OCR

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Thursday 19 June 2014 – Morning

GCSE METHODS IN MATHEMATICS

B392/01 Methods in Mathematics 2 (Foundation Tier)

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

Duration: 1 hour 30 minutes

* B 3 9 2 0 1 *

* 3 0 5 3 2 3 9 2 3 0 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

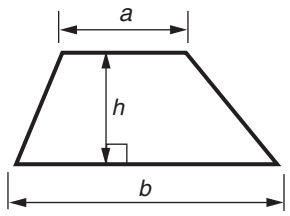
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your quality of written communication is assessed in questions marked with an asterisk (*****).
- The total number of marks for this paper is **90**.
- This document consists of **20** pages. Any blank pages are indicated.

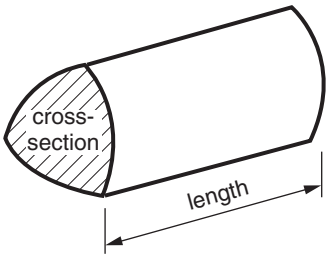
You are permitted to use a calculator for this paper

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = (area of cross-section) × length



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Answer **all** the questions.

1 **(a)** Zoe has two part-time jobs. During one year she earns £9430 in one job and £2819 in the other job.

Work out $\frac{9430 + 2819}{52}$ to find her average weekly pay.

Write your answer correct to the nearest penny.

(a) £ _____ **[2]**

(b) Weekend tickets for a music festival cost £145 each and day tickets cost £85 each.

Work out 12 400 × 145 + 24 240 × 85 to find the total takings for the festival.
Write your answer correct to the nearest thousand pounds.

(b) £ _____ **[2]**

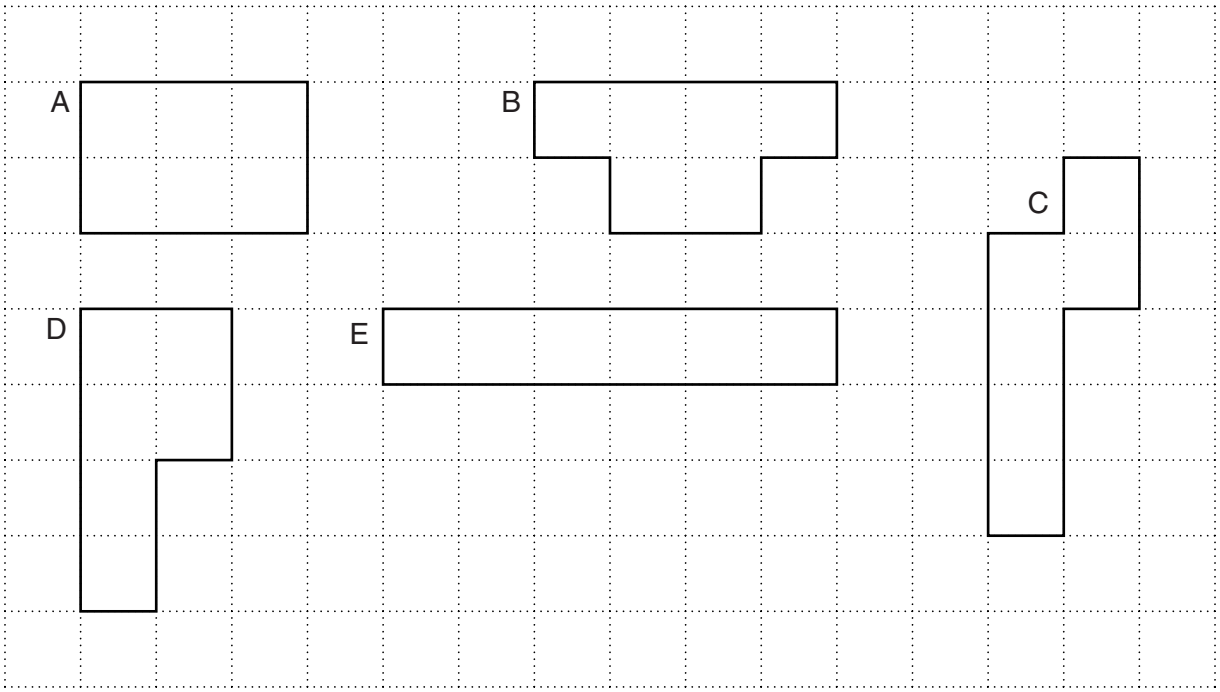
2 This table shows the rules for three sequences and the first two terms of each sequence.

