the start of 2022, the Drama Club had 80 members.
From the start of 2022 until the start of 2023, the number of members of the Drama Club increased by 12.5%
From the start of 2023 until the start of 2024, the number of members of the Drama Club increased by 30%

(e) Calculate the number of students who were members of the Drama Club in 2024

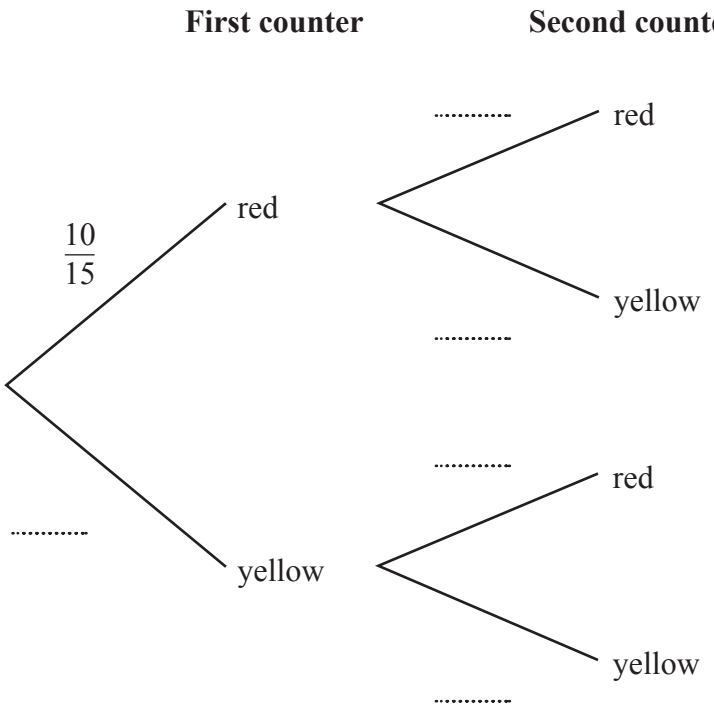
(2)

Question 6 continued

(Total for Question 6 is 7 marks)

7 Bag A contains 10 red counters and 5 yellow counters.
Two counters are taken at random from bag A.

(a) Complete the tree diagram below.



(2)

(b) Calculate the probability that the two counters taken are the same colour.

(2)

Bag B contains 4 red counters and 3 yellow counters.

The two counters that have been taken from bag A are both placed into bag B so that there are a total of 9 counters in bag B.
A counter is then taken at random from bag B.

Given that each of the two counters taken from bag A and the one counter taken from bag B are all the same colour,

(c) calculate the probability that the three counters are all red.

(3)

Question 7 continued

Question 7 continued

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Question 7 continued

(Total for Question 7 is 7 marks)

8

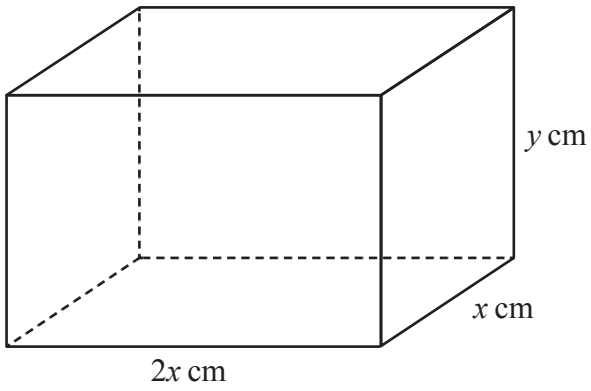

Figure 2

Figure 2 shows a solid cuboid with length $2x$ cm, width x cm and height y cm

The volume of the cuboid is a cm^3, where a is a constant.

