Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1

Thursday 24 May 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
4MB1/01

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 5 4 6 9 6 A 0 1 2 4

Pearson

Answer ALL TWENTY EIGHT 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 $5n - 7$

Write down the second, third and fourth terms of the sequence.

..... , ... , ...

(Total for Question 1 is 2 marks)

2 The bearing of town A from town B is 054°

Find the bearing of town B from town A.

.....°

(Total for Question 2 is 2 marks)

3 At the beginning of the summer, Amrit's weight was 75 kg.
At the end of the summer, his weight was 69 kg.

Calculate the percentage loss in Amrit's weight.

.....%

(Total for Question 3 is 2 marks)

4 The point A is mapped onto the point (–1, 3) under the translation $\begin{pmatrix} 2 \\ -5 \end{pmatrix}$

Find the coordinates of A.

(..... , ...)

(Total for Question 4 is 2 marks)

5 **B E A R I N G**

Write down all the letters of the above word that have

(a) exactly **two** lines of symmetry

.....

(1)

(b) rotational symmetry of order 2

.....

(1)

(Total for Question 5 is 2 marks)

6 Write down which two of the following six numbers are equivalent to irrational numbers.

$$\frac{7}{12} \qquad \frac{\sqrt{27}}{\sqrt{3}} \qquad 2\pi \qquad 16^{\frac{1}{4}} \qquad 4\sqrt{2} \qquad 0.3$$

.....

(Total for Question 6 is 2 marks)

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

$$\frac{7}{8} - \left(\frac{1}{3} \times 2\frac{1}{4}\right)$$

Give your answer as a fraction in its simplest form.

.....

(Total for Question 7 is 3 marks)

8 Solve the equation

$$4x + (5.2 \times 10^5) = (7.1 \times 10^7) - 12x$$

Give your answer in standard form.

.....

(Total for Question 8 is 3 marks)

9 Showing all your working, express $3\sqrt{180} - 2\sqrt{80}$ in the form $a\sqrt{b}$ where a is an integer and b is a prime number.

.....

(Total for Question 9 is 3 marks)

10 The determinant of the matrix $\begin{pmatrix} 2x & 1 \\ 5x & 4 \end{pmatrix}$ is equal to 9

Find the value of x.

$x =$ .....

(Total for Question 10 is 3 marks)

11 Express as a single fraction in its simplest form

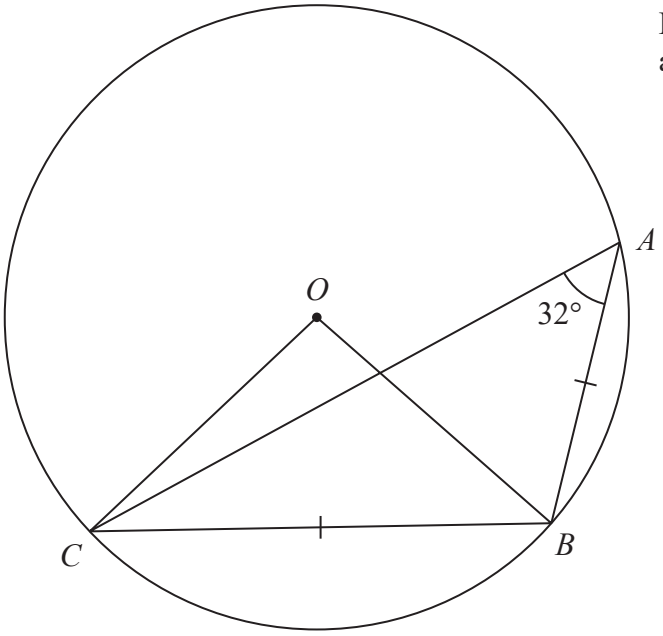
$$\frac{3}{2x-1} - \frac{4}{x+2}$$

.....

(Total for Question 11 is 3 marks)

12

Diagram **NOT** accurately drawn



ABC is a triangle such that the points A, B and C lie on a circle, centre O.

