Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1

Thursday 25 May 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
4MB0/01

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 4 8 2 3 5 A 0 1 2 0

Pearson

Answer ALL TWENTY NINE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here are the first four terms of a sequence.

256 64 16 4

Write down the next two terms in the sequence.

....

(Total for Question 1 is 2 marks)

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

$$\frac{1}{5} + \frac{2}{3} - \frac{1}{2}$$

Give your answer as a fraction in its simplest form.

.....

(Total for Question 2 is 2 marks)

3 The function g is such that

$$g: x \mapsto 12 - x^4 \quad \text{where} \quad x \geqslant -4$$

Write down

(a) the maximum value of g(x),

.....

(1)

(b) the range of g.

.....

(1)

(Total for Question 3 is 2 marks)

4 Two sets A and B are such that $n(A) = 37$, $n(B) = 23$ and $n(A \cap B) = 16$

Find $n(A \cup B)$.

.....

(Total for Question 4 is 2 marks)

5 A train travelled the 40 km between *Commence* station and *Finale* station at an average speed of 30 km/h.
The train arrived at *Finale* station at 17 25

Find the time at which the train left *Commence* station.

.....

(Total for Question 5 is 2 marks)

6 The bearing of A from B is 235°

Find the bearing of B from A.

.....°

(Total for Question 6 is 2 marks)

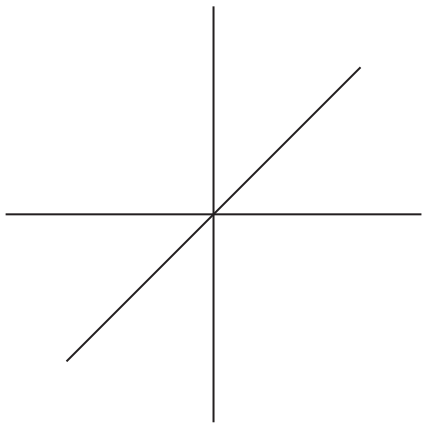
7 $(x + 3)$ is a factor of $2x^3 + 7x^2 + kx - 30$

Find the value of the constant k.

$k =$ .....

(Total for Question 7 is 2 marks)

8 The diagram shows three straight lines intersecting at a point.
Each line is bisected by the point of intersection.



Write down

(a) the number of lines of symmetry of the diagram,

.....

(1)

(b) the order of rotational symmetry of the diagram.

.....

(1)

(Total for Question 8 is 2 marks)

9 A bag contains 40 balls.
There are 10 red balls, 10 blue balls, 10 yellow balls and 10 green balls.
Three balls are taken at random from the bag.

Calculate the probability that all three balls are the same colour.

.....

(Total for Question 9 is 2 marks)

10 Without using a calculator, and showing all your working, express

$$\sqrt{432} - \sqrt{243}$$

in the form $\sqrt{n}$, where n is an integer.

.....

(Total for Question 10 is 3 marks)

11

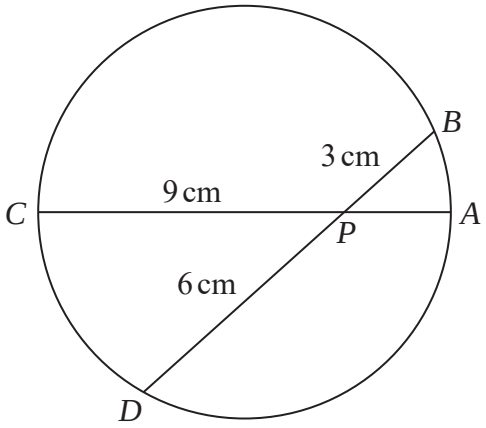


Diagram **NOT** accurately drawn

AC is a diameter of the circle $ABCD$.
The straight lines AC and BD intersect at the point P.

Given that $BP = 3$ cm, $PD = 6$ cm and $PC = 9$ cm,
calculate the radius, in cm, of the circle.

..... cm

(Total for Question 11 is 3 marks)

12 Solve $(x - 1)(x - 4) = -2$

Show clear algebraic working.

