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Centre Number | Candidate Number

# Pearson Edexcel International GCSE

**Time** 1 hour 30 minutes

**Paper reference** **4MB1/01R**

# Mathematics B

## PAPER 1R



**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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**Answer ALL TWENTY SIX questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** Write 48 seconds as a fraction of 1 day.
Give your answer in its simplest form.

.....

**(Total for Question 1 is 2 marks)**

**2** Here are the numbers of items that the last 9 people who visited a shop bought.

6 1 13 20 2 4 14 11 20

Find the median of these numbers of items.

.....

**(Total for Question 2 is 2 marks)**

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**3** Write down a formula for the $n$th term of the sequence.

7 11 15 19 23

.....

**(Total for Question 3 is 2 marks)**

**4** Simplify fully $(125a^9)^{\frac{2}{3}}$

.....

**(Total for Question 4 is 2 marks)**

**5** Given that $y = 21x^2 - \frac{8}{x}$

find $\frac{dy}{dx}$

$\frac{dy}{dx} =$ .....

**(Total for Question 5 is 2 marks)**

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**6** $A = 2^3 \times 3^4 \times 5^3 \times 11$
$B = 2^2 \times 3^3 \times 5^4$

Find the lowest common multiple (LCM) of $2A$ and $7B$
Give your answer as a product of prime factors.

.....

**(Total for Question 6 is 2 marks)**

**7** Without using a calculator, and showing all your working, evaluate

$$3\frac{2}{3} + 2\frac{4}{5}$$

Give your answer as a mixed number in its simplest form.

.....

**(Total for Question 7 is 3 marks)**

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**8** A farmer keeps cows, pigs and sheep.

The ratio of the number of cows he keeps to the number of pigs he keeps is 2 : 3
The ratio of the number of pigs he keeps to the number of sheep he keeps is 7 : 11

The farmer keeps 42 cows.

Work out the number of sheep the farmer keeps.

.....

**(Total for Question 8 is 3 marks)**

**9** Solve $3(2 - x)^2 - 75 = 0$
Show clear algebraic working.

$x =$ .....

**(Total for Question 9 is 3 marks)**

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**10** Simplify $\frac{7}{4x} + \frac{8}{3x} - \frac{2}{5x}$

Give your answer in its simplest form.

.....

**(Total for Question 10 is 3 marks)**

**11** $A = \frac{w - x}{y}$

$w = 21.7$ to one decimal place
$x = 12$ to the nearest whole number
$y = 20$ to the nearest ten

Find the lower bound for the value of $A$
Show your working clearly.

.....

**(Total for Question 11 is 3 marks)**

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**12** $M$ varies inversely as the cube of $p$

$M = 0.8$ when $p = 25$

Find a formula for $M$ in terms of $p$

.....

**(Total for Question 12 is 3 marks)**

**13** Solve

$$\frac{x+3}{7} + \frac{2x-1}{4} = 5$$

Show clear algebraic working.

$x =$ .....

**(Total for Question 13 is 3 marks)**

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**14** The diagram shows a square piece of card from which two semicircles are cut out.

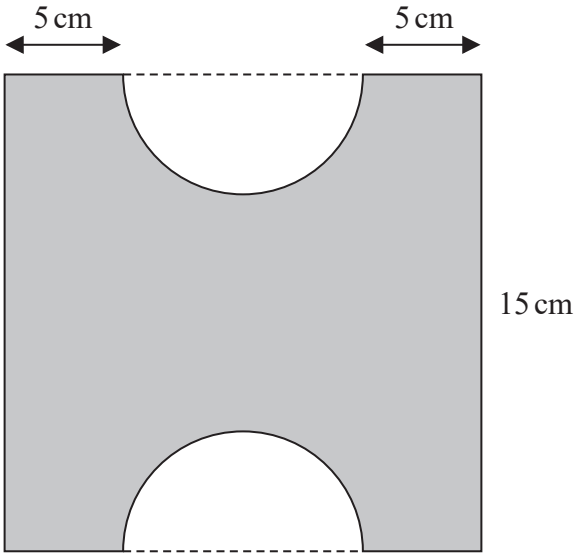


Diagram **NOT** accurately drawn

The square has a side of length 15 cm.