$BC = BA$ and $\angle CAB = 32°$

Find the size, in degrees, of

(a) $\angle COB$

.....°

(1)

(b) $\angle OCA$

.....°

(2)

(Total for Question 12 is 3 marks)

13 Prove that $(4n + 3)^2 - (4n - 3)^2$ is a multiple of 12 for all positive integer values of n.

(Total for Question 13 is 3 marks)

14

$$\mathbf{a} = \begin{pmatrix} 2x - 1 \\ -3 \end{pmatrix}$$

Given that $|\mathbf{a}| = 5$

find the possible values of x.

.....

(Total for Question 14 is 3 marks)

15

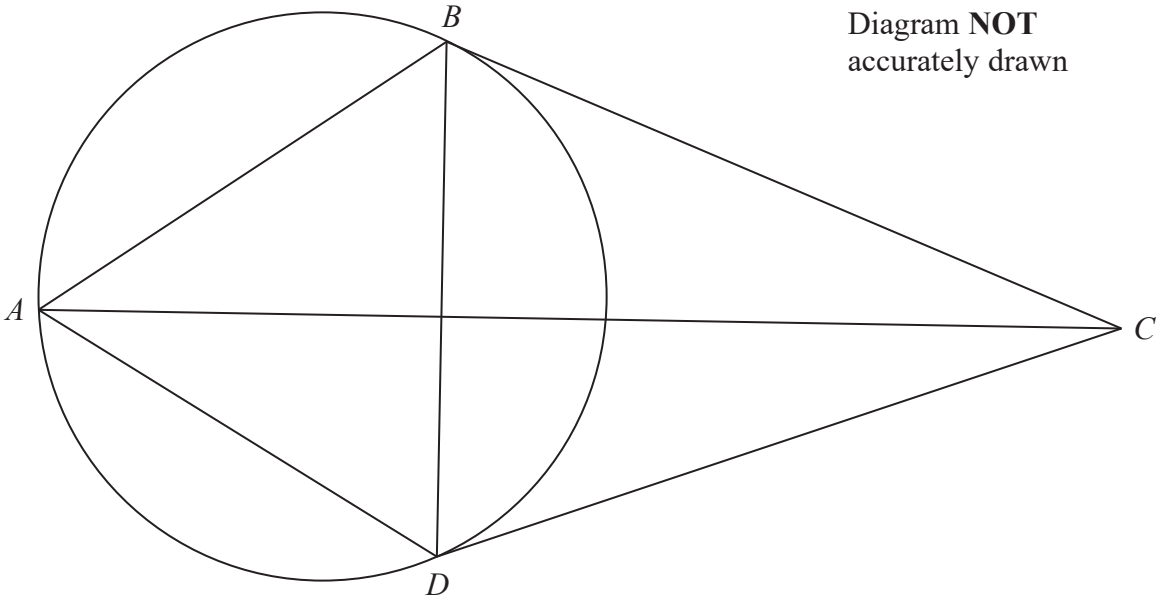


Diagram **NOT** accurately drawn

A, B and D are three points on a circle.

The point C is such that CD and CB are tangents to the circle.

$\angle ADB = \angle ABD$

Prove that ΔABC and ΔADC are congruent.

(Total for Question 15 is 3 marks)

16 (a) Simplify $(4x^5)^2$

.....

(2)

(b) Simplify $(27y^9)^{\frac{4}{3}}$

.....

(2)

(Total for Question 16 is 4 marks)

17 The lengths of the sides of a rectangular piece of paper, measured to the nearest mm, are 296 mm and 210 mm.

Calculate

(a) the lower bound, in mm, for the perimeter of the piece of paper,

..... mm

(2)

(b) the upper bound, to the nearest mm^2, for the area of the piece of paper.

..... mm^2

(2)

(Total for Question 17 is 4 marks)

18 y varies inversely as the cube of x.

