

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel**  
**International GCSE**

Centre Number

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Candidate Number

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**Monday 7 January 2019**

Morning (Time: 1 hour 30 minutes)

Paper Reference **4MB1/01**

**Mathematics B**  
**Paper 1**



**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 ►

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**Pearson**

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 A shop sells a tablet computer for \$230  
The shop increases the price of the tablet computer by 5%  
Calculate the price of the tablet computer after this price increase.

\$

(Total for Question 1 is 2 marks)

- 2 The  $n$ th term of a sequence is given by  $5n^2 - 2$   
Find the first 3 terms of this sequence.

(Total for Question 2 is 2 marks)

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- 3 The lengths of the sides of a triangle are in the ratios 4:5:6  
The perimeter of the triangle is 80 cm.

Find the length of the longest side of the triangle.

cm

(Total for Question 3 is 2 marks)

- 4 Factorise fully  $9x^2y + 12xy^2z$

(Total for Question 4 is 2 marks)

- 5 Make  $x$  the subject of  $y = \frac{8(x+1)}{w}$

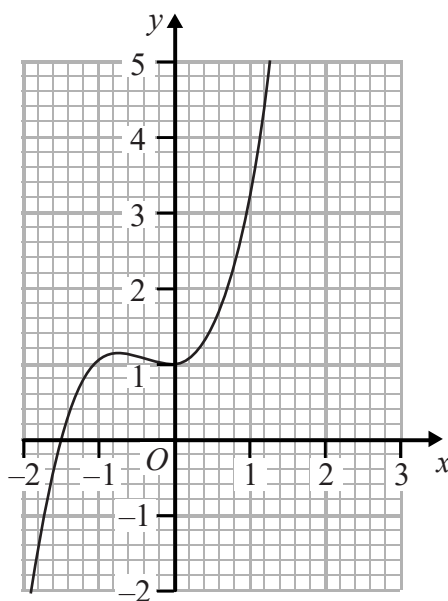
(Total for Question 5 is 2 marks)



6 Simplify fully  $\frac{(2xy^2)^3}{4xy^2}$

(Total for Question 6 is 2 marks)

7



The diagram shows a curve drawn on a grid.

By drawing a suitable straight line on the grid, find an estimate, to one decimal place, of the gradient of the curve at the point when  $x = 1$

(Total for Question 7 is 2 marks)



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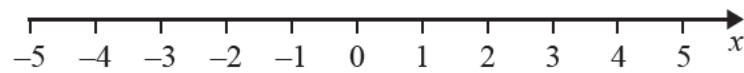
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8 (a) Solve the inequality  $5x + 4 < 20 - 3x$

(2)

(b) Represent, on the number line below, your solution of the inequality in part (a).



(1)

(Total for Question 8 is 3 marks)

9 The points  $O, A, B$  and  $C$  are such that  $\vec{OA} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$ ,  $\vec{OB} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$  and  $\vec{AC} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$

Find  $|\vec{BC}|$

$$|\vec{BC}| =$$

(Total for Question 9 is 3 marks)



10 (a) Write 340 000 000 in standard form.

(1)

(b) Calculate, giving your answer in standard form,  $(2 \times 10^{99}) \div (5 \times 10^{110})$

(2)

(Total for Question 10 is 3 marks)

11 Given that, for all values of  $x$ ,

$$2x^2 - 3x + 21 = a(x - b)^2 + c$$

find the value of  $a$ , the value of  $b$  and the value of  $c$ .

$a =$

$b =$

$c =$

(Total for Question 11 is 3 marks)

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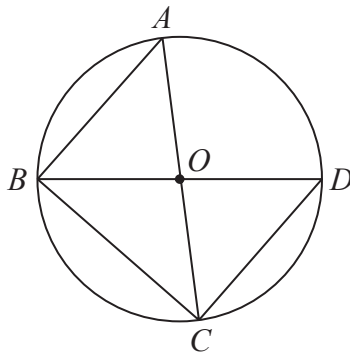


Diagram **NOT**  
accurately drawn

$AOC$  and  $BOD$  are diameters of a circle, centre  $O$ .

Prove that triangle  $ABC$  and triangle  $DCB$  are congruent.

(Total for Question 12 is 3 marks)



13

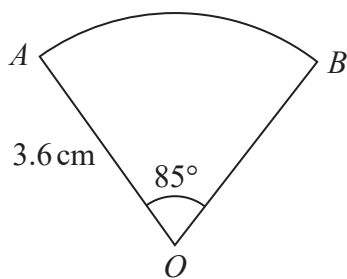


Diagram **NOT** accurately drawn

The diagram shows a sector  $OAB$  of a circle, centre  $O$ .

$$OA = OB = 3.6\text{ cm}$$

$$\text{Angle } AOB = 85^\circ$$

Calculate the perimeter, in cm to 3 significant figures, of the sector  $OAB$ .

cm

(Total for Question 13 is 3 marks)

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14

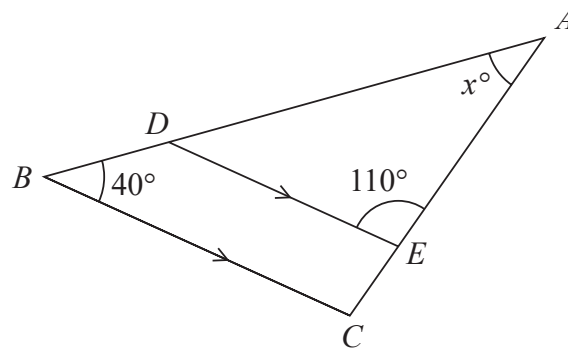


Diagram **NOT** accurately drawn

In the diagram,  $ABC$  is a triangle with point  $D$  on  $AB$  and point  $E$  on  $AC$  such that  $DE$  is parallel to  $BC$ .

$$\angle ABC = 40^\circ \quad \angle AED = 110^\circ \quad \angle BAC = x^\circ$$

Find the value of  $x$ .

Give reasons for each stage of your working.

$$x =$$

(Total for Question 14 is 3 marks)



15 A car travelled at an average speed of 96 km/h for  $1\frac{1}{2}$  hours and then travelled at an average speed of 56 km/h for  $2\frac{1}{2}$  hours.

Calculate the average speed of the car for the whole journey.

km/h

(Total for Question 15 is 4 marks)

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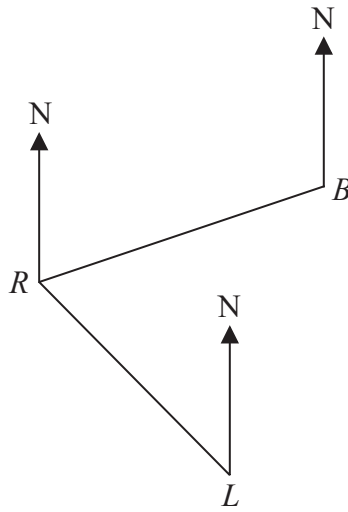


Diagram **NOT** accurately drawn

The diagram shows the position of a rock  $R$ , a boat  $B$  and a lighthouse  $L$ .  
The bearing of  $L$  from  $R$  is  $156^\circ$

(a) Calculate the bearing of  $R$  from  $L$ .

(1)

Given that the bearing of  $B$  from  $R$  is  $072^\circ$  and that  $RB = RL$ ,

(b) calculate the bearing of  $L$  from  $B$ .

(3)

(Total for Question 16 is 4 marks)



17

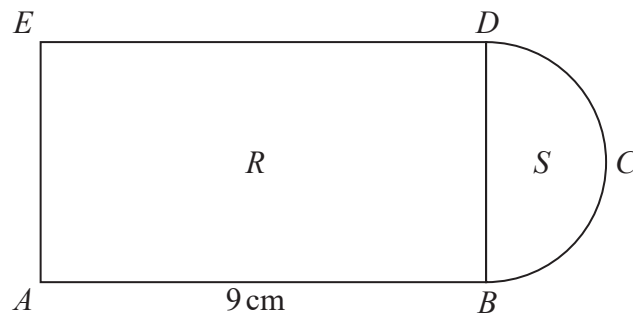


Diagram **NOT** accurately drawn

The diagram shows a shape  $ABCDE$  made from a rectangle  $R$  and a semicircle  $S$ . The side  $DB$  of the rectangle is the diameter of the semicircle.

Given that  $AB = 9\text{ cm}$  and that the area of  $S = 2\pi\text{ cm}^2$

find the area of  $R$ .

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$\text{cm}^2$

(Total for Question 17 is 4 marks)



18

$$\mathbf{A} = \begin{pmatrix} -2 & -4 \\ 1 & 3 \end{pmatrix} \quad \mathbf{BA} = \begin{pmatrix} 2 & -8 \\ 1 & 2 \end{pmatrix}$$

Find the matrix **B**.

$\left( \quad \right)$

(Total for Question 18 is 4 marks)



- 19 A solid cone has a mass of 1200 g, to 2 significant figures.  
The area of the base of the cone is 38.5 cm<sup>2</sup>, to 1 decimal place.  
The height of the cone is 5.0 cm, to 2 significant figures.

