Please check the examination details below before entering your candidate information

| Candidate surname | Other names |
|---|---|

Centre Number | Candidate Number

# Pearson Edexcel International GCSE

## Tuesday 14 May 2024

Afternoon (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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P 7 3 4 9 5 A 0 1 2 4

Pearson

**Answer all TWENTY SIX questions.**

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

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

**1** Write 75 millimetres as a fraction of 3 metres.
Give your answer in its simplest form.

.....

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

**2** (a) Write 5.142 557 to 3 decimal places.

.....

**(1)**

(b) Write 6281 to 3 significant figures.

.....

**(1)**

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

**3** Simplify $\frac{8t^7v^3}{2t^2v}$

.....

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

**4** The *n*th term of a sequence is given by $7n^2 + 100$

(a) Find the 5th term of the sequence.

.....

**(1)**

Barney says that 37 is a term in the sequence.
Barney is wrong.

(b) Explain why Barney is wrong.

.....

.....

**(1)**

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

**5** Evaluate $\dfrac{6\times10^9 + 1.8\times10^8}{3\times10^2}$

Give your answer in standard form.

.....

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

**6** Simplify $(36a^8c^2)^{\frac{3}{2}}$

.....

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

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

$$2\frac{1}{4} \div 2\frac{1}{7}$$

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

.....

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

**8** Given that $y = 12x^3 + \frac{16}{x^2}$

find $\frac{dy}{dx}$

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

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

**9** $X = \frac{a}{c - f}$

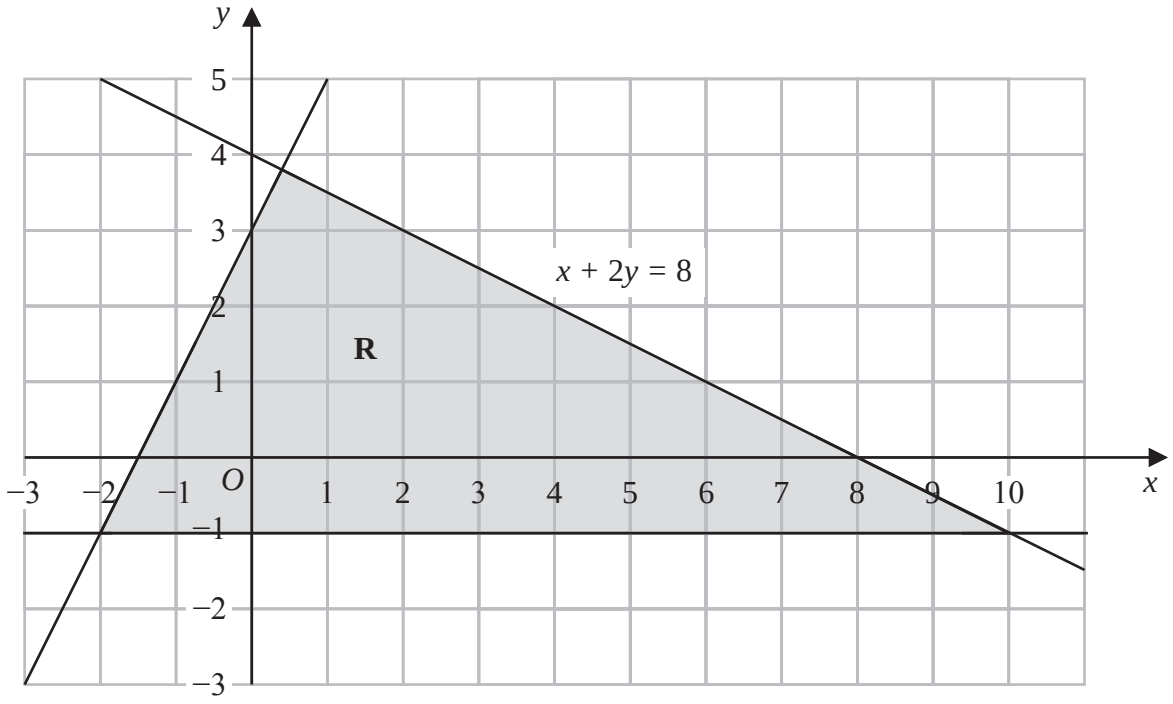
$a$ = 40 to the nearest whole number
$c$ = 2.2 to 1 decimal place
$f$ = 0.6 to 1 decimal place

Calculate the upper bound for the value of $X$
Show your working clearly.