Write down the next three terms in each sequence.

Rule	Terms of sequence
Subtract 6 from the previous number	37, 31, _____, _____, _____
Multiply the previous number by 3	4, 12, _____, _____, _____
Add 3 to the previous number and then multiply by 2	2, 10, _____, _____, _____

[4]

3 **(a)** These shapes are all made from 6 squares. They are drawn on a one-centimetre grid.



(i) Work out the perimeter of each shape.

A _____ cm B _____ cm C _____ cm

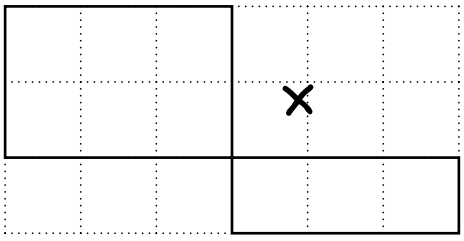
D _____ cm E _____ cm **[2]**

(ii) Complete this sentence to describe what is special about all the perimeters.

The perimeters are all _____ numbers. **[1]**

(b) In this part you have to use nine one-centimetre squares to make each shape.
The shapes must all be drawn using horizontal and vertical lines like those in part **(a)**.

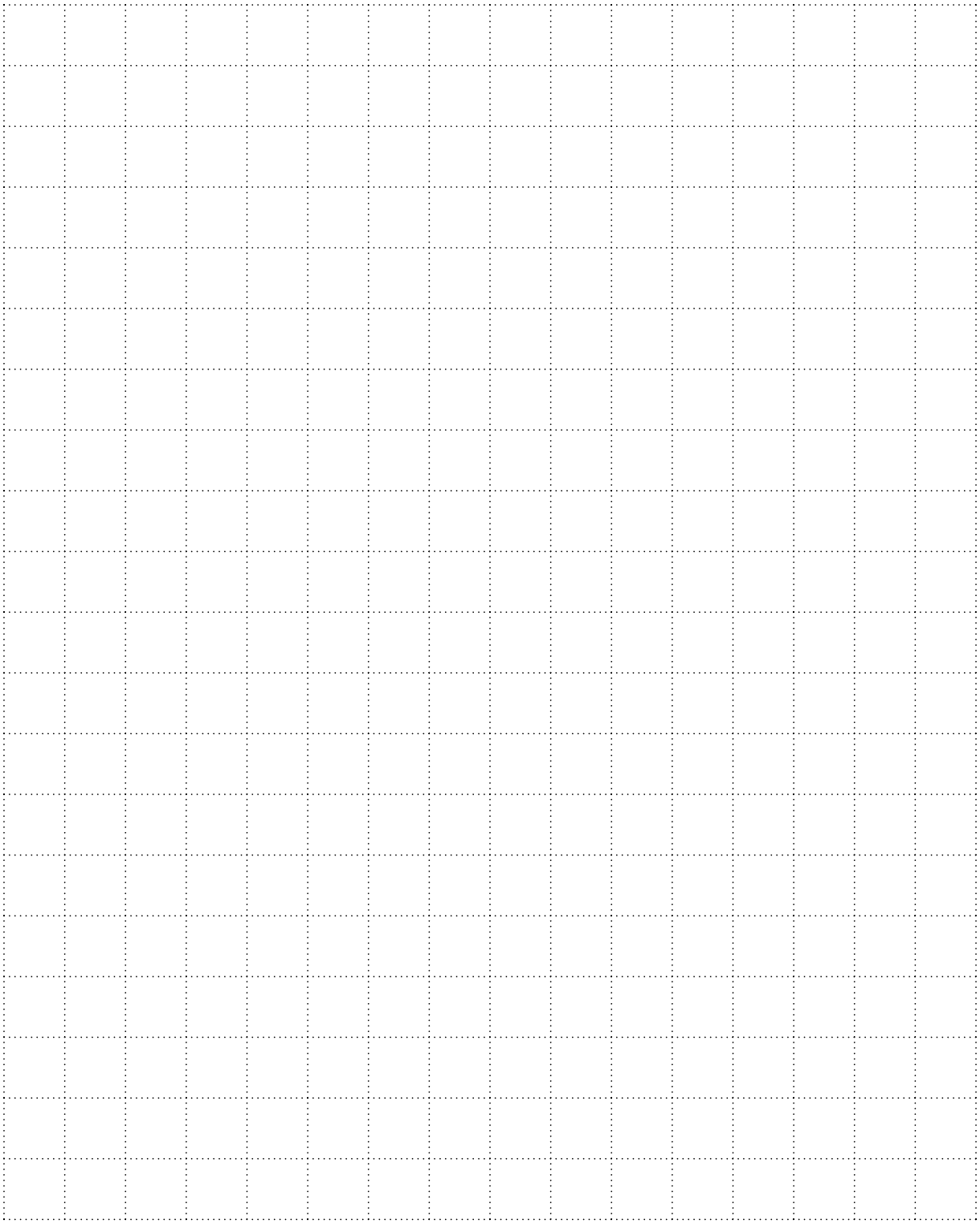
In each shape, at least one side of any square must join completely to a side of another square. So shapes like this are **not** allowed.



