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Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Time 1 hour 30 minutes

Paper reference **4MB1/01**

Mathematics B
PAPER 1



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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Q:1/1/1/1/

P 6 9 4 8 8 A 0 1 2 4

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Answer all TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The nth term of a sequence is given by $4n - 12$

Write down the first 2 terms of the sequence.

1st term .....

2nd term .....

(Total for Question 1 is 2 marks)

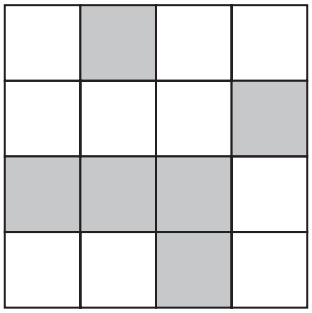
2 Bronze is made from copper and tin in the ratio of 22 : 3 by weight.

Calculate the weight of copper, in kg, needed to make 12.5 kg of bronze.

..... kg

(Total for Question 2 is 2 marks)

3 A pattern on a white grid is made from 6 shaded squares.



Shade exactly 2 more squares so that the 8 shaded squares will make a pattern with rotational symmetry of order 4

(Total for Question 3 is 2 marks)

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4 Make u the subject of

$$s = ut + \frac{1}{2}at^2$$

.....

(Total for Question 4 is 2 marks)

5 Without using a calculator and showing all your working, evaluate

$$3\frac{1}{8} \times 2\frac{4}{5}$$

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

.....

(Total for Question 5 is 2 marks)

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6 Factorise completely

$$2mc^2 + 6p^2c^4$$

.....

(Total for Question 6 is 2 marks)

7 Inzamam cycles 6.4 km from his home to school.
He leaves home at 07 40 and arrives at school at 08 20

Calculate his average speed, in km/h, for the journey.

..... km/h

(Total for Question 7 is 2 marks)

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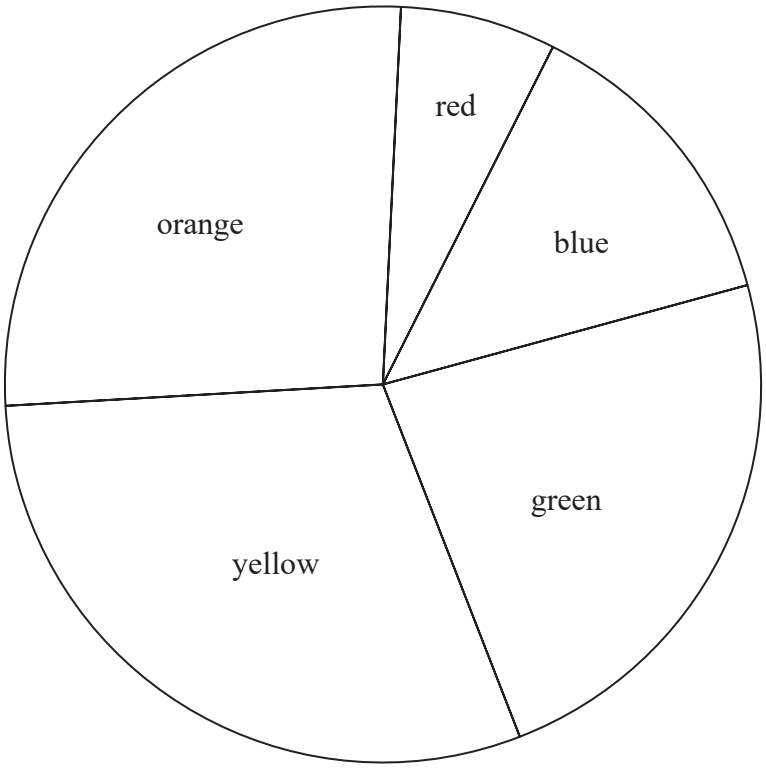
8 Rohan asked each of the students in his school what colour paper they would prefer him to use for their worksheets.
There are 150 students in Rohan's school.

Using his results, Rohan drew the following accurate pie chart.



Find how many of the 150 students preferred blue paper.

.....

