



CANDIDATE  
NAME

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CANDIDATE  
NUMBER

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## 0444/21

May/June 2024

**1 hour 30 minutes**

You will need: Geometrical instruments

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, center 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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary work clearly.
- All answers should be given in their simplest form.

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

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

## Formula List

For the equation

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Lateral surface area,  $A$ , of cylinder of radius  $r$ , height  $h$ .

$$A = 2\pi rh$$

Lateral surface area,  $A$ , of cone of radius  $r$ , sloping edge  $l$ .

$$A = \pi rl$$

Surface area,  $A$ , of sphere of radius  $r$ .

$$A = 4\pi r^2$$

Volume,  $V$ , of pyramid, base area  $A$ , height  $h$ .

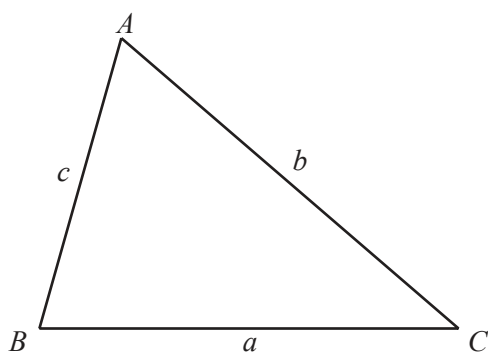
$$V = \frac{1}{3}Ah$$

Volume,  $V$ , of cone of radius  $r$ , height  $h$ .

$$V = \frac{1}{3}\pi r^2 h$$

Volume,  $V$ , of sphere of radius  $r$ .

$$V = \frac{4}{3}\pi r^3$$

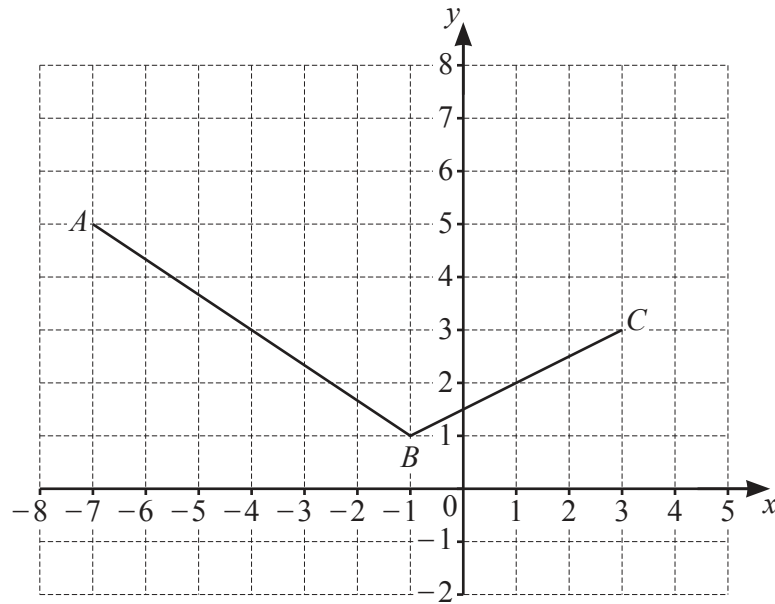


$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area} = \frac{1}{2}bc \sin A$$

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) In sequence  $B$  the  $k$ th term is  $-156$ .

Find the value of  $k$ .

$k = \dots\dots\dots$  [2]