(i) Using the grid on the next page, find the shape with the smallest possible perimeter and the shape with the largest possible perimeter.
Label the shape with the smallest perimeter S.
Label the shape with the largest perimeter L.

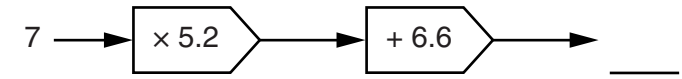
(ii) Write down the perimeter of shape S and the perimeter of shape L.

Use this grid for your rough work but make sure you label clearly S and L.

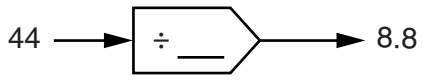


Perimeter of S _____ cm Perimeter of L _____ cm **[4]**

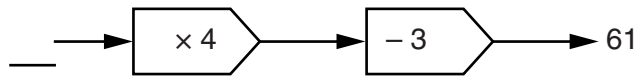
4 Fill in the missing number in each part.

(a) 

[1]

(b) 

[1]

(c) 

[2]

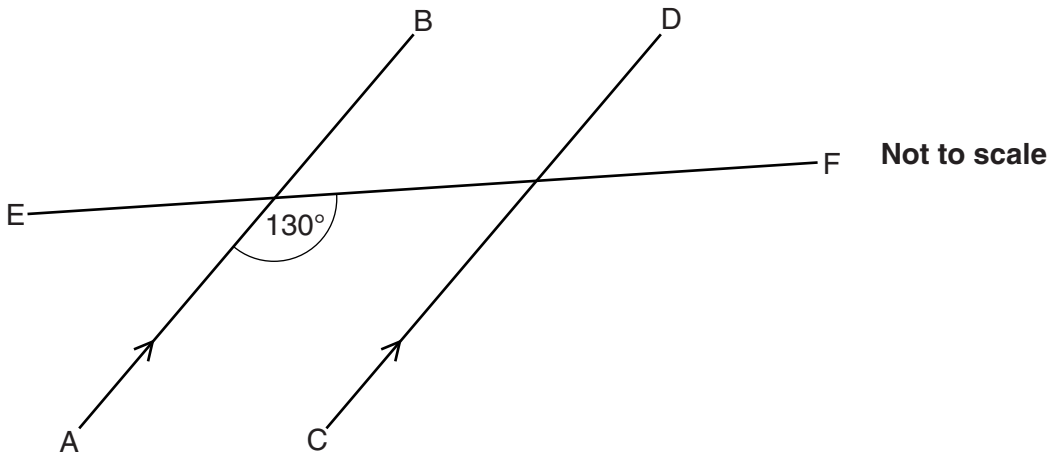
5 The rows in the table show equivalent fractions, decimals and percentages.