$y = 297$ when $x = \frac{1}{3}$

Find the value of x^2 when $y = 704$

$x^2 =$ .....

(Total for Question 18 is 4 marks)

19 Simplify fully

$$\frac{10x + 5y - 2x^2 - xy}{4x^2 - y^2}$$

.....

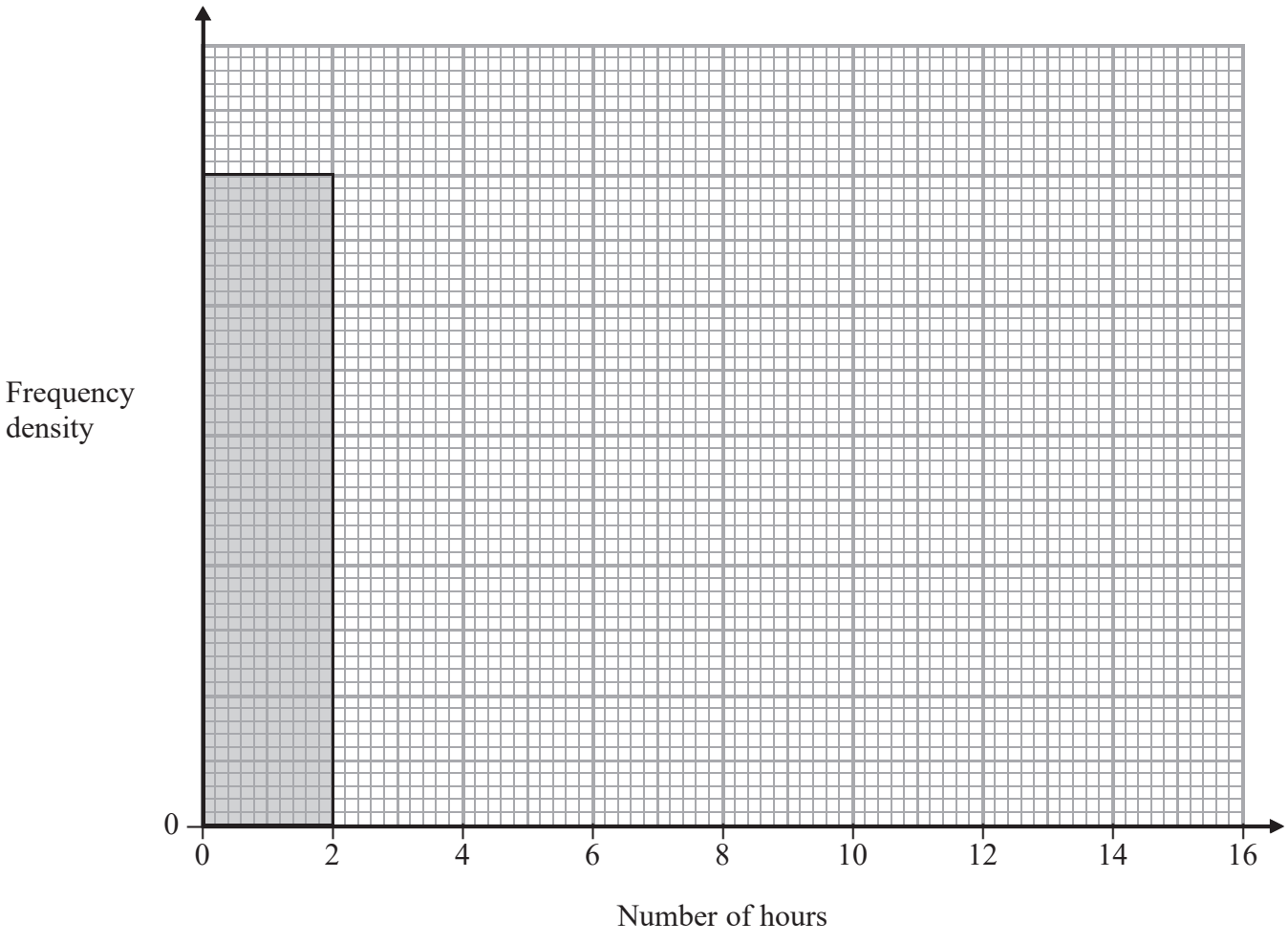
(Total for Question 19 is 4 marks)