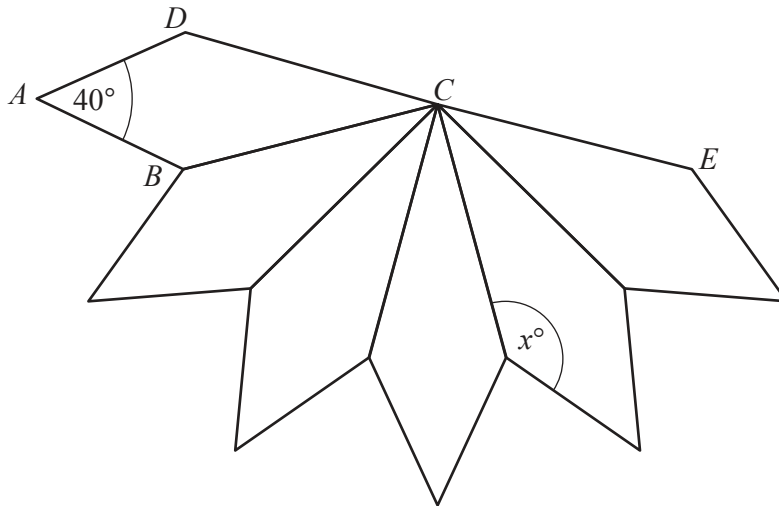
- 4 Find the greatest **odd** number that is a factor of 140 and a factor of 210.

$\dots\dots\dots$  [2]

- 5 Work out  $(6 \times 10^{17}) \times (2.1 \times 10^{17})$ .

Give your answer in scientific notation.

$\dots\dots\dots$  [2]

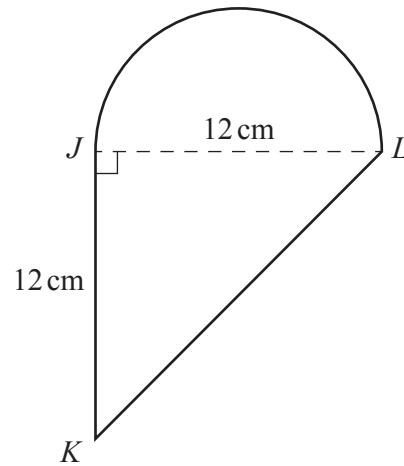


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The diagram shows 5 kites that are congruent to kite  $ABCD$ .  
Each kite is joined to the next kite along one edge.  
Angle  $DAB = 40^\circ$  and  $DCE$  is a straight line.

Find the value of  $x$ .

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



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The diagram shows a shape made from a triangle  $JKL$  and a semicircle with diameter  $JL$ .  $JKL$  is an isosceles right-angled triangle with  $JK = JL = 12$  cm.

- (a) Work out the area of this shape.  
Give your answer in the form  $a + b\pi$ .

.....  $\text{cm}^2$  [3]

- (b) Work out the perimeter of this shape.

Give your answer in the form  $a + b\sqrt{2} + c\pi$ .

..... 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 \$10 000.  
Each year the value of the car decreases exponentially by 20%.

Work out the value of this car after 2 years.

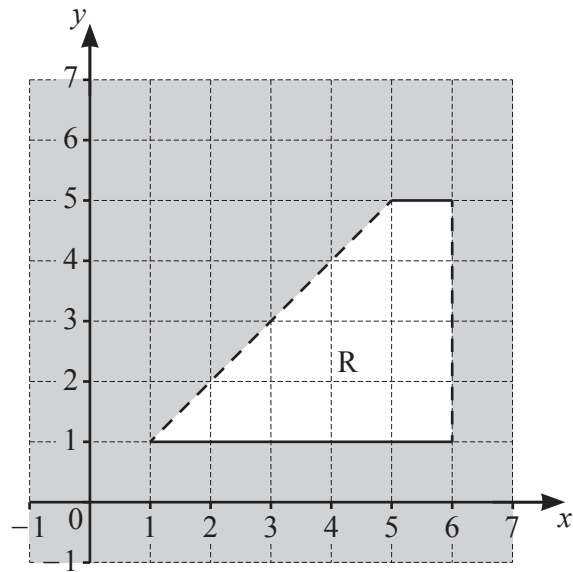
\$ ..... [2]

- 10 Amir invests \$3000 in an account.  
The account pays simple interest at a rate of  $r$  % per year.  
At the end of 6 years the value of his investment is \$3360.

Find the value of  $r$ .

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

11



Find the inequalities that define the unshaded region, R.

