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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

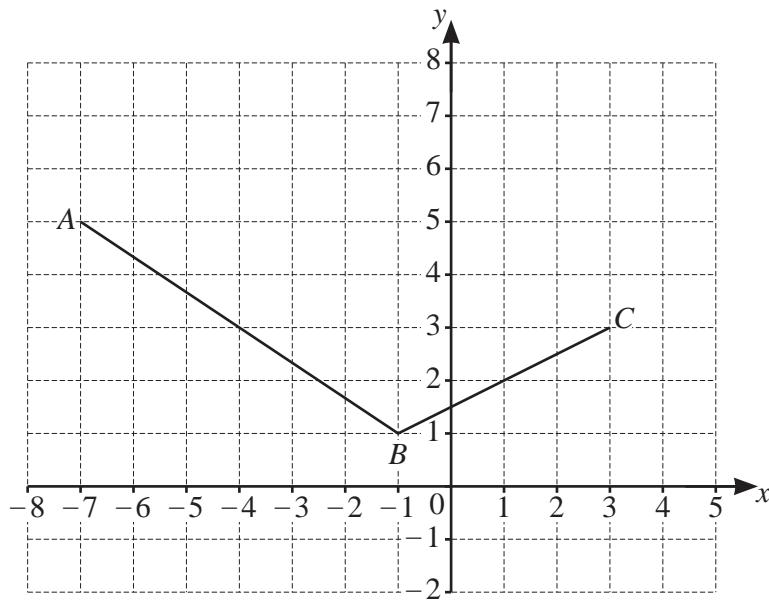
INSTRUCTIONS

- 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 π , 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.

	<i>n</i> 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]

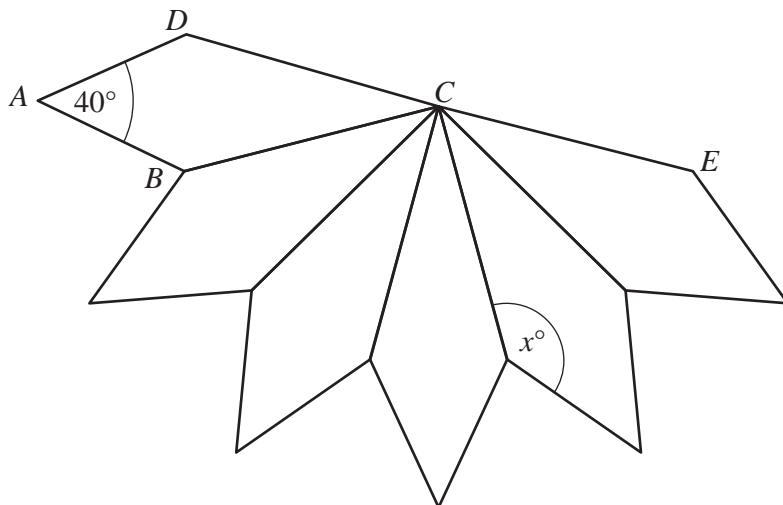
- 5** Calculate.

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

..... [1]

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

..... [1]

6

**NOT TO
SCALE**

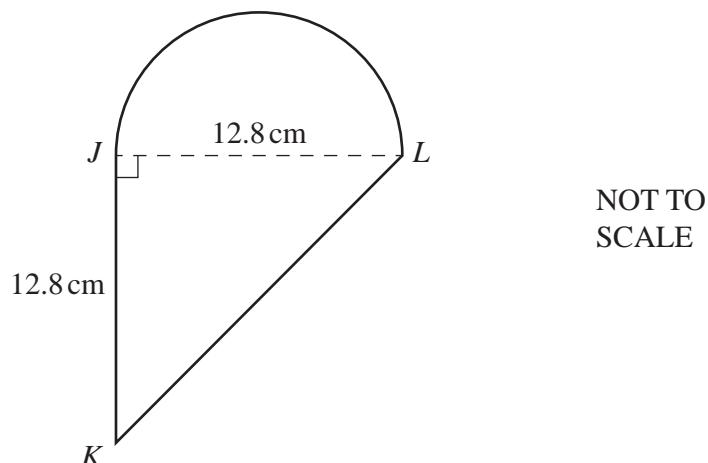
The diagram shows 5 kites that are congruent to kite $ABCD$.

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 .

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

7


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

- (a)** Calculate the area of this shape.