The total surface area of the cuboid is S cm^2

(a) Show that $S = 4x^2 + \frac{3a}{x}$

(4)

Given that the minimum value of S is 400

(b) Find, to 3 significant figures, the value of a

(5)

Question 8 continued

Question 8 continued

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Question 8 continued

(Total for Question 8 is 9 marks)

9

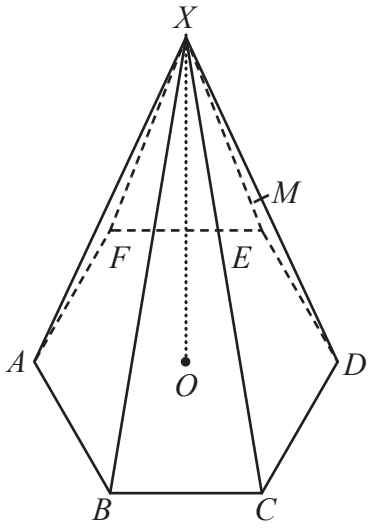

Diagram **NOT** accurately drawn

Figure 3

Figure 3 shows a solid right pyramid *ABCDEFX*

The base *ABCDEF* of the pyramid is horizontal and is a regular hexagon of side 3 cm

O is the midpoint of the base.

The vertex *X* of the pyramid is vertically above point *O* such that $OX = 5$ cm

M is the midpoint of *XD*

(a) Find the area, in cm^2 to one decimal place, of the hexagonal base.

(3)

(b) Calculate the size, in degrees to 3 significant figures, of $\angle AMX$
Show all your working.

(6)

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

Question 9 continued

Question 9 continued

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Question 9 continued

(Total for Question 9 is 9 marks)

10 $f(x) = x^3 - 3x - 2$

(a) Use the factor theorem to show that that $(x-2)$ is a factor of $f(x)$

(2)

(b) Hence, factorise $f(x)$ completely.

(3)

(c) Complete the table of values for $y = x^3 - 3x - 2$
Give your values of y to one decimal place where necessary.

x	–2	–1.5	–1	–0.5	0	0.5	1	1.5	2	2.5
y	–4	–0.9			–2	–3.4	–4		0	6.1

(2)

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

(3)

(e) By drawing a suitable straight line on the grid, find an estimate, to one decimal place, for the solution of the equation

$$2x^3 - 7x - 6 = 0 \text{ in the interval } -2 \leqslant x \leqslant 2.5$$

(3)

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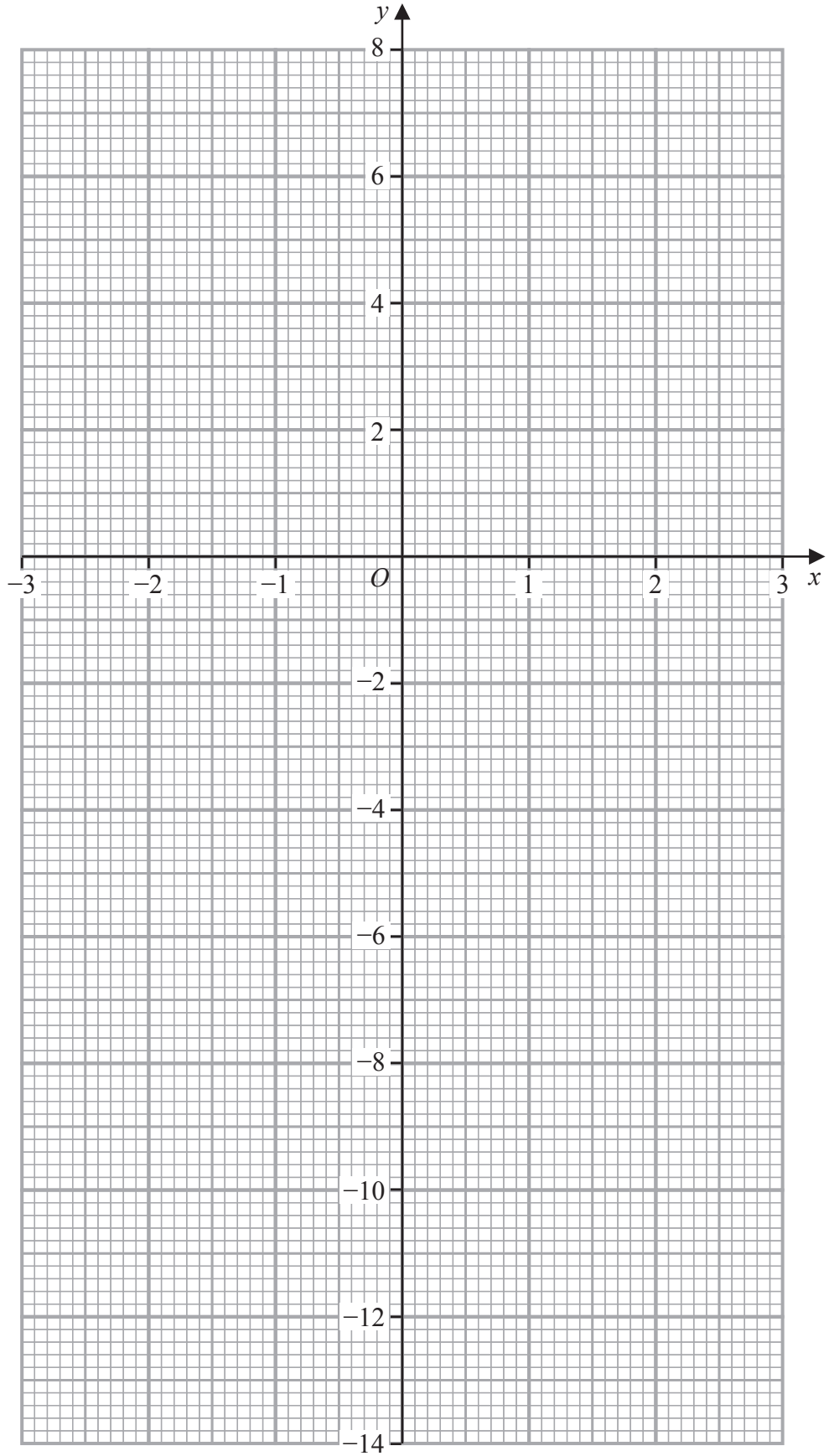
Question 10 continued



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

Question 10 continued

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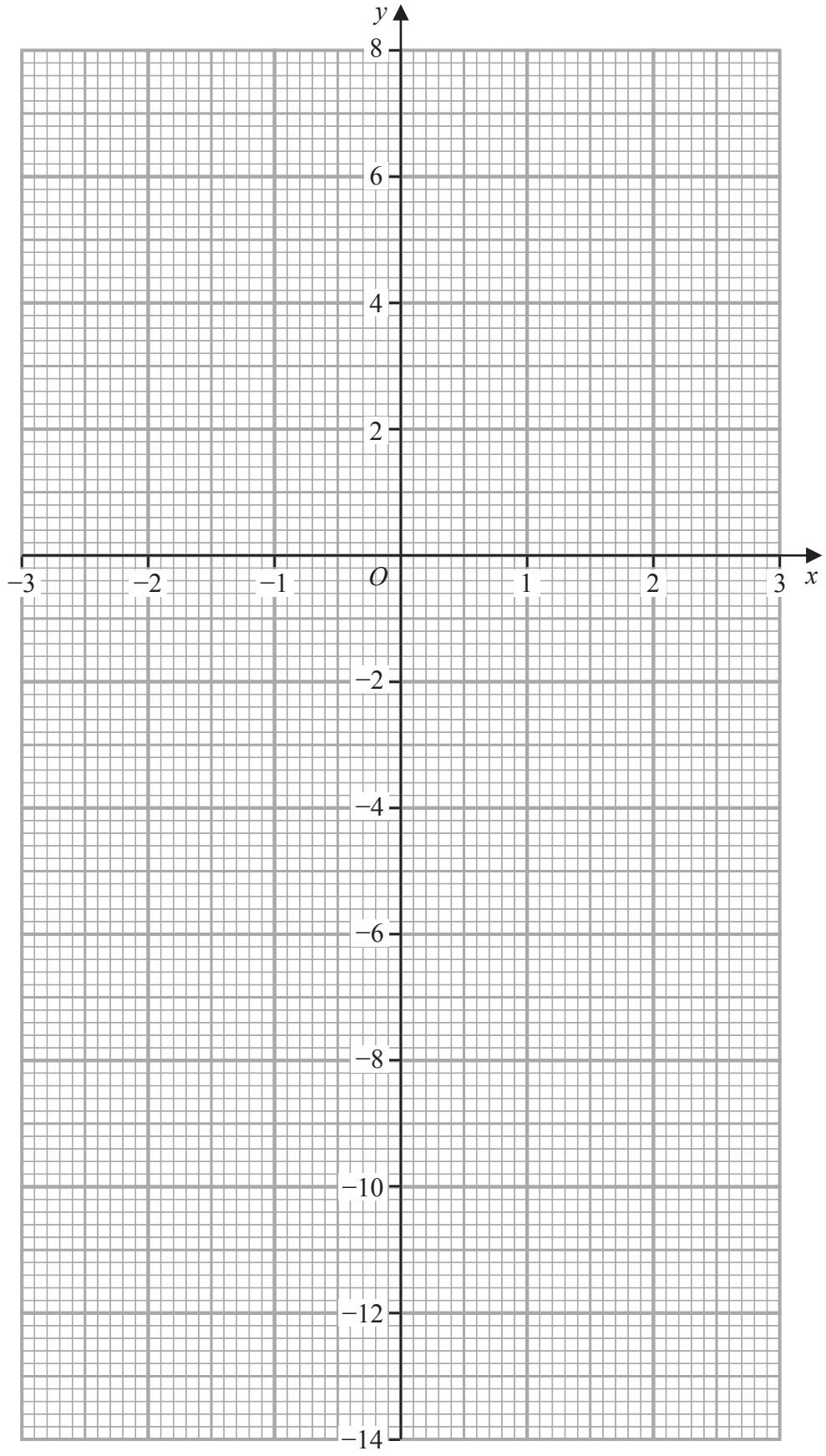
Question 10 continued

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



(Total for Question 10 is 13 marks)

11 The functions f, g and h are defined as

$$\mathrm{f} : x \mapsto 6 - \frac{1}{2}x^2 \qquad 0 < x < 3$$

$$\mathrm{g} : x \mapsto \frac{x}{x^2 + 6x + 8} + \frac{1}{x+2} \qquad x < -4$$

$$\mathrm{h} : x \mapsto \frac{x+5}{2x+3} \qquad x > 0$$

(a) Write g(x) as a single fraction in its simplest form.
Show clear algebraic working.

(3)

(b) Find hf(2)

(2)

(c) Find the inverse function h^{-1} in the form $\mathrm{h}^{-1} : x \mapsto ...$
Give your answer in its simplest form.

(4)

(d) Solve the equation $\mathrm{hh}(x) = x$
Show your working clearly.

(3)

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

Question 11 continued

Question 11 continued

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Question 11 continued

(Total for Question 11 is 12 marks)

12 Triangle A and triangle E are drawn on the grid opposite.

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

(3)

Triangle A is transformed to triangle B under a reflection in the y-axis.

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

(2)

Triangle A is transformed to triangle C under a translation with the vector $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

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

(2)

(d) Triangle A is transformed to triangle D under the transformation with matrix $\mathbf{M}$ where

$$\mathbf{M} = \begin{pmatrix} -2 & 1 \\ 1 & -3 \end{pmatrix}$$

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

(3)

Triangle F is transformed to triangle A under the transformation with matrix $\mathbf{N}$ where

$$\mathbf{N} = \begin{pmatrix} k & -5 \\ 1 & -1 \end{pmatrix}$$

Triangle F is transformed to triangle D under the transformation with matrix $\mathbf{P}$