Complete the table.

Fraction (in its simplest form)	**Decimal**	**Percentage**
$\frac{1}{5}$	0.2	20%
$\frac{1}{4}$		
	0.4	
		$66\frac{2}{3}\%$

[4]

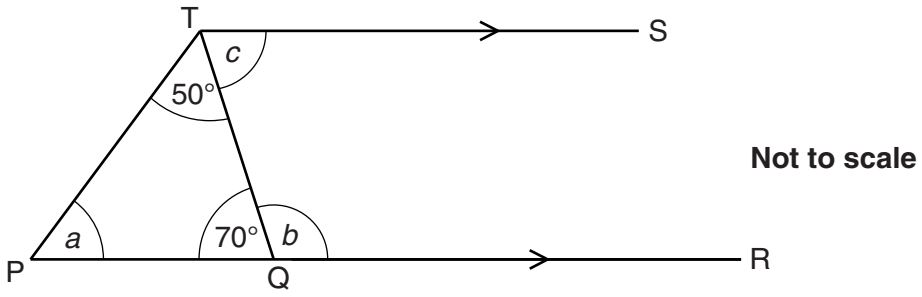
6 **(a)** AB and CD are parallel lines.
EF is a straight line crossing AB and CD.



Not to scale

An angle of 130° is marked.
Mark **all** the other angles of 130°. **[2]**

(b) PQR is a straight line.
TS is parallel to PQR.



Not to scale

Work out angles *a*, *b* and *c*.

(b) *a* = _____ °

b = _____ °

c = _____ °

[3]

7 A fruit juice drink is sold in three different sized packs containing 4 cartons, 6 cartons or 10 cartons.

(a) A pack of 4 cartons costs £1.44.
What is the cost of 1 carton?

(a) _____ **[2]**

(b)* A pack of 6 cartons costs £1.92.
A pack of 10 cartons costs £3.48.

Which size pack, 4, 6 or 10 cartons, is the best 'value for money'?

_____

_____

_____ **[3]**

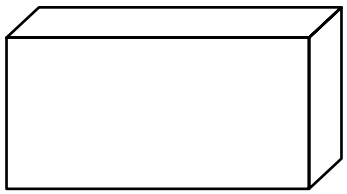
8 Use fractions to complete the following statements.

(a) $1 - \square = \frac{7}{8}$ **[1]**

(b) $3 \times \square = 1$ **[1]**

(c) $\frac{1}{10} + \square = \frac{4}{5}$ **[2]**

9 Mia has some small cubes. Each cube is 1 cm by 1 cm by 1 cm.
She uses the cubes to make different cuboids.



(a) Mia arranges the cubes into a cuboid which measures 20 cm by 10 cm by 5 cm.

Explain why this means that Mia has used 1000 cubes.

_____ **[1]**

(b) Mia makes a **different** cuboid using the 1000 cubes.
This cuboid has a base 25 cm by 4 cm.

What is the height of this cuboid?

(b) _____ cm **[1]**

(c) Mia then makes another **different** cuboid using the 1000 cubes.
All six faces of this cuboid are squares.

(i) What is the special name for this cuboid?

(c)(i) _____ **[1]**

(ii) What are the dimensions for this special cuboid?

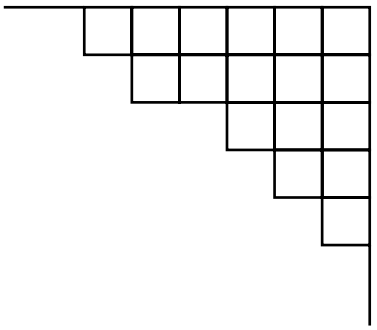
(ii) _____ cm by _____ cm by _____ cm **[1]**

(d) Mia then makes another **different** cuboid using the 1000 cubes.
Two of the faces of this cuboid are square.

Work out possible dimensions for this cuboid.