Calculate the area, in $cm^2$ to 3 significant figures, of the piece of card left when the semicircles are cut out.

..... $cm^2$

**(Total for Question 14 is 4 marks)**

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**15** Solve the simultaneous equations

$$9x + 7y = 3$$
$$5x - 4y = 6.4$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

**(Total for Question 15 is 4 marks)**

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**16**

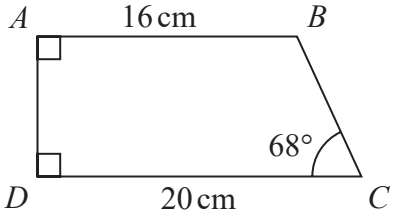


Diagram **N**
accurately dr

The diagram shows trapezium $ABCD$ in which

$AB = 16\,\text{cm}$ $DC = 20\,\text{cm}$ $\angle BCD = 68°$ $\angle BAD = \angle CDA = 90°$

Calculate the area, in $\text{cm}^2$ to 3 significant figures, of trapezium $ABCD$

..... $\text{cm}^2$

**(Total for Question 16 is 4 marks)**

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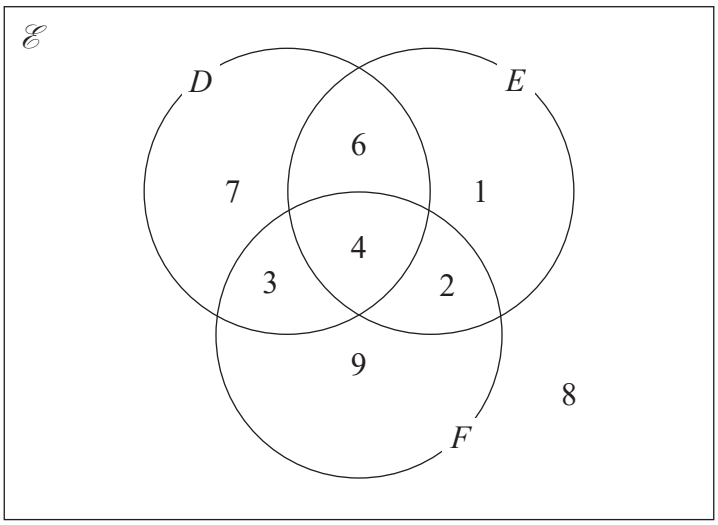
**17** The Venn diagram shows the sets $D$, $E$ and $F$ where the numbers represent **numbers** of elements.




(a) Find n($D \cup E$)

.....

**(1)**

(b) Find n($D \cap E'$)

.....

**(1)**

(c) Find n($F'$)

.....

**(1)**

(d) Find n([$D \cup F$] $\cap E'$)

.....

**(1)**

**(Total for Question 17 is 4 marks)**

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**18** Make $b$ the subject of $a = \sqrt{\dfrac{3b + 5}{b - d}}$

.....

**(Total for Question 18 is 4 marks)**

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**19**

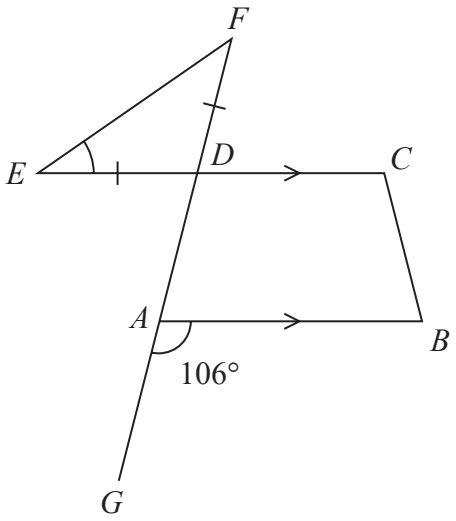


Diagram **NOT** accurately drawn

In the diagram, $ABCD$ is a trapezium and $EDF$ is an isosceles triangle with $DE = DF$

$EDC$ and $GADF$ are straight lines.

$\angle GAB = 106°$

Calculate the size, in degrees, of $\angle DEF$
Give reasons for each stage of your working.