..... cm^2 [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]

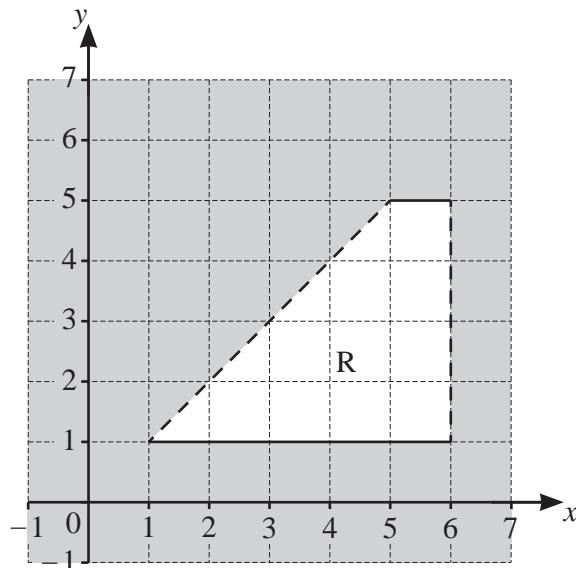
- 10 Amir invests \$1500 in an account.

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]

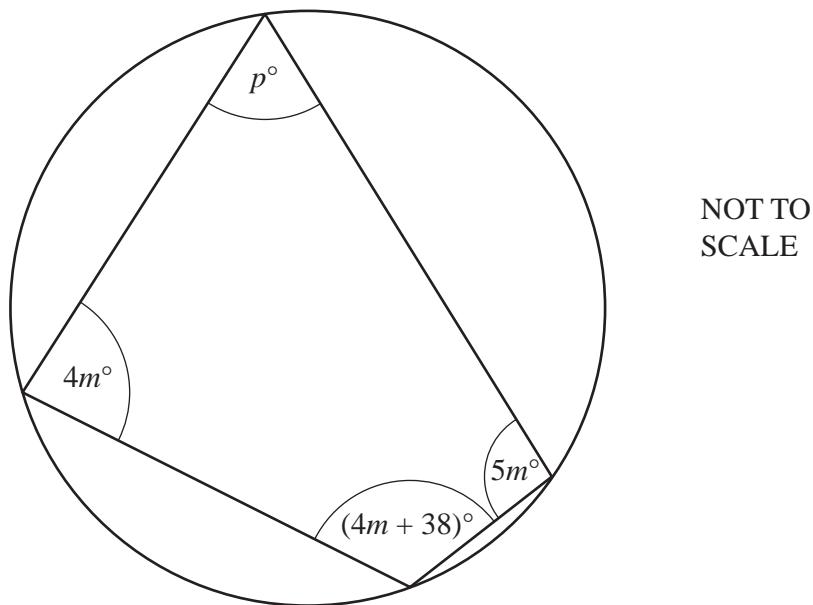
- 12** Solve the simultaneous equations.
 You must show all your working.

$$\begin{aligned}\frac{3x}{2} + 5y &= 5 \\ 4x - 3y &= 46\end{aligned}$$

$$x = \dots$$

$$y = \dots [4]$$

13

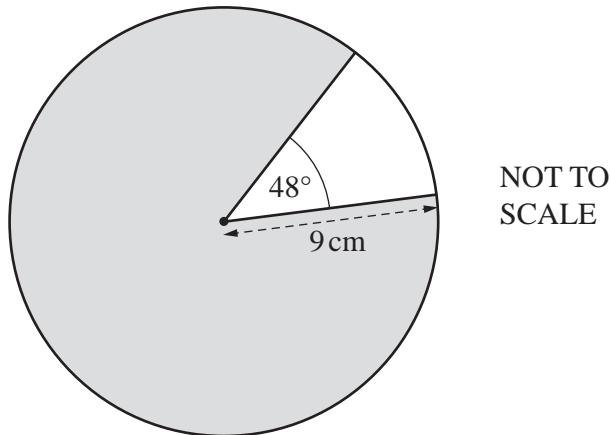


The diagram shows a cyclic quadrilateral.

Find the value of p .

$$p = \dots [3]$$

14



The diagram shows a circle with radius 9 cm.

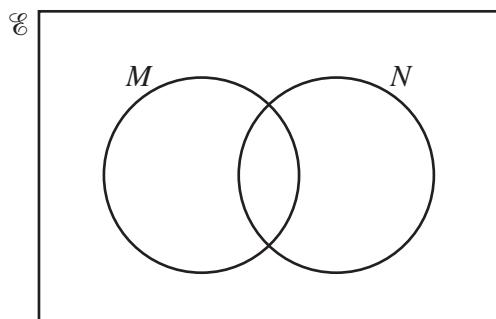
Calculate the area of the shaded major sector.

..... cm² [3]

- 15 Write $0.\dot{1}\dot{4}\dot{6}$ as a fraction in its simplest form.
You must show all your working.