.....

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

**10**




The region **R**, shown shaded in the diagram, is bounded by three straight lines.

Find three inequalities that define **R**

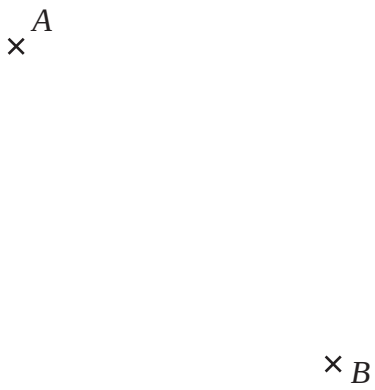
.....

.....

.....

**(Total for Question 10 is 4 marks)**

**11** The diagram shows the point $A$ and the point $B$




(a) Construct the locus of all points that are 4 cm from $A$

**(1)**

(b) Using ruler and compasses, and **showing all your construction lines**, construct the perpendicular bisector of $AB$

**(2)**

The region $R$ consists of all the points that are nearer to $B$ than to $A$ and that are less than 4 cm from $A$

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

**(1)**

**(Total for Question 11 is 4 marks)**

**12**

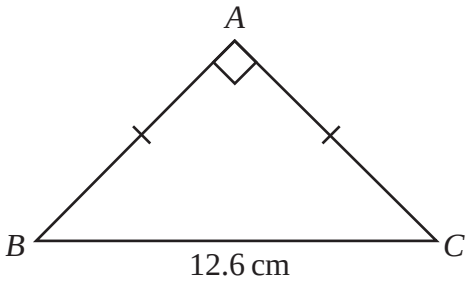



Diagram **NOT** accurately drawn

The diagram shows isosceles triangle $ABC$ where $AB = AC$

$\angle BAC = 90°$ $BC = 12.6$ cm

Calculate the perimeter, in cm to one decimal place, of the triangle.

..... cm

**(Total for Question 12 is 4 marks)**

**13**

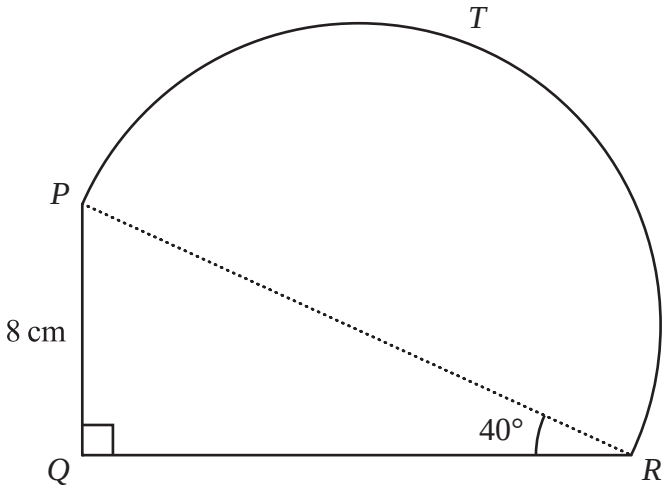



Diagram **NOT** accurately drawn

The diagram shows shape *PTRQ* where *PRQ* is a triangle and *PTR* is a semicircle with diameter *PR*

$$\angle PQR = 90° \qquad \angle PRQ = 40° \qquad PQ = 8 \text{ cm}$$

Calculate the total area, in cm² to the nearest whole number, of shape *PTRQ*

..... $cm^2$

**(Total for Question 13 is 4 marks)**

**14** Solve the simultaneous equations

$$2x + 6y = 14$$
$$3x + 5y = 10$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

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

**15** Make $y$ the subject of $c = \sqrt{\dfrac{3y + 5}{8 - y}}$

.....