$\angle DEF =$ ..... °

**(Total for Question 19 is 5 marks)**

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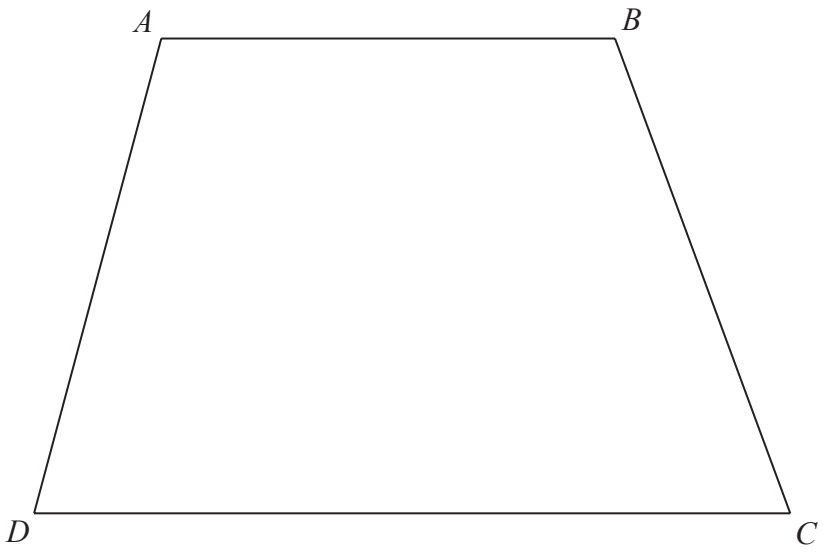
**20**




The diagram shows a quadrilateral $ABCD$

(a) Construct the locus of all points inside the quadrilateral that are 5 cm from $D$

**(1)**

(b) Using ruler and compasses only and **showing all your construction lines**, construct the locus of all points inside the quadrilateral that are equidistant from $AB$ and $BC$

**(2)**

(c) Construct the locus of all points inside the quadrilateral that are 3 cm from $BC$

**(1)**

The region $R$ consists of all the points inside the quadrilateral that are more than 5 cm from $D$, nearer to $BC$ than to $AB$ and more than 3 cm from $BC$

(d) Show, by shading, the region $R$
Label the region $R$

**(1)**

**(Total for Question 20 is 5 marks)**

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**21** $(x + 2)$ is a factor of $6x^3 + 31x^2 + kx + 30$

(a) Use the factor theorem to show that $k = 53$

**(2)**

(b) Factorise fully $6x^3 + 31x^2 + 53x + 30$

**(3)**

**(Total for Question 21 is 5 marks)**

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**22**

$$\mathbf{A} = \begin{pmatrix} 3 & 4 \\ 2 & -3 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} -2 & 3 \\ 4 & -1 \end{pmatrix} \qquad \mathbf{C} = \begin{pmatrix} 7 & x \\ 2 & 4 \end{pmatrix}$$

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

$\begin{pmatrix} \\ \\ \end{pmatrix}$

**(2)**

Given the determinant of **BC** is 20

(b) find the value of $x$

$x =$ .....

**(4)**

**(Total for Question 22 is 6 marks)**

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**23** (a) Simplify $7y^0$ where $y > 0$

.....

**(1)**

(b) Solve $\dfrac{2^2 \times 15^{2x} \times 3^{5x(x-3)} \times 3^{x+3} \times 4^{x-1}}{10^{2x}} = 81^3$

$x =$ .....

**(5)**

**(Total for Question 23 is 6 marks)**

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**24**

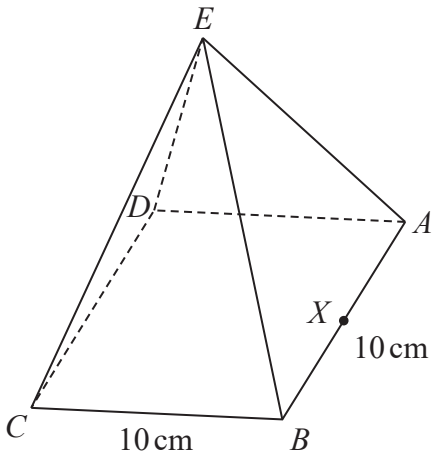


Diagram **NOT** accurately drawn

The diagram shows a solid right square-based pyramid $ABCDE$
The volume of the pyramid is $1000\,cm^3$

The pyramid is standing with its square base, $ABCD$, on a horizontal table.
The square base has side 10 cm.

