



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/21**

Paper 2 (Extended)

**May/June 2024**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

## INSTRUCTIONS

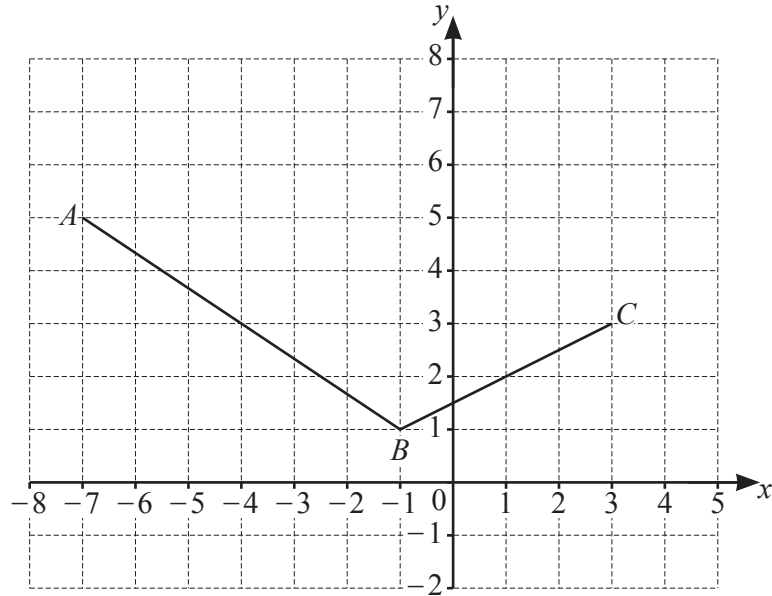
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use either your calculator value or 3.142.

## INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Any blank pages are indicated.

1



The diagram shows two sides of a parallelogram  $ABCD$ .

Find the coordinates of point  $D$ .

( ..... , ..... ) [2]

- 2 Geetha has a box of toys.  
She picks a toy at random from the box.  
The probability that she picks a wooden toy is 0.6 .

(a) Work out the probability that she does not pick a wooden toy.

..... [1]

(b) The box contains three types of toys, wooden, plastic or metal.

|                |        |         |       |
|----------------|--------|---------|-------|
| Type of toy    | Wooden | Plastic | Metal |
| Number of toys |        | 14      | 14    |
| Probability    | 0.6    |         |       |

Complete the table.

[2]

- 3 The table shows some information about two sequences.

|              | $n$ th term | 5th term |
|--------------|-------------|----------|
| Sequence $A$ | $60 - 4n$   |          |
| Sequence $B$ | $n^2 - 300$ |          |

- (a) Complete the table.

[2]

- (b) Find the smallest **positive** number in sequence  $B$ .

..... [2]

- 4 Find the greatest **odd** number that is a factor of 140 and a factor of 210.

..... [2]

- 5 Calculate.

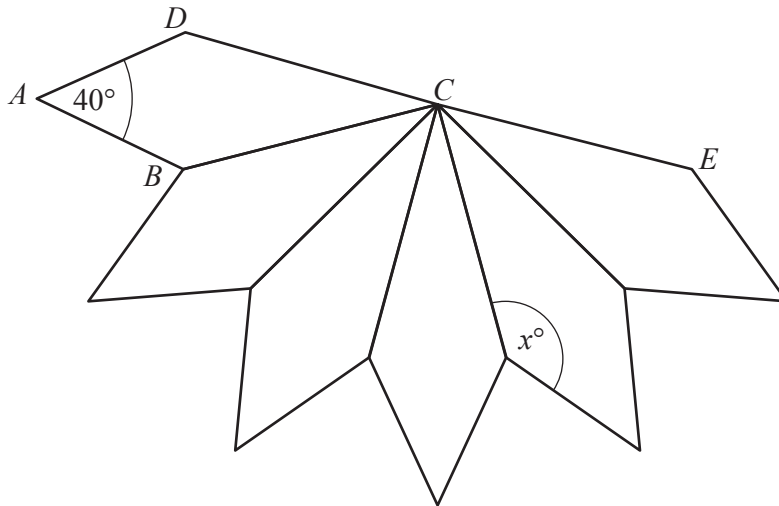
(a)  $\sqrt[3]{343} - \sqrt{40.96}$

..... [1]