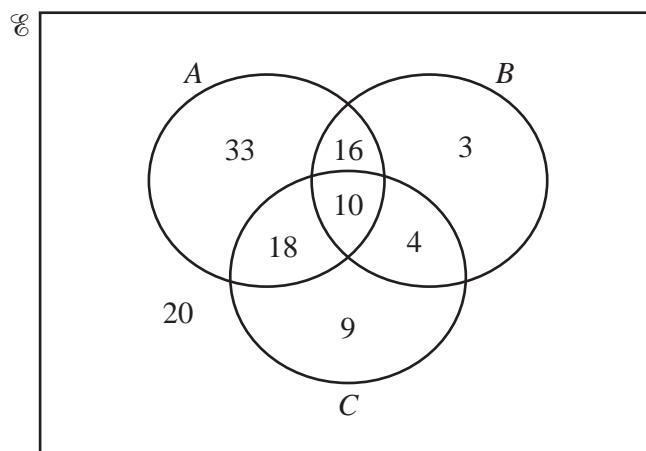
..... [3]

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



[1]

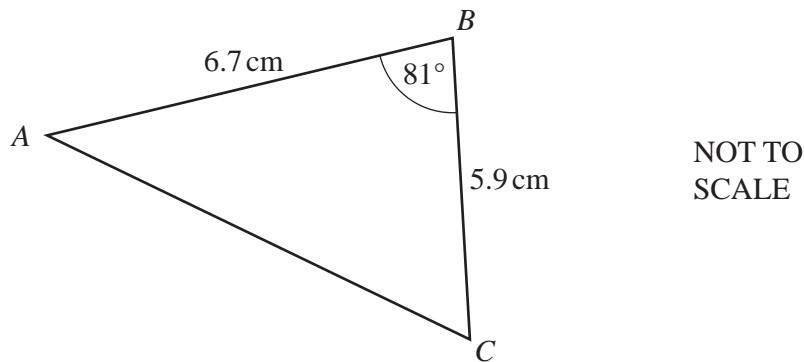
- (b)** Find $n(B \cap (A' \cup C))$.



..... [1]

11

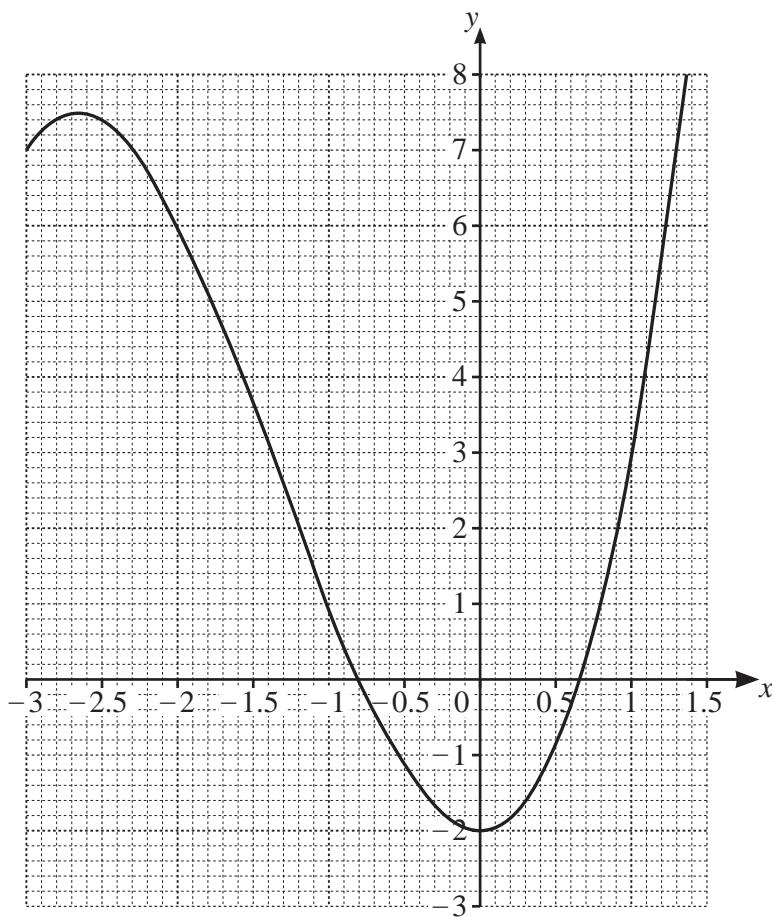
17



Calculate the area of triangle ABC .

..... cm^2 [2]

18



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 $-3 \leq x \leq 1.5$.

$$x = \dots \text{ or } x = \dots [3]$$

19 Factorise completely.

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

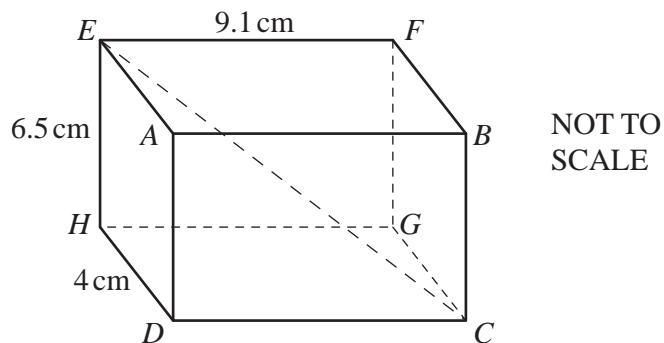
..... [3]

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

..... [2]

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

$x = \dots$ or $x = \dots$ [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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