..... [4]

- 12 Solve the system of linear equations.  
You must show all your working.

$$6x + 2y = 29$$

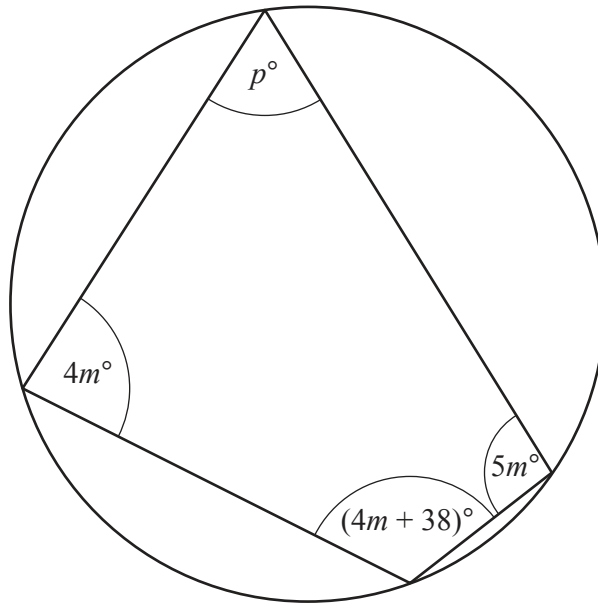
$$3x - 4y = 17$$

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

$$y = \dots\dots\dots [3]$$



13

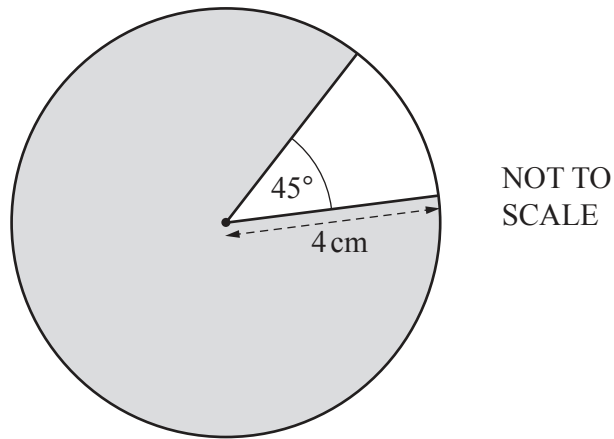
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The diagram shows a cyclic quadrilateral.

Find the value of  $p$ .

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

14



The area of the shaded sector is  $k\pi \text{ cm}^2$ .

Find the value of  $k$ .

$k = \dots\dots\dots$  [3]

15 (a) Simplify  $\sqrt{20} \times \sqrt{5}$ .

$\dots\dots\dots$  [1]

(b)  $(3 + 2\sqrt{3})^2 = c + k\sqrt{3}$

Find the value of  $c$  and the value of  $k$ .

$c = \dots\dots\dots$

$k = \dots\dots\dots$  [2]

16 Simplify.

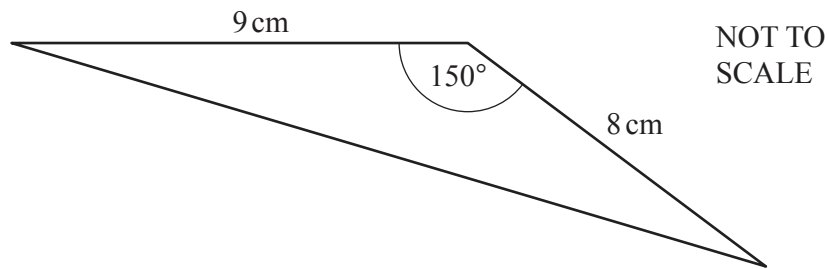
(a)  $177^0$

..... [1]

(b)  $\left(\frac{1}{2}\right)^{-2}$ .