$x =$ .....

(Total for Question 12 is 3 marks)

13

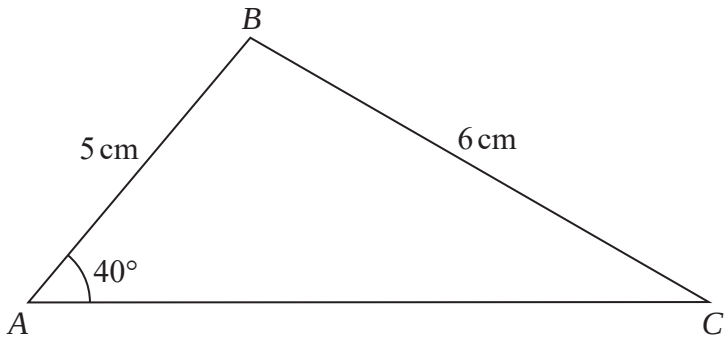


Diagram **NOT** accurately drawn

The diagram shows triangle ABC in which $AB = 5$ cm, $BC = 6$ cm and $\angle BAC = 40°$

Calculate the size, in degrees to 3 significant figures, of $\angle ACB$.

.....

°

(Total for Question 13 is 3 marks)

14 Tang owns two cars, car *A* and car *B*.
This year, car *A* is 9 years old and car *B* is *x* years old.
5 years ago, the ratio of the age of car *A* to the age of car *B* was 2 : 5

Calculate the value of *x*.

x = ...

(Total for Question 14 is 3 marks)

15 *ABCD* is a rhombus such that the coordinates of *A* are (1, 1) and $\overrightarrow{AC} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

Given that the diagonals of the rhombus intersect at the point *P*,
find the coordinates of *P*.

(..... , ...)

(Total for Question 15 is 3 marks)

16 Make b the subject of $\frac{1}{a} = \frac{2}{c} - \frac{1}{b}$

Simplify your answer.

.....

(Total for Question 16 is 3 marks)

17 (i) Find the Lowest Common Multiple (LCM) of 84, 126 and 294

LCM = ...

(ii) Find the Highest Common Factor (HCF) of 84, 126 and 294

HCF = ...

(Total for Question 17 is 3 marks)

18 Simplify fully $\frac{2wy - 3x^2 - 6wx + xy}{2y^2 - 6xy}$

.....

(Total for Question 18 is 4 marks)

19 (a) Express $\frac{1}{21}$

(i) as a decimal to 2 significant figures,

.....

(ii) as a decimal to 2 decimal places.

.....

(2)

(b) Calculate $\frac{9 \times 10^{-98}}{50 \times 10^{50}}$

Give your answer in standard form.

.....

(2)

(Total for Question 19 is 4 marks)

20 Find the integer values of x such that

$$6 - x < 4 - 2x \leqslant 28 + 2x$$

.....

(Total for Question 20 is 4 marks)