(b)  $(192 + 4 \times 16)^{1.25}$

..... [1]

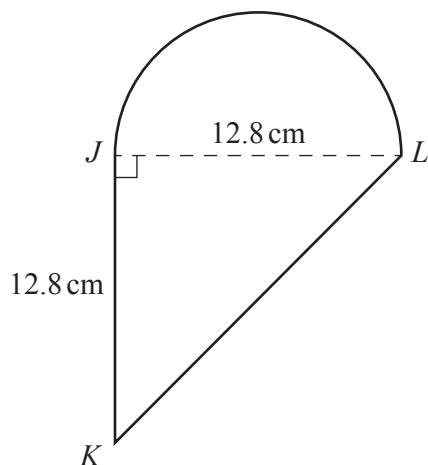
6

NOT TO  
SCALE

The diagram shows 5 kites that are congruent to kite  $ABCD$ .  
 Each kite is joined to the next kite along one edge.  
 Angle  $DAB = 40^\circ$  and  $DCE$  is a straight line.

Find the value of  $x$ .

$x = \dots\dots\dots$  [3]



NOT TO SCALE

The diagram shows a shape made from a triangle  $JKL$  and a semicircle with diameter  $JL$ .  $JKL$  is an isosceles right-angled triangle with  $JK = JL = 12.8$  cm.

(a) Calculate the area of this shape.

..... cm<sup>2</sup> [3]

(b) Calculate the perimeter of this shape.

..... cm [4]

- 8 These are the first five terms of a sequence.

11      18      25      32      39

Find an expression for the  $n$ th term of the sequence.

..... [2]

- 9 The value of a car is \$8000.  
Each year the value of the car decreases exponentially by 25%.

Calculate the value of this car after 3 years.

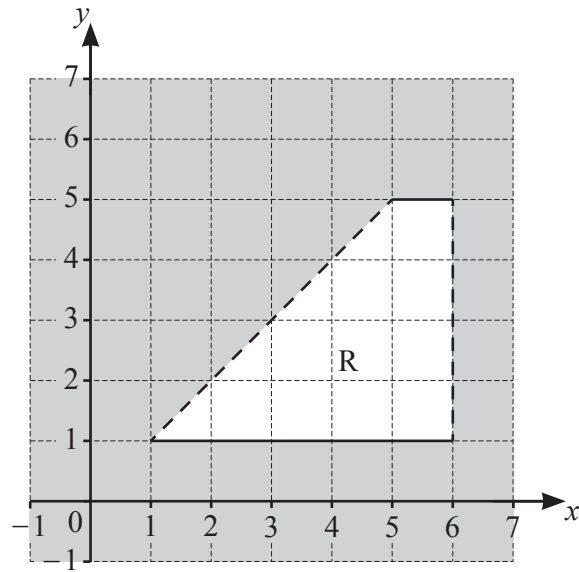
\$ ..... [2]

- 10 Amir invests \$1500 in an account.  
The account pays compound interest at a rate of  $r$  % per year.  
At the end of 8 years the value of his investment is \$1656.73 .

Find the value of  $r$ .

$r =$  ..... [3]

11



Find the inequalities that define the unshaded region, R.

..... [4]

- 12 Solve the simultaneous equations.  
You must show all your working.