(d) _____ cm by _____ cm by _____ cm **[1]**

10 Harry is covering a floor with tiles.
The floor is a rectangle 450 cm by 300 cm.
Each tile is a square with sides of length 30 cm.



(a) Show that Harry needs to use 150 tiles to cover the floor.

_____

_____ **[2]**

(b) Harry chooses to use brown tiles and cream tiles to cover the floor.
He decides to use 1 brown tile for every 4 cream tiles.

The tiles are sold in packs of 10.
Work out how many packs of each colour tile he should buy.

(b) brown tiles _____ packs

cream tiles _____ packs
[4]

11 **(a)** These are some inequalities in which a represents the age of a person in years.

$$a > 17 \qquad a \leqslant 17 \qquad a \geqslant 17 \qquad a < 17$$

Write down an inequality, in terms of a, for the ages in these two statements.
Choose from the inequalities above.

(i) To drive a car a person must be at least 17 years old.

(a)(i) _____ **[1]**

(ii) Reduced prices are available for a person less than 17 years old.

(ii) _____ **[1]**

(b) Solve this inequality.

$2x - 1 < 13$

(b) _____ **[2]**

12 Rearrange these formulas to make x the subject.

(a) $y = \frac{x}{3}$

(a) $x =$ _____ **[1]**

(b) $y = 5x + 3$

(b) $x =$ _____ **[2]**

13 **(a)** A jar of strawberry jam costs £1.50.
The price is increased by 8%.

(i) Work out 8% of £1.50.

(a)(i) £ _____ **[2]**

(ii) Work out the new price of a jar of strawberry jam.

(ii) £ _____ **[1]**

(b)* A jar of strawberry jam contains 400 g of jam.
There is 140 g of fruit in the strawberry jam.
A jar of cherry jam contains 250 g of jam.
There is 100 g of fruit in the cherry jam.

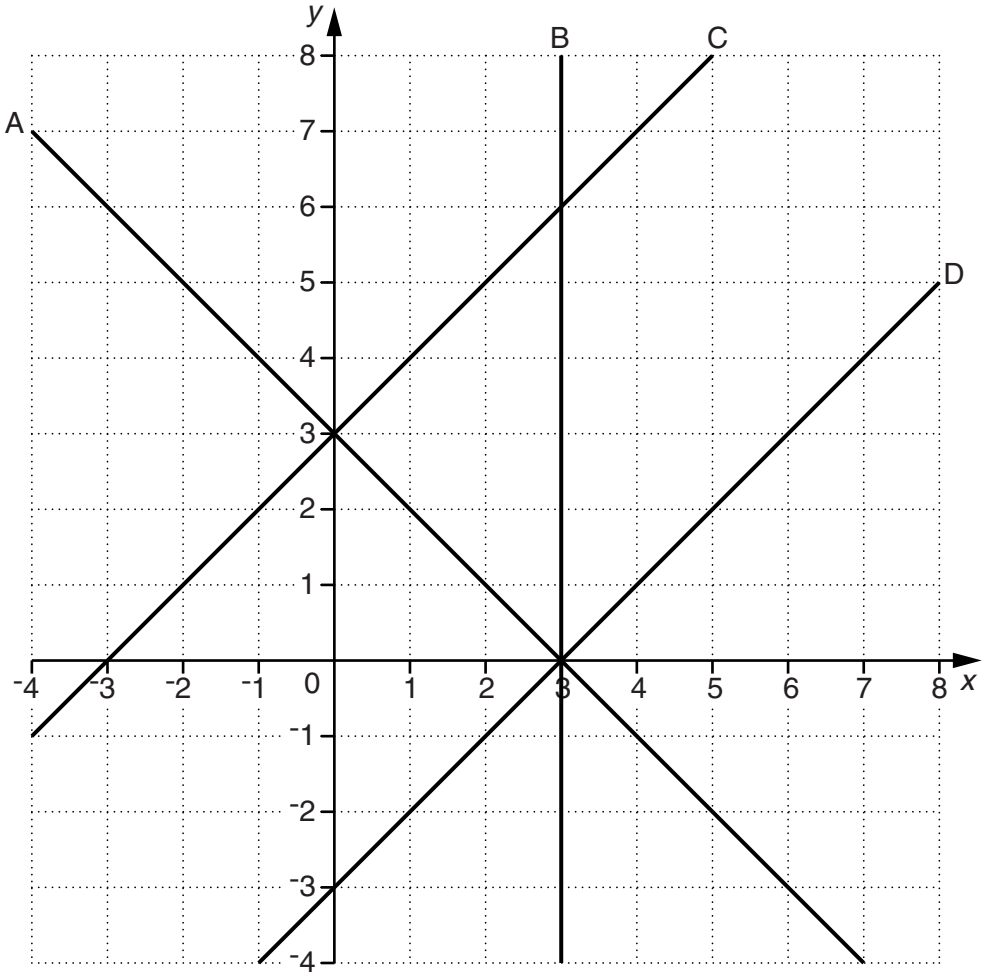
Which jar contains the greater percentage of fruit?