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

**16**

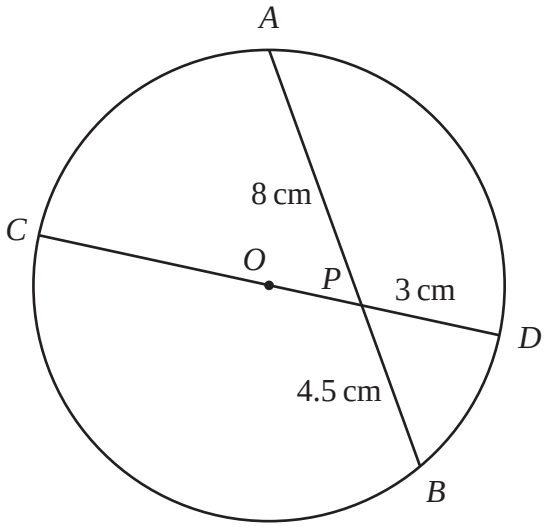



Diagram **NOT** accurately drawn

*A*, *D*, *B* and *C* are points on a circle centre *O*

*COD* is a diameter of the circle.
*AB* is a chord of the circle.
*COD* and *AB* intersect at the point *P*

$AP = 8$ cm  $PB = 4.5$ cm  $PD = 3$ cm

Calculate the circumference, in cm to 3 significant figures, of the circle.

..... cm

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

**17** $\overrightarrow{OA} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ $\overrightarrow{BA} = \begin{pmatrix} 5 \\ -9 \end{pmatrix}$

(a) Find the position vector of the point $B$

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

**(2)**

(b) Calculate $\left|\overrightarrow{OB}\right|$, giving your answer as a surd.

$\left|\overrightarrow{OB}\right| =$ .....

**(2)**

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

**18** The table gives information about the heights, in cm, of 80 plants in a garden.

| Height ($h$ cm) | Frequency |
|---|---|
| $0 < h \leqslant 10$ | 2 |
| $10 < h \leqslant 20$ | 26 |
| $20 < h \leqslant 30$ | 10 |
| $30 < h \leqslant 40$ | 24 |
| $40 < h \leqslant 50$ | 18 |

(a) Find the class interval that contains the median height of these plants.

.....

**(1)**

(b) Calculate an estimate for the mean height, in cm, of these plants.

..... cm

**(4)**

**(Total for Question 18 is 5 marks)**

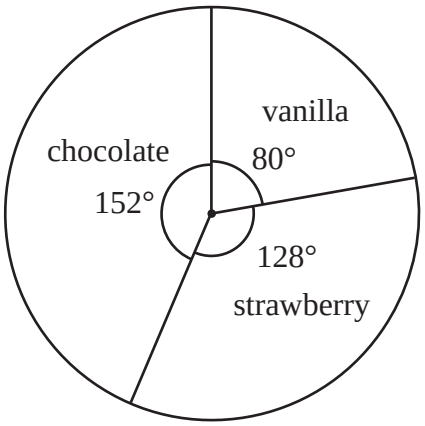
**19** The students in class **7T** and the students in class **8Y** were asked to name their favourite ice cream flavour.

The table shows information about the favourite ice cream flavour for class **7T**
The pie chart shows information about the favourite ice cream flavour for class **8Y**

class **7T**

| **ice cream flavour** | **number of students** |
|---|---|
| vanilla | $3x + 1$ |
| strawberry | $5x - 12$ |
| chocolate | $2x + 3$ |

class **8Y**




There are 32 students in class **7T**
There are 45 students in class **8Y**

More students in class **7T** than in class **8Y** said vanilla was their favourite ice cream flavour.

Find how many more.

.....

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

**20** (a) Solve $\frac{7+3y}{2}+5=4y-7$

Show clear algebraic working.

$y =$ .....