(Total for Question 8 is 3 marks)

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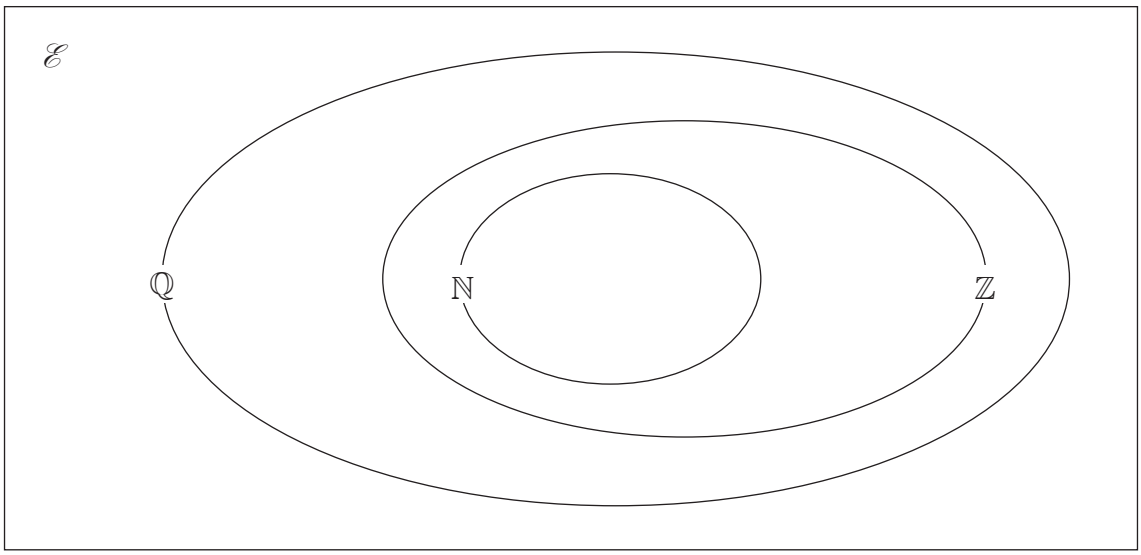
9 Solve

$$2(x + 7) = 5x - 6$$

$x =$ .....

(Total for Question 9 is 3 marks)

10



Above is a Venn diagram showing the sets $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$ and $\mathscr{E}$

$\mathbb{N}$ is the set of natural numbers,
$\mathbb{Z}$ is the set of integers,
$\mathbb{Q}$ is the set of rational numbers
$\mathscr{E}$ is the universal set.

Place each of the following four numbers in the correct place in the above diagram.

$$-\frac{4}{11} \qquad \sqrt{169} \qquad \sqrt{17} \qquad \frac{22}{7}$$

(Total for Question 10 is 3 marks)

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11 The diagram shows a biased spinner with four colours blue, red, green and yellow.

When the spinner is spun once

- the probability it lands on blue is twice the probability it lands on red
- the probability it lands on yellow is three times the probability it lands on blue
- the probability it lands on green is 0.25

Find the probability the spinner lands on yellow.

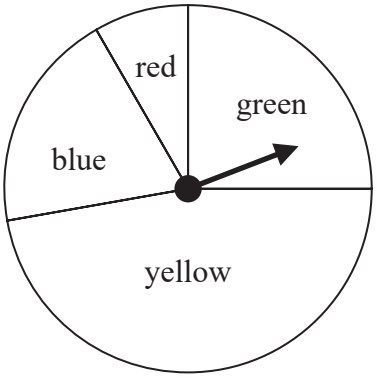

Diagram **NOT** accurately drawn

.....

(Total for Question 11 is 3 marks)

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12 Here is a list of four numbers.

1.1×10^{15} 2.1×10^{13} 3.2×10^{14} 3.7×10^{16}

Find the median of these four numbers.
Give your answer in standard form.

.....

(Total for Question 12 is 3 marks)

13 Given that $x \neq -4$

simplify $\dfrac{x^2 + 4x}{2x + 8}$

.....