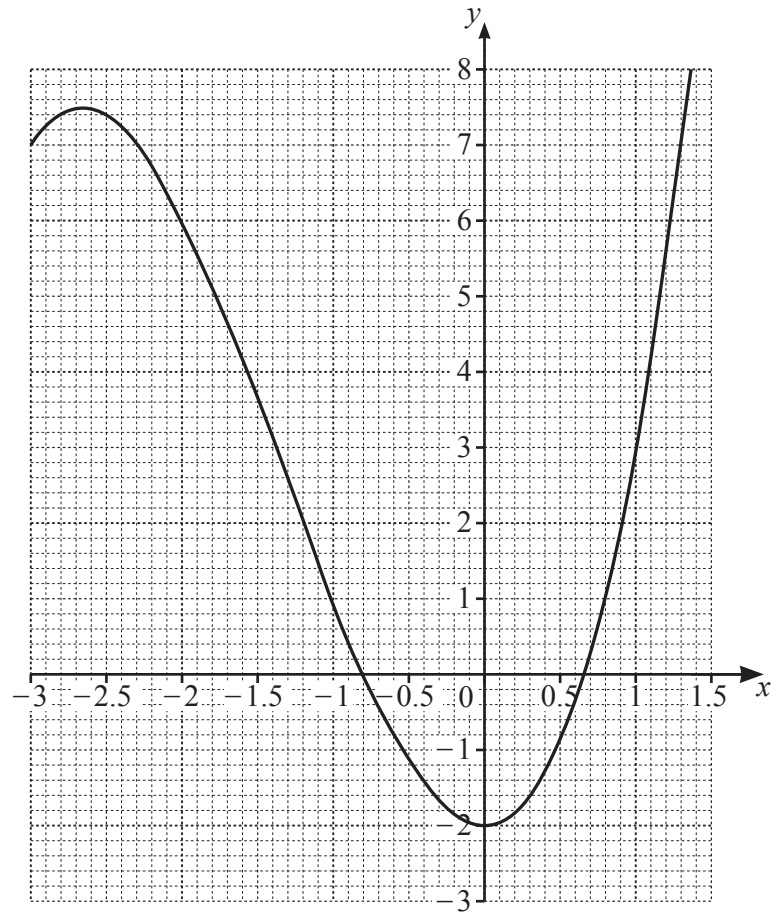
..... [1]

17



Work out the area of the triangle.

.....  $\text{cm}^2$  [3]



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 Factor completely.

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

..... [3]

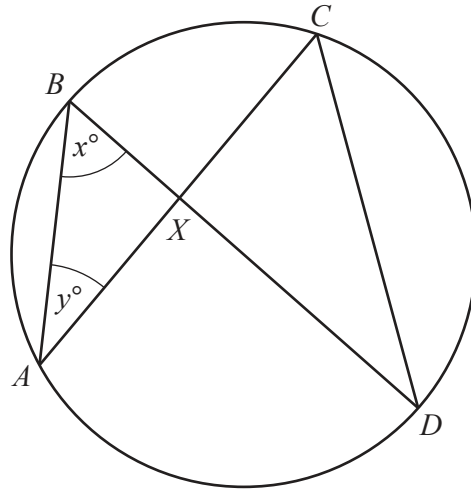
(b)  $xy + 15 + 3y + 5x$

..... [2]

20 Solve the equation  $4 \cos x + 5 = 3$  for  $0^\circ \leq x \leq 360^\circ$ .

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

21

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The points  $A$ ,  $B$ ,  $C$  and  $D$  lie on a circle.  
The chords  $AC$  and  $BD$  intersect at  $X$ .

(a) Find, in terms of  $x$  and/or  $y$

(i) angle  $AXB$

..... [1]

(ii) angle  $CDX$ .

..... [1]

(b)  $AB = 4$  cm,  $AX = 3$  cm,  $BX = 1.8$  cm and  $CD = 6$  cm.

Work out the length of  $CX$ .

$CX =$  ..... cm [2]

- 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  $\frac{2}{5}$ .

The probability that Stephan and Jen both pick a red counter is  $\frac{1}{4}$ .

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

..... [4]

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