21

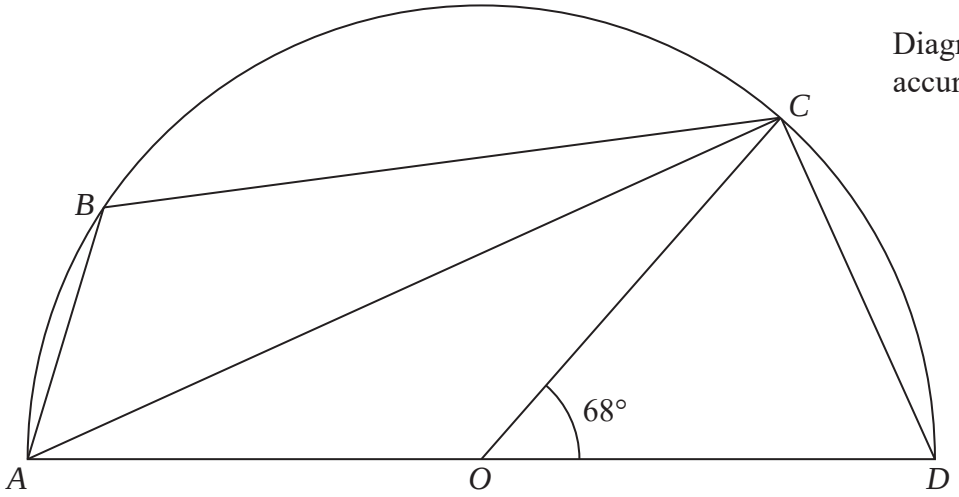


Diagram **NOT** accurately drawn

In the diagram, $ABCD$ is a semicircle, centre O, with diameter AOD and $\angle COD = 68°$

(a) Find the size, in degrees, of $\angle CAD$.

.....°

(1)

(b) Find the size, in degrees, of $\angle ABC$.

Give reasons for your working.

.....°

(3)

(Total for Question 21 is 4 marks)

22

$$\mathbf{M} = \begin{pmatrix} 2 & 4 \\ 3 & -5 \end{pmatrix} \qquad \mathbf{N} = \begin{pmatrix} -1 & -3 \\ 7 & -8 \end{pmatrix}$$

Calculate,

(a) $2\mathbf{M} - 3\mathbf{N}$

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

(2)

(b) $\mathbf{MN}$

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

(2)

(Total for Question 22 is 4 marks)

23 y varies directly as the square of x.
$y = 900$ when $x = 2$

Find the values of x when $y = 36$

.....

(Total for Question 23 is 4 marks)

24 The five numbers 18, –2, 14, $2x$ and $3x$ have a mean of $\frac{5x + 2}{4}$

(a) Calculate the value of x.

$x =$ .....

(3)

(b) Hence find the median of the five numbers.

.....

(1)

(Total for Question 24 is 4 marks)

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

$$x = -6t^2 + 57t + 27 \qquad t \geqslant 0$$

At time t seconds, the velocity of P is v m/s.

(a) Find an expression for v in terms of t.

$v =$.....

(2)

Particle P comes to instantaneous rest at the point A.

(b) Find the value of t when P is at A.

$t =$.....

(2)

(c) Find, to the nearest metre, the distance OA.

..... m

(2)

(Total for Question 25 is 6 marks)

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26

AB is one side of the triangle *ABC* in which $AC = 6\,\text{cm}$ and $\angle BAC = 60°$

(a) Make an accurate drawing of triangle *ABC*.

(1)

(b) **Showing all your construction lines**, construct the locus of all points inside triangle *ABC*

(i) that are 4 cm from *B*,

(ii) that are equidistant from *BA* and *BC*.

(3)

The region *R* consists of all the points inside triangle *ABC* that are more than 4 cm from *B* and are closer to *BC* than to *BA*.

(c) Show, by shading, the region *R*.

Label the region *R*.

(1)

(Total for Question 26 is 5 marks)

27

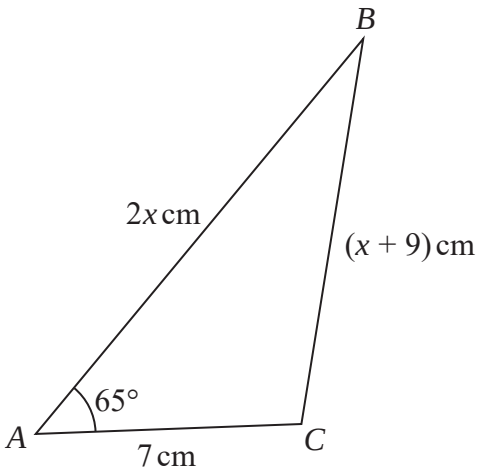


Diagram **NOT** accurately drawn

The diagram shows triangle ABC in which

$AB = 2x$ cm
$BC = (x + 9)$ cm
$AC = 7$ cm
$\angle BAC = 65°$

Calculate, to 3 significant figures, the value of x.

.....