(Total for Question 13 is 3 marks)

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14

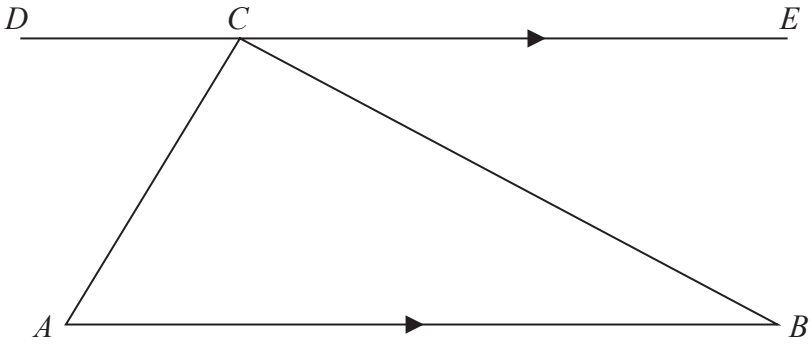

Diagram **NOT** accurately drawn

Using the diagram above, prove that the sum of the angles of triangle *ABC* is the same as the sum of the angles on the straight line *DCE*
Give a reason for each stage of your proof.

(Total for Question 14 is 3 marks)

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15 The numbers A, B, and C are given as products of their prime factors.

$$A = 3^5 \times 7^4 \times 1039$$
$$B = 3^{16} \times 7^9 \times 11^4$$
$$C = 3^8 \times 7^4 \times 269^2$$

(a) Find the Highest Common Factor (HCF) of A, B and C

.....

(2)

Exactly one of the three numbers is the square of an integer N

(b) Calculate the value of N

$N =$.....

(2)

(Total for Question 15 is 4 marks)

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16 $\mathbf{A} = \begin{pmatrix} 3 & -2 \\ -6 & -1 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} -1 & 1 \\ 3 & 1 \end{pmatrix}$

(a) Calculate $\mathbf{A} + 2\mathbf{B}$

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$

(2)

(b) Calculate $\mathbf{AB}$

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$

(2)

(Total for Question 16 is 4 marks)

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17

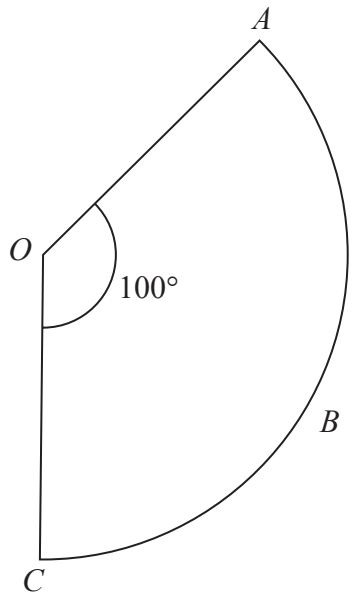

Diagram **NOT** accurately drawn

OABC is a sector of a circle, centre *O*, with $\angle AOC = 100°$
The area of the sector is $27\,cm^2$

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

..... cm

(Total for Question 17 is 4 marks)

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18 Given that $p = \dfrac{1+\sqrt{5}}{2}$

show that $\dfrac{1}{p} = p - 1$

Show your working clearly.

(Total for Question 18 is 3 marks)

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19 There are 1000 cm^3 of orange juice in a carton.
The total surface area of this carton is 700 cm^2

For a special offer, a new carton is designed.
The volume of orange juice in the new carton is 33.1% more than the volume of orange juice in the original carton.
The new carton is mathematically similar to the original carton.

Calculate the total surface area of the new carton.

..... cm^2

(Total for Question 19 is 4 marks)

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20 Given that $\mathbf{a} = \begin{pmatrix} x-2 \\ \sqrt{2x} \end{pmatrix}$ where $|\mathbf{a}| = \sqrt{5}$

find the exact value of x

$x =$ .....

(Total for Question 20 is 4 marks)

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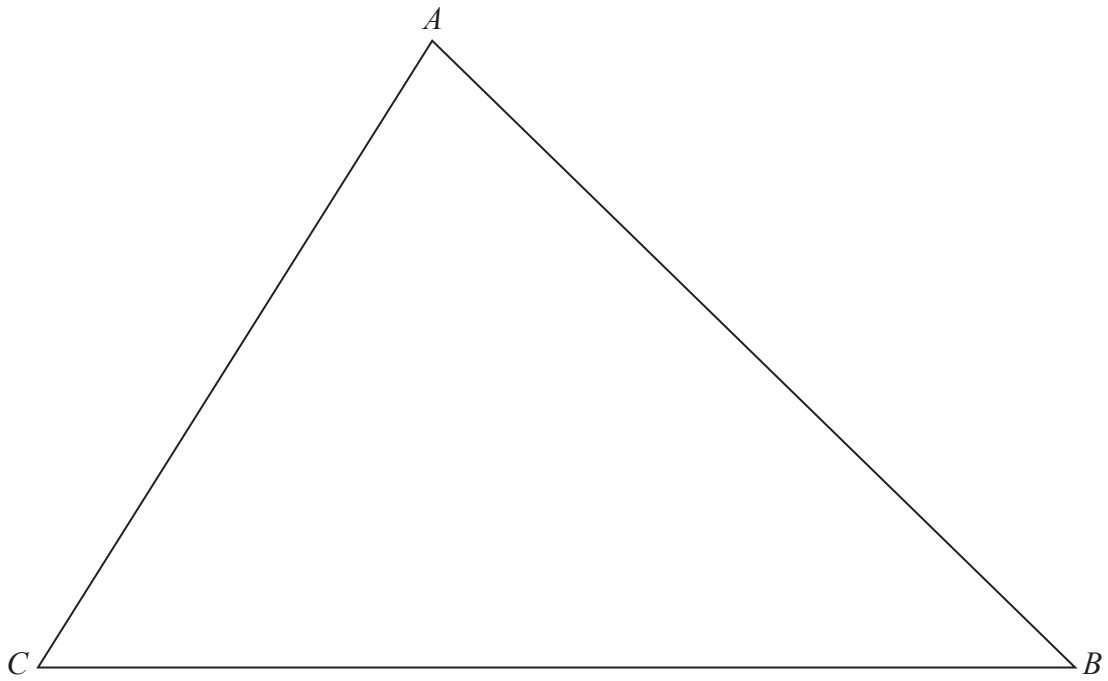
21 The diagram shows triangle ABC



The region R consists of all the points inside the triangle that are closer to C than to B and also closer to AB than to AC

Using ruler and compasses only and **showing all your construction lines**, construct and show by shading the region R
Label the region R

(Total for Question 21 is 3 marks)

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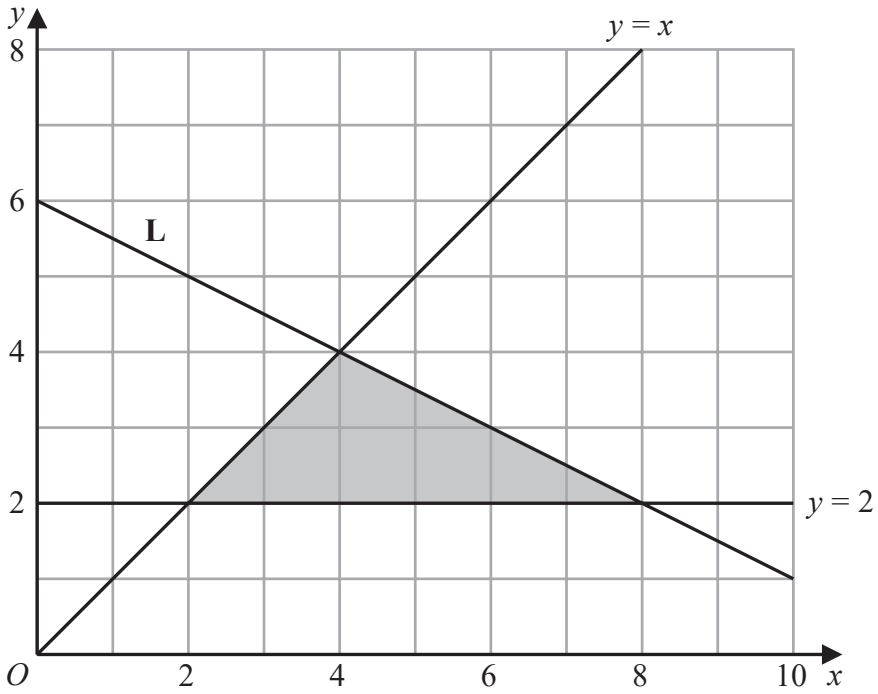
22



The diagram above shows the line **L**, the line with equation $y = 2$ and the line with equation $y = x$ drawn on a grid.

(a) Find an equation of the line **L**

.....

(2)

(b) Write down the three inequalities that define the region shaded in the diagram.

.....

.....

.....

(3)

(Total for Question 22 is 5 marks)

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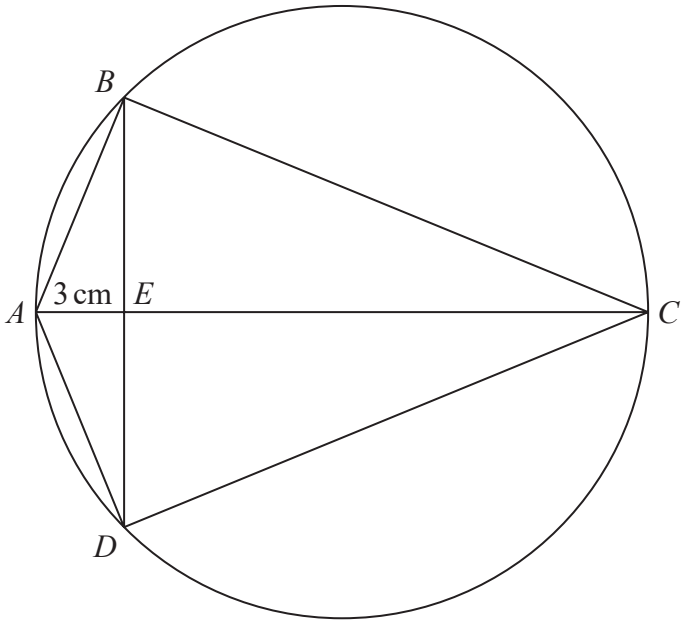

Diagram **NOT** accurately drawn

ABCD is a kite so that the points *A*, *B*, *C* and *D* lie on a circle with radius 7.5 cm.
The diagonals, *AC* and *BD*, of the kite intersect at point *E*, so that *AE* = 3 cm.
The line *AEC* is a diameter of the circle.

Find the area of the kite *ABCD*

..... cm^2

(Total for Question 23 is 5 marks)

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24 In a triangle ABC

$AC = 6.5\,\text{cm}$ $BC = 12\,\text{cm}$ $\angle ABC = 30°$

Calculate, in cm^2 to 3 significant figures, the smaller of the areas of the two possible triangles ABC

..... cm^2

(Total for Question 24 is 6 marks)

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25 There are 25 sweets in a bag.

n of the sweets are orange.
The rest of the sweets are yellow.

Chana takes a sweet at random from the bag.
She eats the sweet.

Chana takes at random another sweet from the bag.
She eats the sweet.

The probability that Chana eats one orange sweet and one yellow sweet is $\frac{1}{3}$

(a) Write down the probability that both sweets taken by Chana are the same colour.

.....

(1)

(b) Find the possible values of *n*
Show clear algebraic working.

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.....

(6)

(Total for Question 25 is 7 marks)

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26 $f(x) = 2x^3 + 9x^2 - 14x - 9$

(a) Using the factor theorem, show that $(2x - 1)$ is **not** a factor of $f(x)$

(2)

(b) Express $\frac{f(x)}{2x+1}$ in the form $(x + a)^2 + b$

where a and b are integers to be found.

.....

(3)

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(c) Hence find the exact solutions of f(x) = 0

.....

(2)

(Total for Question 26 is 7 marks)

Turn over for Question 27

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27 A particle P is moving along a straight line. At time t seconds, the displacement, s metres, of P from a fixed point O on the line is given by

$$s = t^3 - 18t^2 + 81t \qquad 0 \leqslant t \leqslant 9$$

At time T seconds, where $T < 9$, P is at the point A on the line.
At A, particle P instantaneously reverses its direction of motion and moves back towards O

(a) Find the value of T

$T =$ .....

(5)

As P moves from A back towards O, the greatest speed of P is V m/s

(b) Find the value of V

$V =$ .....

(4)

(Total for Question 27 is 9 marks)

TOTAL FOR PAPER IS 100 MARKS

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