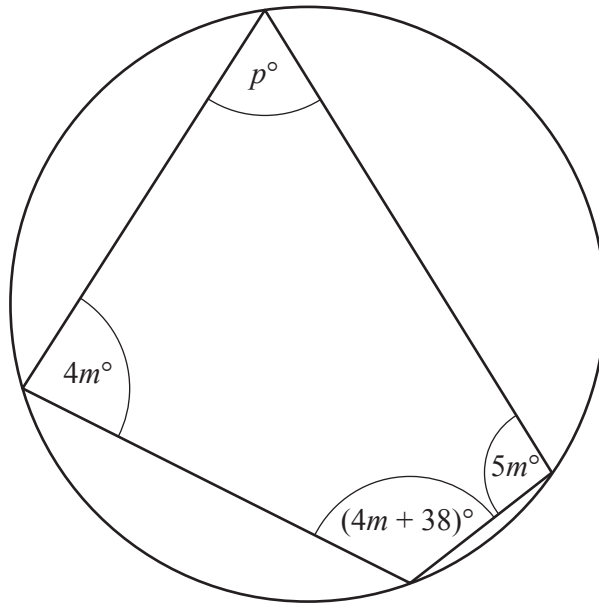
$$\frac{3x}{2} + 5y = 5$$

$$4x - 3y = 46$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [4]$$

13

NOT TO  
SCALE

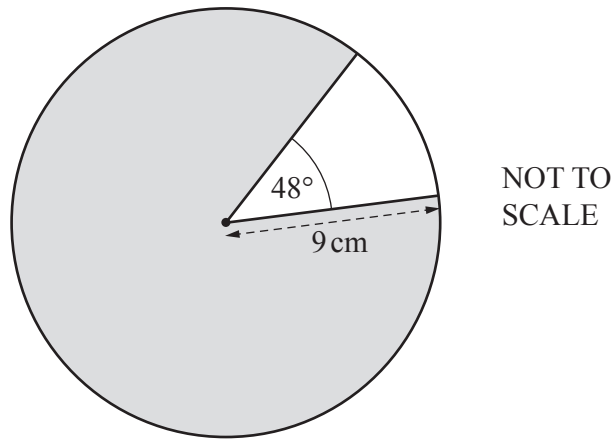
The diagram shows a cyclic quadrilateral.

Find the value of  $p$ .

$p = \dots\dots\dots$  [3]



14



The diagram shows a circle with radius 9 cm.

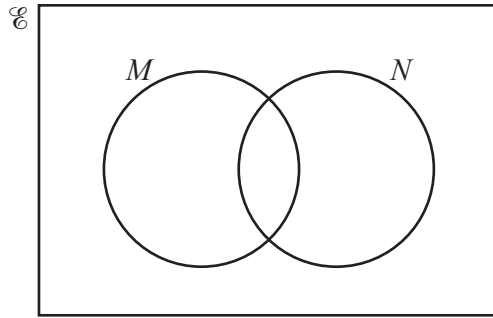
Calculate the area of the shaded major sector.

..... cm<sup>2</sup> [3]

- 15 Write  $0.1\dot{4}\dot{6}$  as a fraction in its simplest form.  
You must show all your working.

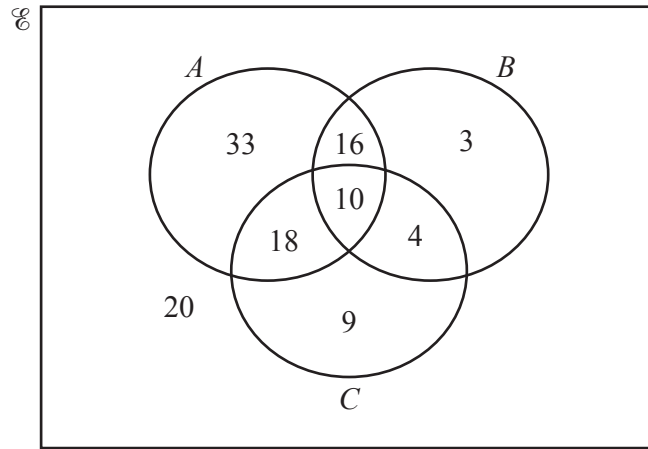
..... [3]

16 (a) In the Venn diagram, shade the region  $M' \cap N'$ .



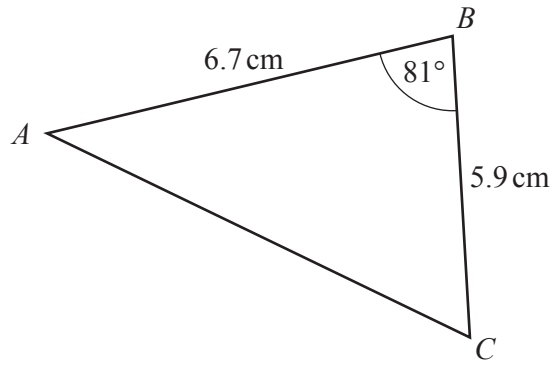
[1]

(b) Find  $n(B \cap (A' \cup C))$ .