20 The table shows information about the number of hours for which each of 100 children used a computer one week.

Number of hours (h)	Frequency
$0 < h \leqslant 2$	20
$2 < h \leqslant 5$	24
$5 < h \leqslant 8$	12
$8 < h \leqslant 12$	14
$12 < h \leqslant 15$	30

The diagram below is an incomplete histogram representing this information.

Use the information in the table to complete the histogram.



(Total for Question 20 is 4 marks)

21

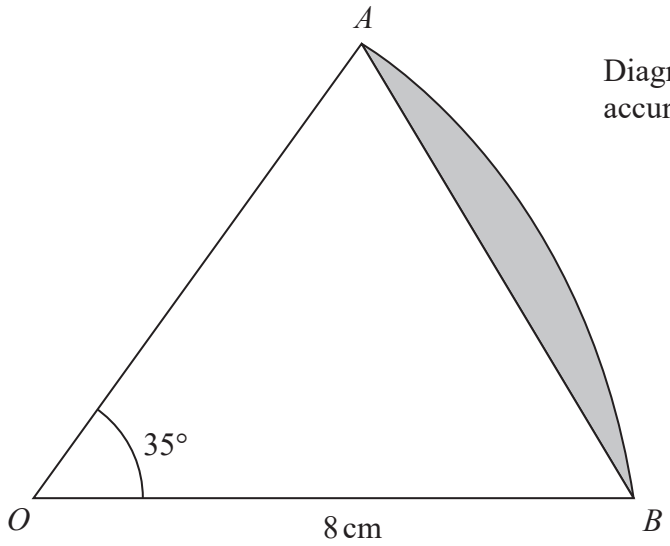


Diagram **NOT** accurately drawn

The diagram shows a sector, AOB, of a circle centre O and radius 8 cm.
The angle AOB is 35°

Find the area, in cm^2 to 3 significant figures, of the segment shaded in the diagram.

.....cm^2

(Total for Question 21 is 4 marks)

22 Two containers, A and B, are mathematically similar.

Container A has a volume of 4500 cm^3 and a total surface area of 1500 cm^2
Container B has a volume of 972 cm^3

Calculate the total surface area, in cm^2, of container B.

.....cm^2

(Total for Question 22 is 4 marks)

23 Jenny has 18 sweets in a bag. There are 11 orange sweets and 7 green sweets in the bag.

Jenny takes at random 3 sweets from the bag.

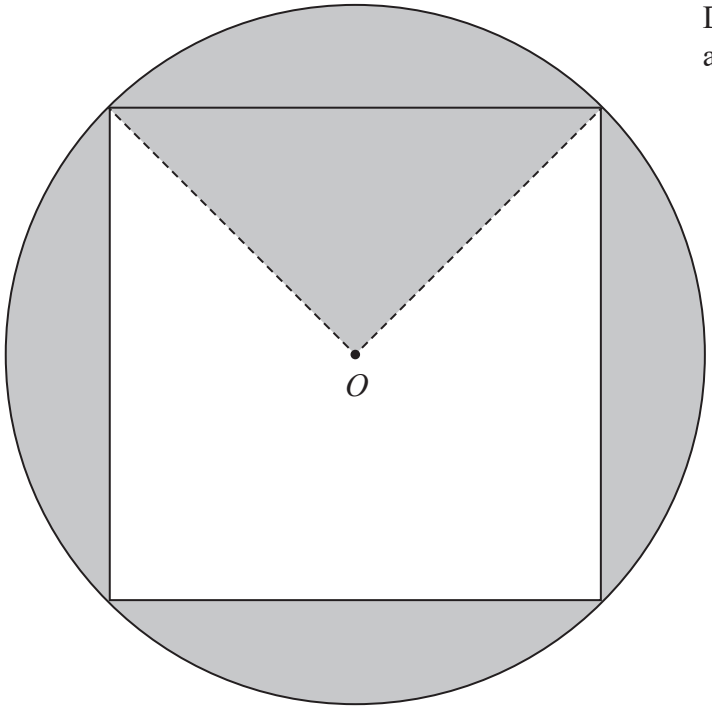
Calculate the probability that the 3 sweets are **not** all of the same colour.