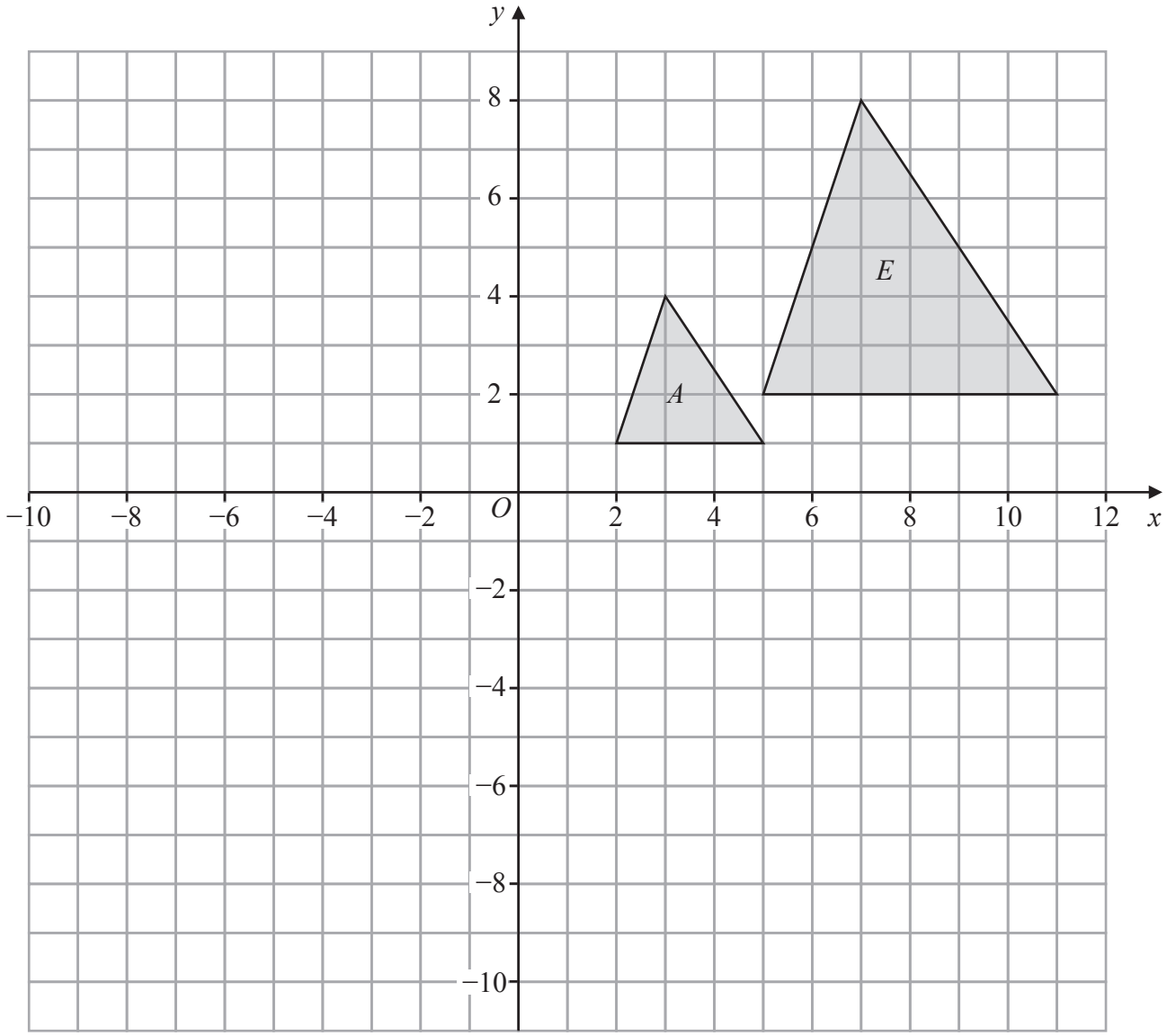
Given that the determinant of $\mathbf{P}$ is 5

(ii) calculate the value of k

(4)

$$\left[\textbf{Determinant of matrix } \begin{pmatrix} a & b \\ c & d \end{pmatrix} = ad - bc \right]$$