$X$ is the midpoint of the side $AB$

Calculate the size, in degrees to the nearest degree, of $\angle CEX$

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**(Total for Question 24 is 5 marks)**

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**25**

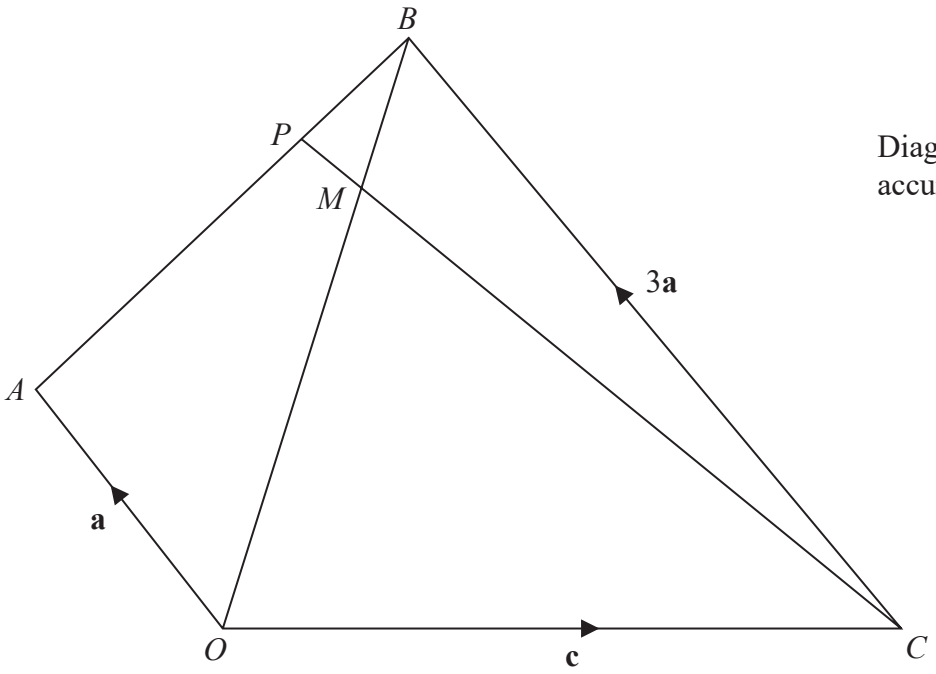


Diagram **NOT** accurately drawn

The diagram shows a quadrilateral $OABC$ in which

$$\overrightarrow{OA} = \mathbf{a} \qquad \overrightarrow{OC} = \mathbf{c} \qquad \overrightarrow{CB} = 3\mathbf{a}$$

The point $M$ lies on $OB$ such that $OM : MB = 7 : 3$
The point $P$ lies on $AB$ such that $CMP$ is a straight line.

(a) Find, in terms of **a** and **c**, simplifying your answer, the vector $\overrightarrow{CM}$

$\overrightarrow{CM} =$ .....

**(3)**

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(b) Using a vector method, and showing your working clearly, find $AP : PB$ in the fo
$x : y$ where $x$ and $y$ are integers.
Show your working clearly.

$AP : PB =$ .....

**(4)**

**(Total for Question 25 is 7 marks)**

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**26** Jenny has a shop.

One Monday, each of the 40 people who went in Jenny's shop were asked how long they were in the shop.

The table below shows information about the results.

| Time ($t$ minutes) | Frequency |
|---|---|
| $0 < t \leqslant 5$ | 10 |
| $5 < t \leqslant 15$ | 7 |
| $15 < t \leqslant 25$ | 5 |
| $25 < t \leqslant 30$ | 6 |
| $30 < t \leqslant 40$ | 12 |

(a) Calculate an estimate for the mean length of time, in minutes, that these people were in the shop.