_____

_____

_____ **[4]**

14 Four straight lines A, B, C and D are drawn on the grid below.



Find the correct equation for each of the straight lines A, B, C and D.
Choose from these equations.

$x = 3$ $y = 3$ $x + y = 3$ $x - y = 3$

$y = 3x$ $y = 3x + 1$ $y = x + 3$

A _____ **[1]**

B _____ **[1]**

C _____ **[1]**

D _____ **[1]**

15 This question is about a regular polygon with 15 sides.

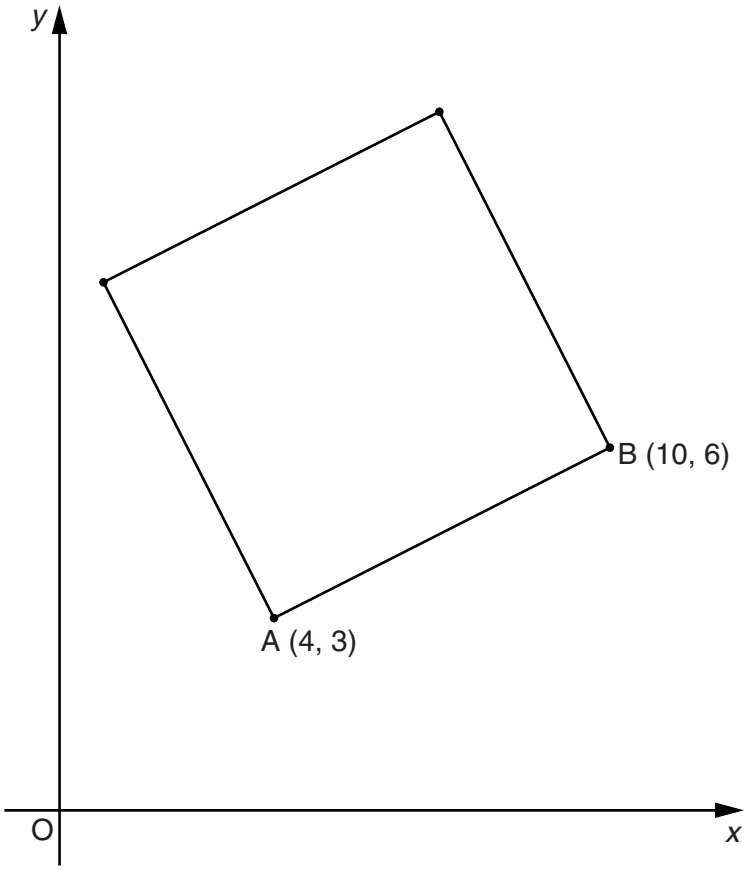
(a) Calculate the size of each exterior angle.

(a) _____° **[2]**

(b) Calculate the size of each interior angle.