.....

(Total for Question 23 is 4 marks)

24

Diagram **NOT** accurately drawn



The diagram shows a circle and a square. The circle has centre O and diameter k cm and each vertex of the square lies on the circle.

The total area of the regions shown shaded in the diagram is A cm^2

(a) Show that $8A = 2\pi k^2 - 3k^2$

.....

(3)

(b) Hence find an expression for k in terms of A and π.

$k =$ .....

(2)

(Total for Question 24 is 5 marks)

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

$$x = t^3 - 6t^2 + 15t \qquad t \geqslant 0$$

At time t seconds, the acceleration of the particle is a m/s^2

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

$a =$ .....

(3)

(b) Find the least speed of the particle.

..... m/s

(2)

(Total for Question 25 is 5 marks)

26 The straight line **L** has equation $2x + y = 8$

(a) Find the gradient of **L**.

.....

(2)

L meets the y-axis at the point A and the x-axis at the point B.

(b) Find the area of triangle AOB, where O is the origin.

.....

(4)

(Total for Question 26 is 6 marks)

27

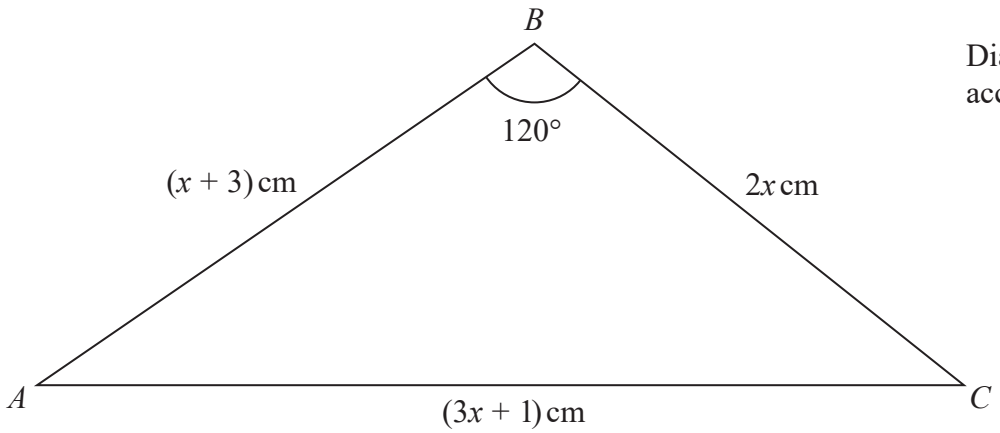


Diagram **NOT** accurately drawn

The diagram shows triangle ABC in which

$AB = (x + 3)\,\text{cm}$
$BC = 2x\,\text{cm}$
$AC = (3x + 1)\,\text{cm}$
$\angle ABC = 120°$

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

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

$\angle ACB =$ ..... °

(Total for Question 27 is 6 marks)

28 (a) Solve the inequality $4(x - 2) < 1 + x$

.....

(2)

(b) Without using a calculator and showing all your working, solve the inequality $2x^2 \leqslant 7x + 9$

.....

(4)

(c) Hence find the range of values of x for which both

$$4(x - 2) < 1 + x \quad \textbf{and} \quad 2x^2 \leqslant 7x + 9$$

.....

(1)

(Total for Question 28 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS