

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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P 6 0 7 9 2 A 0 1 2 4


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)

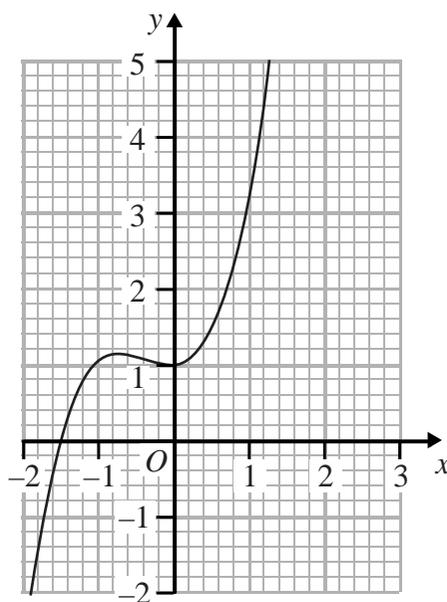


P 6 0 7 9 2 A 0 3 2 4

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)

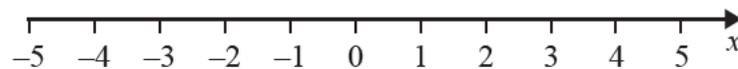


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8 (a) Solve the inequality $5x + 4 < 20 - 3x$

(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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12

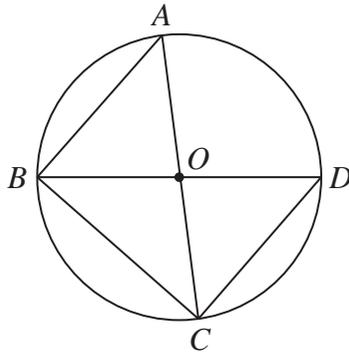


Diagram **NOT**
accurately drawn

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

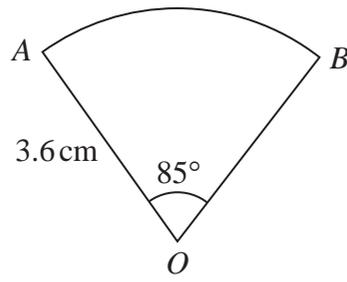


Diagram **NOT** accurately drawn

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

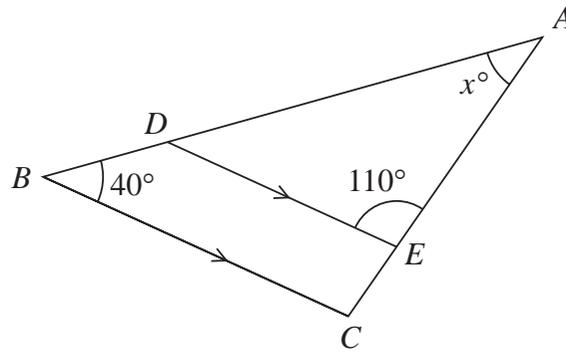


Diagram **NOT** accurately drawn

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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16

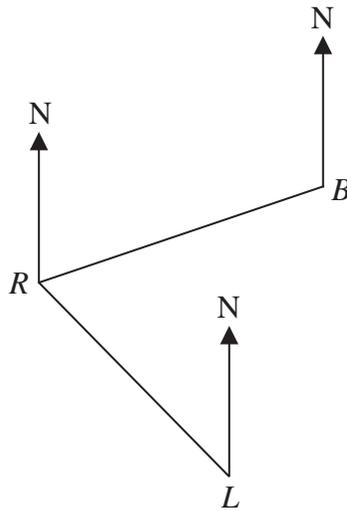


Diagram **NOT** accurately drawn

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

(a) Calculate the bearing of R from L .

(1)

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

(b) calculate the bearing of L from B .

(3)

(Total for Question 16 is 4 marks)



17

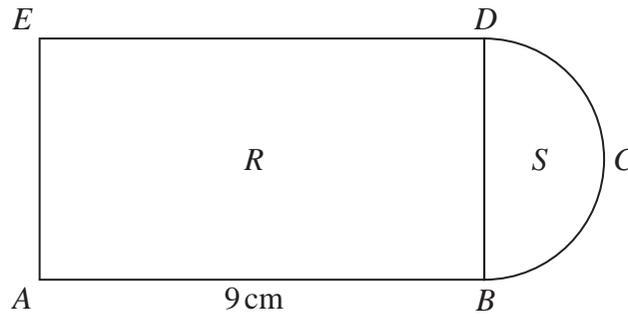


Diagram **NOT** accurately drawn

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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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 cm², 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.

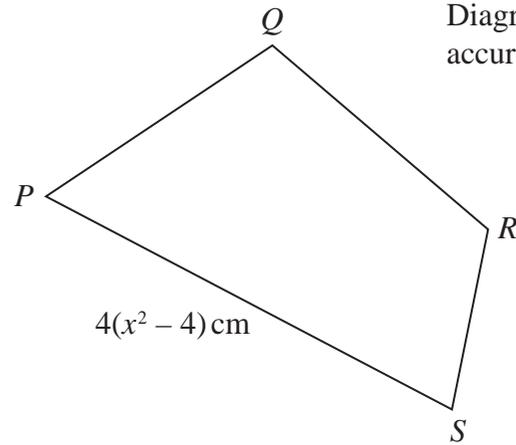
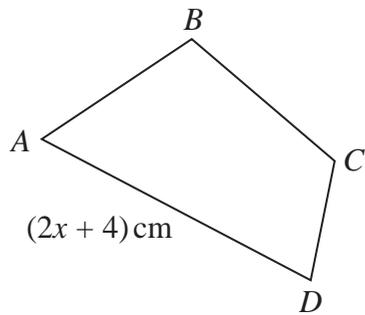
g/cm³

(Total for Question 19 is 4 marks)

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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 10cm^2

Show that the area, in cm^2 , of the quadrilateral $PQRS$ is $a(x - b)^2$

where a and b are integers to be found.

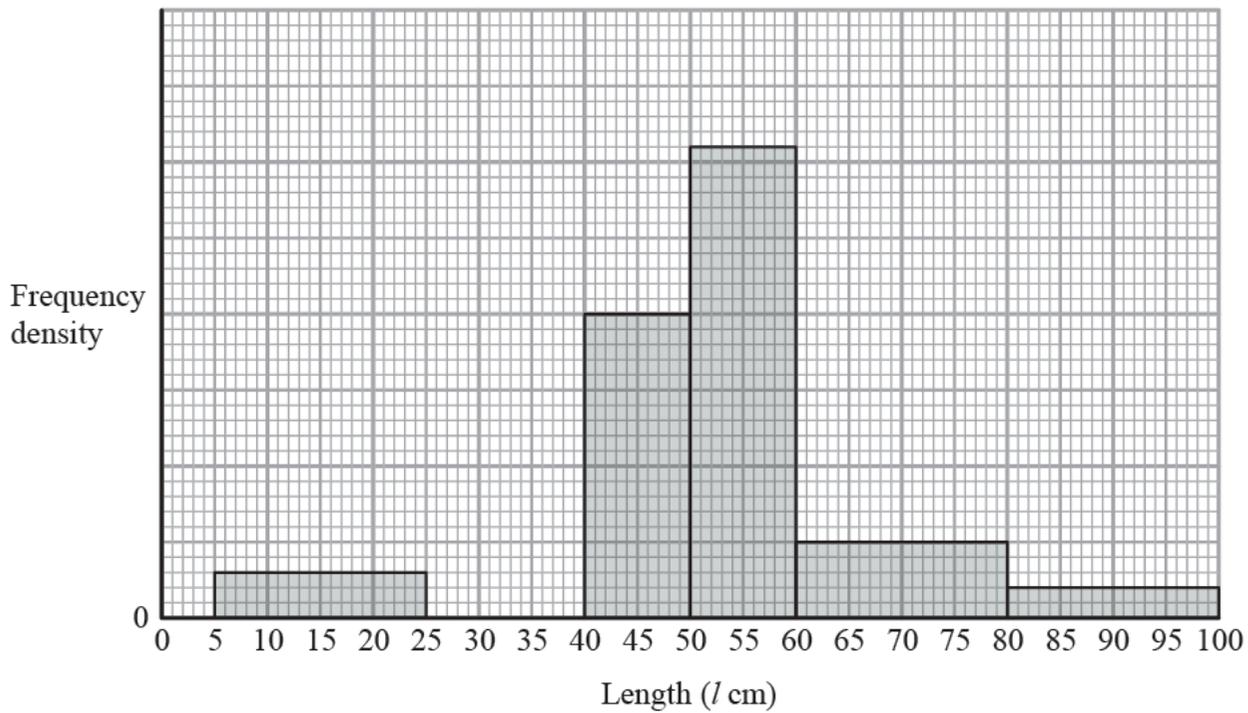
(Total for Question 20 is 4 marks)



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 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)

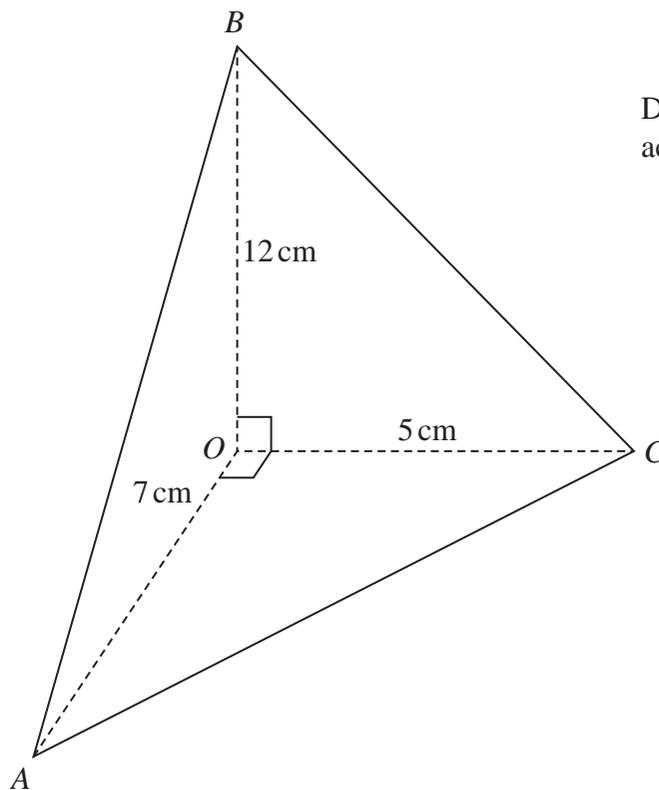
The function g is defined by $g: x \mapsto 4x - 5$

(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 cm^3 , of the pyramid.

(2) cm^3



(b) Calculate the area, in cm^2 to 3 significant figures, of triangle ABC .

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(6) 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