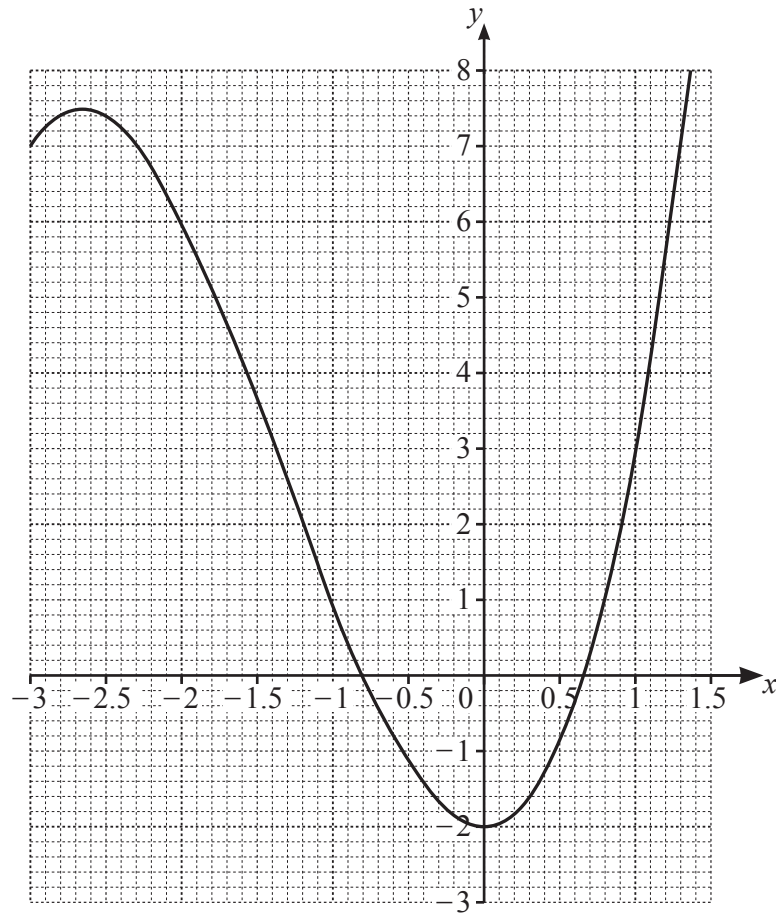
..... [1]

17

NOT TO  
SCALE

Calculate the area of triangle  $ABC$ .

.....  $\text{cm}^2$  [2]



The diagram shows the graph of  $y = x^3 + 4x^2 - 2$  for  $-3 \leq x \leq 1.5$ .

By drawing a suitable straight line, solve the equation  $x^3 + 4x^2 - 2 = 2x$  for  $-3 \leq x \leq 1.5$ .

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [3]

19 Factorise completely.

(a)  $12m^2 - 75t^2$

..... [3]

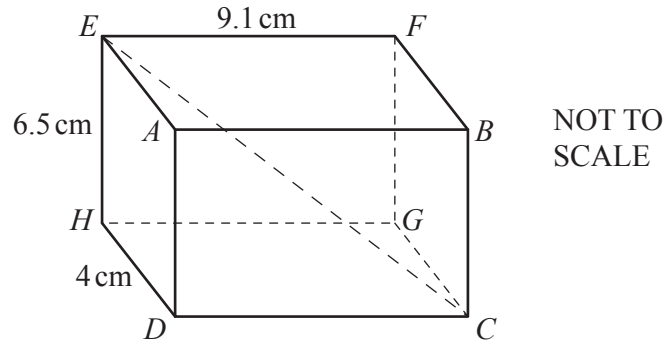
(b)  $xy + 15 + 3y + 5x$

..... [2]

20 Solve the equation  $8 \sin x + 6 = 1$  for  $0^\circ \leq x \leq 360^\circ$ .

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [3]

21



The diagram shows a cuboid.

$HD = 4\text{ cm}$ ,  $EH = 6.5\text{ cm}$  and  $EF = 9.1\text{ cm}$ .

Calculate the angle between  $CE$  and the base  $CDHG$ .

..... [4]

- 22 Bag  $A$  and bag  $B$  each contain red counters and blue counters only.  
Stephan picks a counter at random from bag  $A$  and Jen picks a counter at random from bag  $B$ .

The probability that Stephan picks a red counter is  $0.4$ .

The probability that Stephan and Jen both pick a red counter is  $0.25$ .

Find the probability that Stephan and Jen both pick a blue counter.

..... [4]

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