(Total for Question 27 is 6 marks)

28 Three right circular cylinders *A*, *B* and *C* are similar. The cylinders *A*, *B* and *C* have volumes 27 cm^3, 729 cm^3 and 1728 cm^3 respectively.

The height of cylinder *B* is 15 cm.

(a) Calculate the height, in cm, of cylinder *A*.

..... cm

(3)

(b) Calculate the base area, in cm^2, of cylinder *C*.

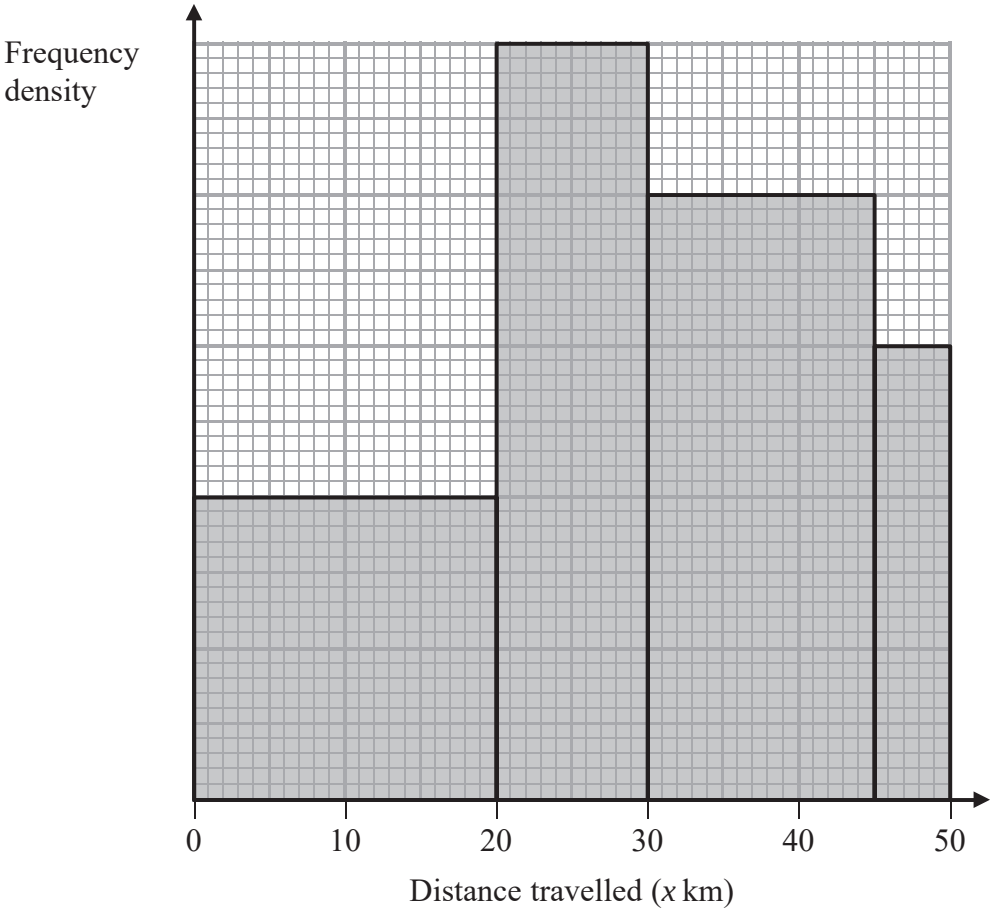
..... cm^2

(4)

(Total for Question 28 is 7 marks)

29 In a travel survey, passengers arriving at a bus station were asked how far they had travelled (x km) to get to the bus station.

The histogram below was drawn for these results.



There are 50 passengers in the class interval $20 < x \leqslant 30$

(a) Calculate the number of passengers who had travelled at most 20 km to get to the bus station.

.....

(3)

(b) Calculate the total number of passengers in the survey.

.....

(2)

One of the passengers in the survey is chosen at random.

(c) Find the probability that this passenger travelled more than 30 km to get to the bus station.

.....

(1)

(Total for Question 29 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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