Given that

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

calculate the upper bound of the density of the cone.  
Give your answer to 3 significant figures.

g/cm<sup>3</sup>

(Total for Question 19 is 4 marks)

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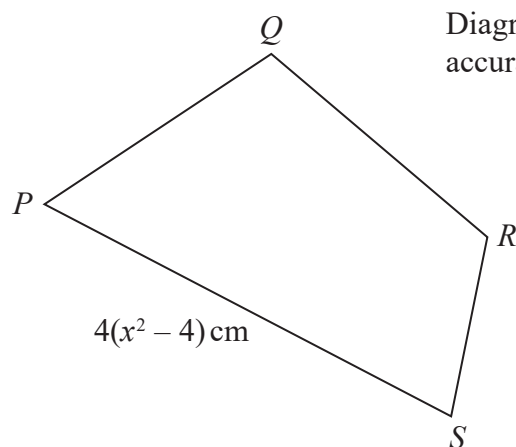
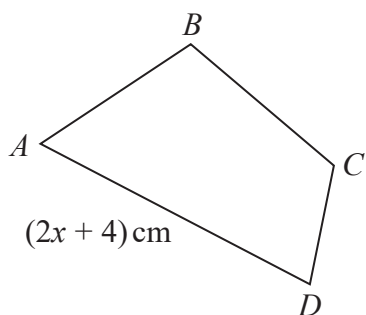
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20



$ABCD$  and  $PQRS$  are two similar quadrilaterals.

The side  $AD$  of length  $(2x + 4)$  cm is the longest side of quadrilateral  $ABCD$ .

The side  $PS$  of length  $4(x^2 - 4)$  cm is the longest side of quadrilateral  $PQRS$ .

The area of the quadrilateral  $ABCD$  is  $10 \text{ cm}^2$

Show that the area, in  $\text{cm}^2$ , of the quadrilateral  $PQRS$  is  $a(x - b)^2$  where  $a$  and  $b$  are integers to be found.

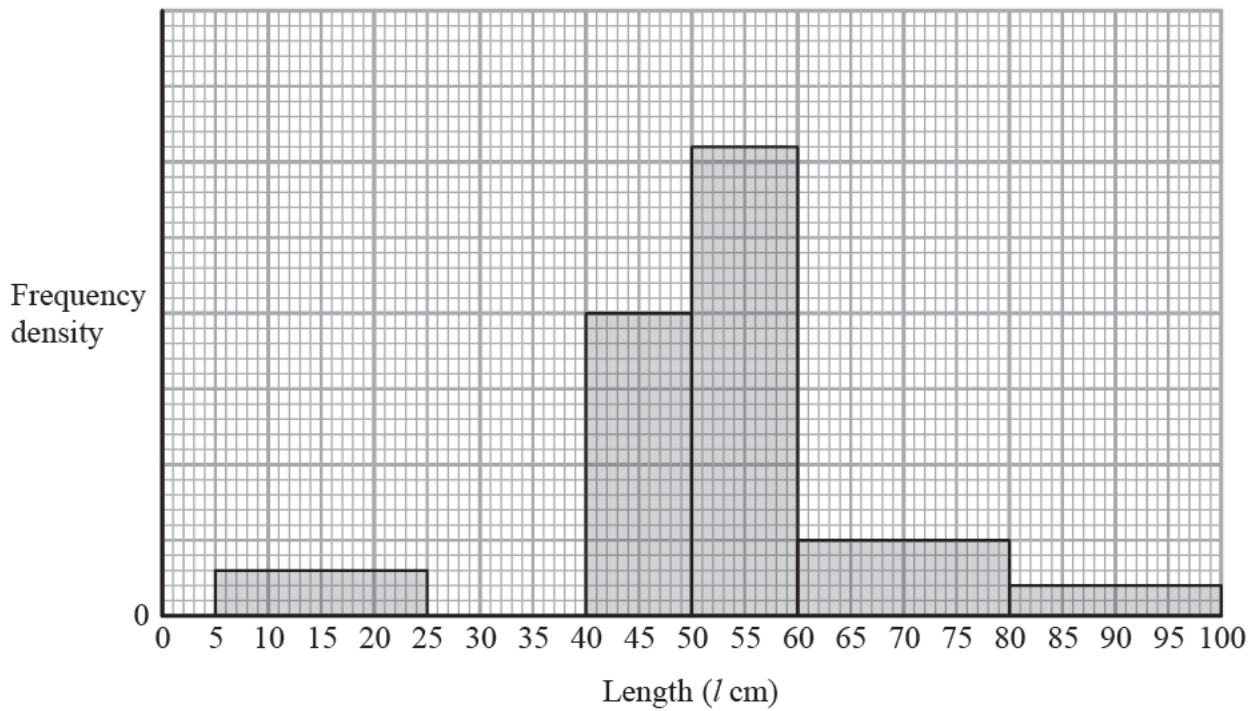
(Total for Question 20 is 4 marks)



21 The lengths of cod caught by fishermen in a small fishing boat last month were measured.

The incomplete table and histogram below give information about the length of each cod caught last month.