Question 12 continued



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

Question 12 continued

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Question 12 continued

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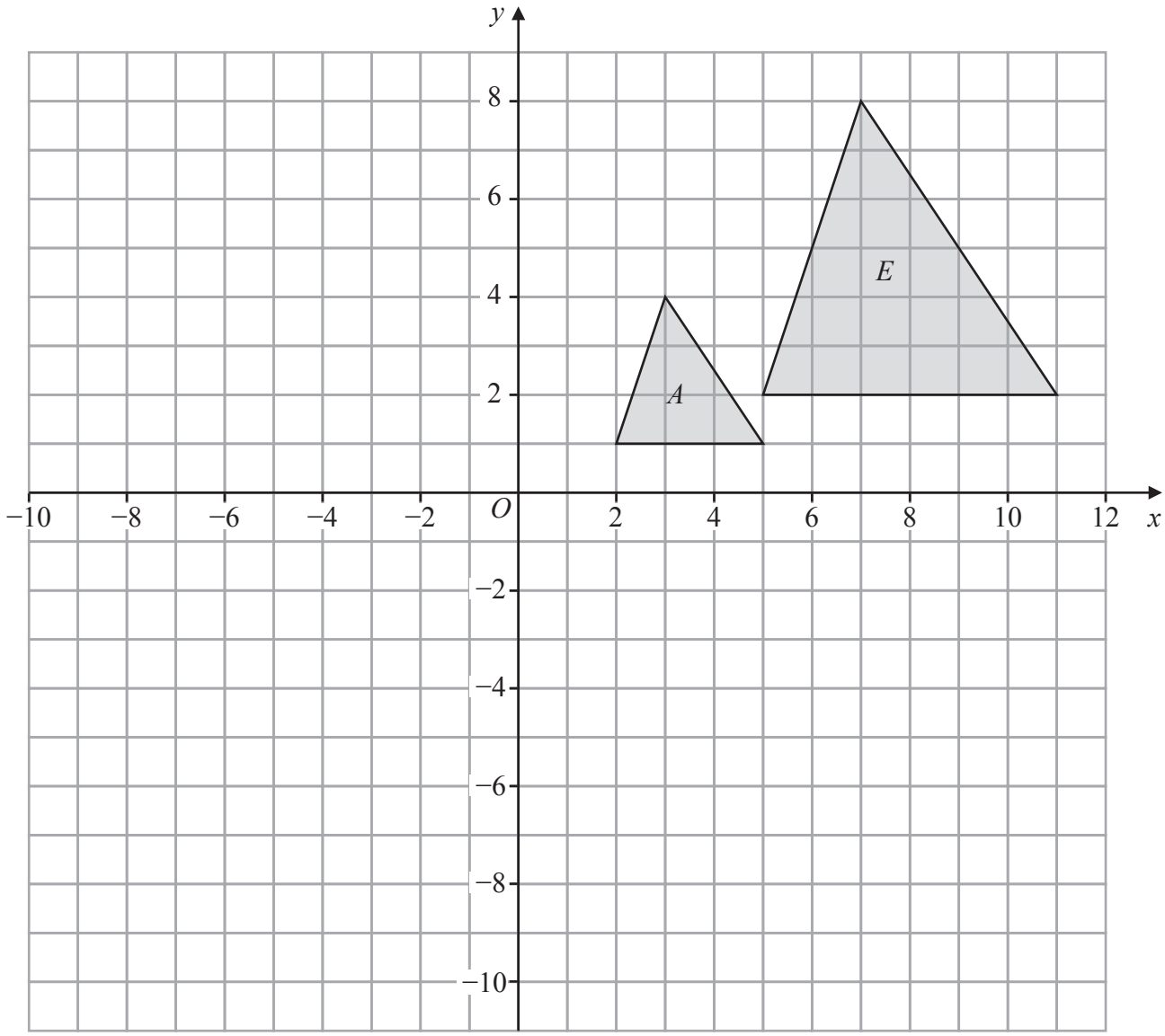

(Total for Question 12 is 14 marks)

TOTAL FOR PAPER IS 100 MARKS

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