(b) _____° **[1]**

16 AB is a side of a square.
A has coordinates (4, 3) and B has coordinates (10, 6).

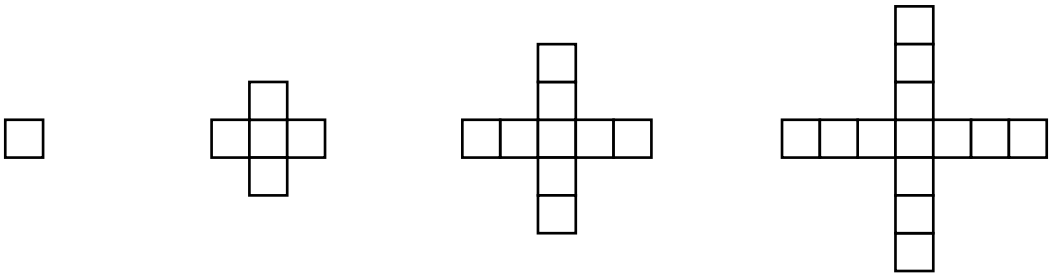


Not to scale

Calculate the area of the square.

_____ square units **[4]**

17 The diagrams show a sequence of patterns using squares.
The first four patterns are shown.



(a) How many squares are needed to make the 5th pattern?

(a) _____ **[2]**

(b) Find a formula for the number of squares in the nth pattern.

(b) _____ **[2]**

(c)* Explain why there cannot be a pattern in this sequence with an even number of squares.

_____

_____

_____

_____

_____

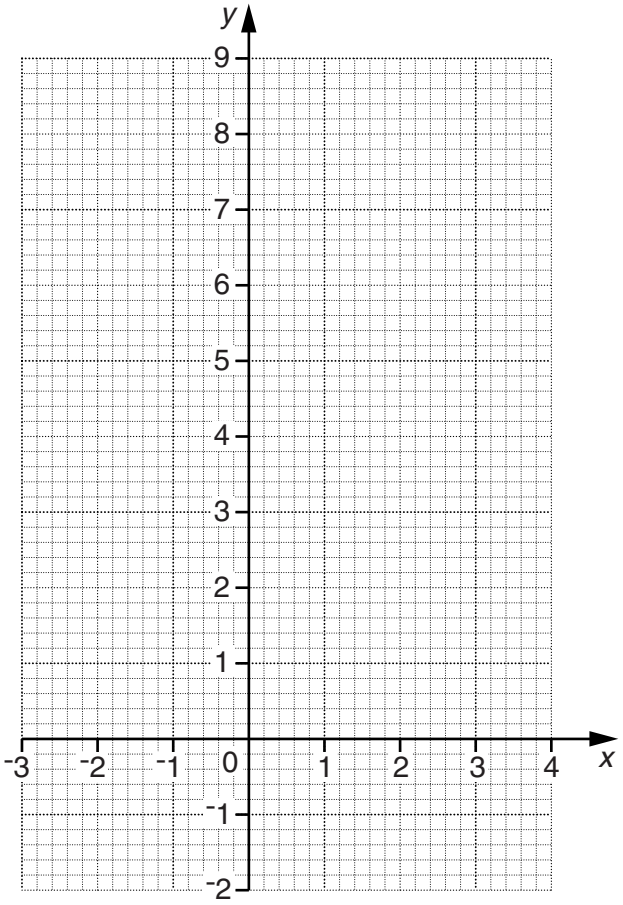
_____ **[2]**

18 **(a)** Complete the table for $y = x(x - 2)$.

x	$^{-}2$	$^{-}1$	0	1	2	3
y	8					3

[2]

(b) Draw the graph of $y = x(x - 2)$.

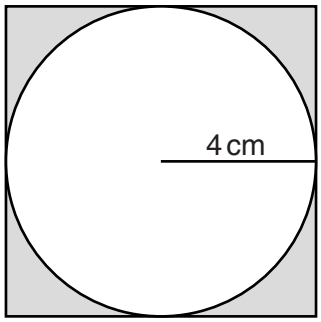


[2]

(c) Use your graph to solve the equation $x(x - 2) = 1$.
Give your answers correct to 1 decimal place.

(c) _____ **[2]**

19 The diagram shows a circle of radius 4 cm drawn inside a square.
The circle touches each side of the square.



Work out the total shaded area.

_____ cm^2 **[5]**

END OF QUESTION PAPER

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