Length ( $l$ cm)	Number of cod
$5 < l \leq 25$	30
$25 < l \leq 40$	75
$40 < l \leq 50$	100
$50 < l \leq 60$	155
$60 < l \leq 80$	
$80 < l \leq 100$	20



(a) Complete the table and the histogram.

(2)



Cod that have a length less than 35 cm are returned to the sea.

- (b) Calculate an estimate, to one decimal place, of the percentage of cod caught that were returned to the sea from the boat last month.

%

(3)

(Total for Question 21 is 5 marks)

- 22 The width of a rectangle is  $x$  metres.  
The length of the rectangle is 7 m longer than the width of the rectangle.

Find the set of values of  $x$  for which the area of the rectangle is less than  $44 \text{ m}^2$   
Show clear algebraic working.

(Total for Question 22 is 5 marks)



23 Josh asks the students in his form how many hours they played sport last week.

The table shows information about his results.

Number of hours ( $t$ )	Frequency
$0 \leq t < 1$	9
$1 \leq t < 2$	8
$2 \leq t < 3$	5
$3 \leq t < 4$	7
$4 \leq t < 6$	3
6 or more	0

(a) Find the class interval that contains the median number of hours.

(1)

(b) Calculate an estimate, to 3 significant figures, for the mean number of hours that the students in Josh's form played sport last week.

hours

(4)

(Total for Question 23 is 5 marks)



24 The function  $f$  is defined by  $f: x \mapsto 4 + \frac{3}{x} \quad x > 0$

(a) Find  $f(2)$

(1)

(b) Find the range of  $f$ .

(1)

(c) Express the inverse function  $f^{-1}$  in the form  $f^{-1}: x \mapsto \dots$

(3)

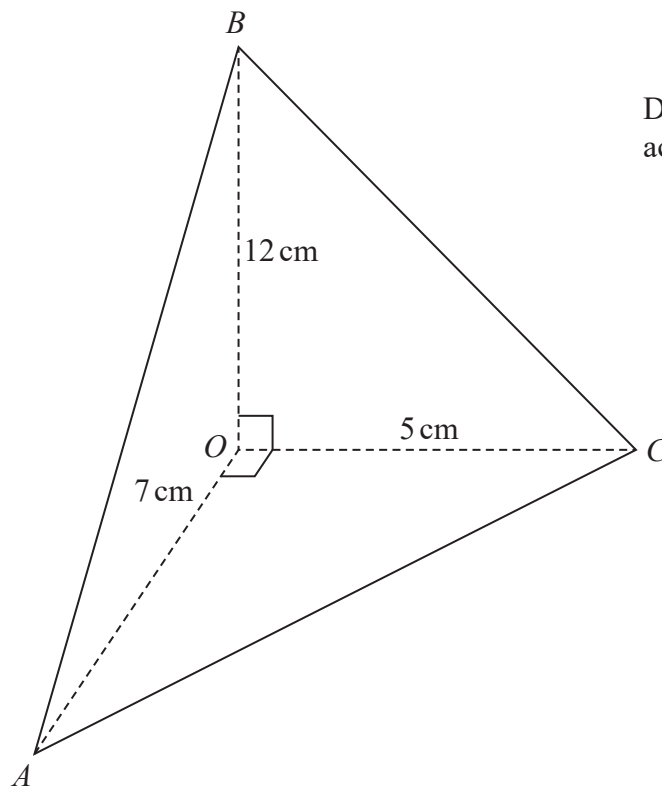
The function  $g$  is defined by  $g: x \mapsto 4x - 5$

(d) Express the composite function  $fg$  in the form  $fg(x) = \dots$

(1)

(Total for Question 24 is 6 marks)





The diagram shows a pyramid with triangular base  $OAC$ . The edges  $OA$ ,  $OB$  and  $OC$  of the pyramid are perpendicular to each other.

$$OA = 7\text{ cm} \quad OB = 12\text{ cm} \quad OC = 5\text{ cm}$$

(a) Calculate the volume, in  $\text{cm}^3$ , of the pyramid.

(2)  $\text{cm}^3$

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(b) Calculate the area, in  $\text{cm}^2$  to 3 significant figures, of triangle  $ABC$ .

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(6)  $\text{cm}^2$

(Total for Question 25 is 8 marks)

Turn over for question 26



26 Solve the simultaneous equations

$$\begin{aligned}x^2 &= 10 - y^2 \\x + 2y &= 5\end{aligned}$$

Show clear algebraic working.

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(Total for Question 26 is 6 marks)

Turn over for question 27



27 A curve has equation  $y = x^3 - 4x^2 + 2x$

Find the  $x$  coordinate of each of the points on the curve at which the gradient of the tangent to the curve is 2

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(Total for Question 27 is 6 marks)

**TOTAL FOR PAPER IS 100 MARKS**