..... minutes

**(4)**

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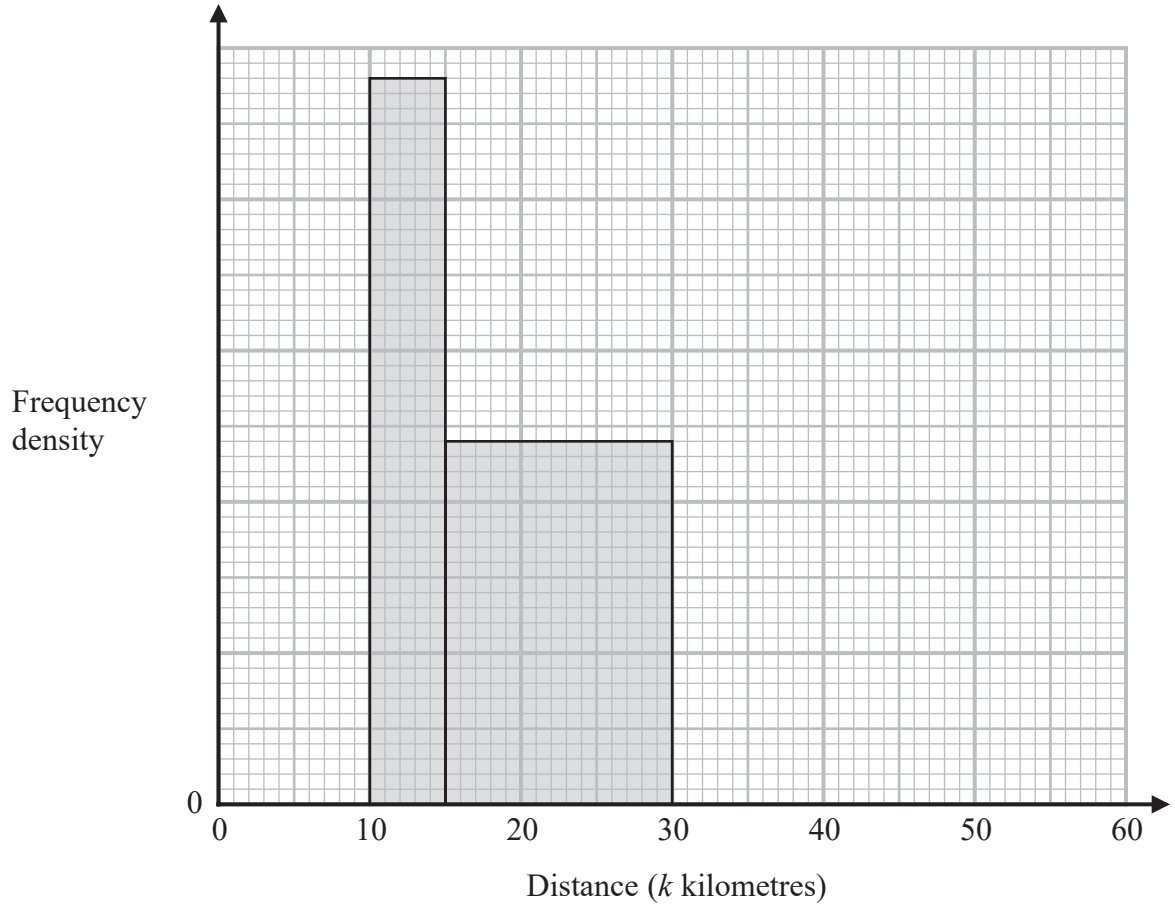
The incomplete table and the incomplete histogram give information about the numb of kilometres each of the 40 people had travelled to get to the shop.

| Distance ($k$ kilometres) | Frequency |
|---|---|
| $0 < k \leqslant 10$ | 4 |
| $10 < k \leqslant 15$ | |
| $15 < k \leqslant 30$ | |
| $30 < k \leqslant 60$ | 6 |

None of the people travelled more than 60 km.




(b) Complete the histogram and the frequency table.

**(4)**

**(Total for Question 26 is 8 marks)**

**TOTAL FOR PAPER IS 100 MARKS**

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