**(3)**

$A = 8x - 2w$

(b) Work out the value of $x$ when $A = -35$ and $w = -4.5$

$x =$ .....

**(2)**

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



**21**

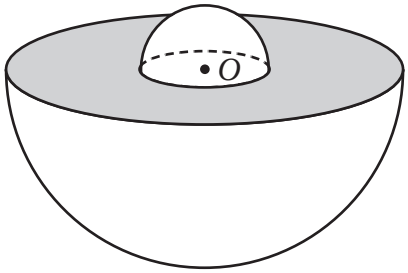



Diagram **NOT** accurately drawn

The diagram shows a solid shape made by joining a large hemisphere and a small hemisphere.

The centre of the base of the large hemisphere and the centre of the base of the small hemisphere meet at the point $O$

radius of large hemisphere : radius of small hemisphere = 3 : 1

The total surface area of the solid shape is $567\pi$ cm$^2$

Calculate the total volume, in cm$^3$ to 3 significant figures, of the solid shape.

..... $cm^3$

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

**Turn over for Question 22**

**22** (a) Express $\sqrt{50}+\sqrt{242}$ in the form $a\sqrt{a}$ where $a$ is an integer.

.....

**(2)**

(b) Express $\dfrac{12}{\sqrt{5}-1}$ in the form $y\sqrt{x}+y$ where $x$ and $y$ are integers.

Show each stage of your working.

.....

**(3)**

**(Total for Question 22 is 5 marks)**

**23** $(x+4)$ is a factor of $6x^3+kx^2-26x-24$, where $k$ is a constant.

(a) Use the factor theorem to show that $k = 19$

**(2)**

(b) Hence solve $6x^3+19x^2-26x-24=0$
Show clear algebraic working.

.....

**(4)**

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

**24** There are only pink and yellow sweets in a bag containing $N$ sweets.

There are 25 more pink sweets than yellow sweets.

Stan takes at random 2 sweets from the bag.

The probability that Stan takes 2 pink sweets from the bag is $\frac{7}{19}$

Find the probability that Stan takes 2 yellow sweets from the bag.
Show clear algebraic working.

.....

**(Total for Question 24 is 6 marks)**

**Turn over for Question 25**

**25**

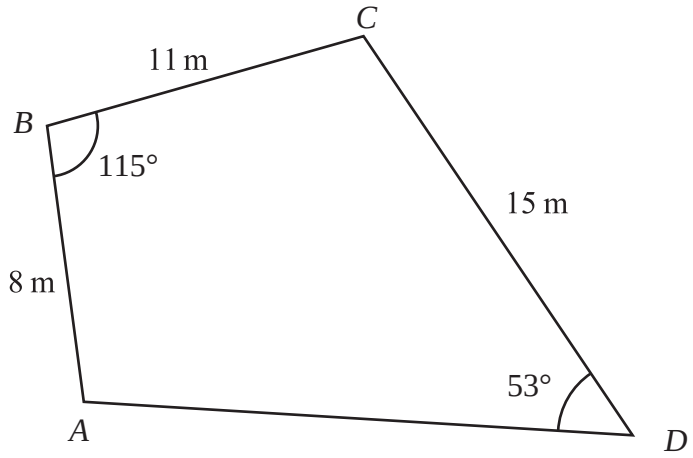



Diagram **NOT** accurately drawn

The diagram represents a small horizontal field *ABCD*

$AB = 8$ m  $BC = 11$ m  $CD = 15$ m

$\angle ABC = 115°$  $\angle ADC = 53°$

Calculate, in m² to the nearest whole number, the area of the field.

..... $m^2$

**(Total for Question 25 is 5 marks)**

**Turn over for Question 26**

**26** Show that $\left(\frac{6}{x-2}+\frac{4}{x+3}\right)\times\frac{5x^2-15x+10}{x^2-1}$ can be written in the form $\frac{p}{x+q}$ where $p$ and $q$ are integers to be found.

**(Total for Question 26 is 5 marks)**

**TOTAL FOR PAPER IS 100 MARKS**