

Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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14 – 15	
16 – 17	
18 – 19	
TOTAL	



General Certificate of Secondary Education
Foundation Tier
June 2012

Methods in Mathematics (Linked Pair Pilot)

93652F

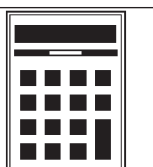
Unit 2 Geometry and Algebra

F

Wednesday 13 June 2012 9.00 am to 10.30 am

For this paper you must have:

- a calculator
- mathematical instruments.



Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 11 and 12. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

Advice

- In all calculations, show clearly how you work out your answer.



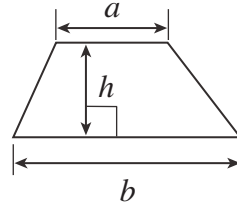
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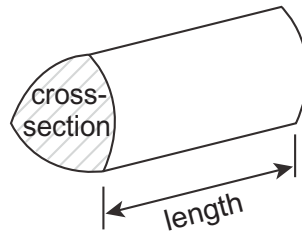
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Formulae Sheet: Foundation Tier

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



Volume of prism = area of cross-section \times length



Answer **all** questions in the spaces provided.

1 Here is a list of numbers.

4 7 15 24 27 42

1 (a) Write down the factor of 20.

Answer (1 mark)

1 (b) Write down the multiple of 9.

Answer (1 mark)

1 (c) Write down the prime number.

Answer (1 mark)

1 (d) Write down the cube number.

Answer (1 mark)

1 (e) Write down **two** numbers from the list that have a difference of 9.

.....

Answer and (1 mark)

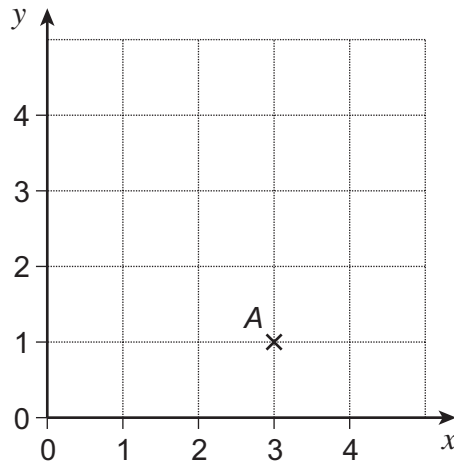
1 (f) Write down **two** numbers from the list that add to give a square number.

.....

Answer and (1 mark)



2 (a) Point A is shown on the centimetre grid.



2 (a) (i) Write down the coordinates of A .

Answer (.....,) (1 mark)

2 (a) (ii) Plot the point $B(2, 4)$ on the grid.

(1 mark)

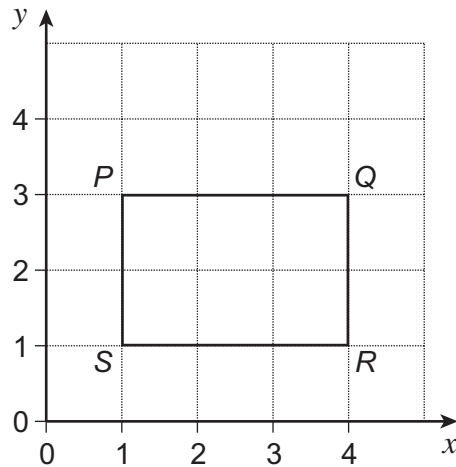
2 (a) (iii) Triangle ABC has one **vertical** line of symmetry.

Draw a possible triangle ABC on the grid.

(1 mark)



2 (b) Quadrilateral $PQRS$ is shown on the centimetre grid.



2 (b) (i) What is the special name of quadrilateral $PQRS$?

Answer (1 mark)

2 (b) (ii) What is the area of quadrilateral $PQRS$?

.....

Answer cm^2 (1 mark)

Turn over for the next question



- 3 A, B, C, D, E and F are numbers.
 $B = 6$ and $E = 2$

Use the clues to work out the numbers A, C, D and F .
Write the numbers in the table.

	A	B	C	D	E	F
Clue	$A = B + E$		$C = D + F$	$D = \frac{B}{E}$		$F = \frac{A}{E}$
Number		6			2	

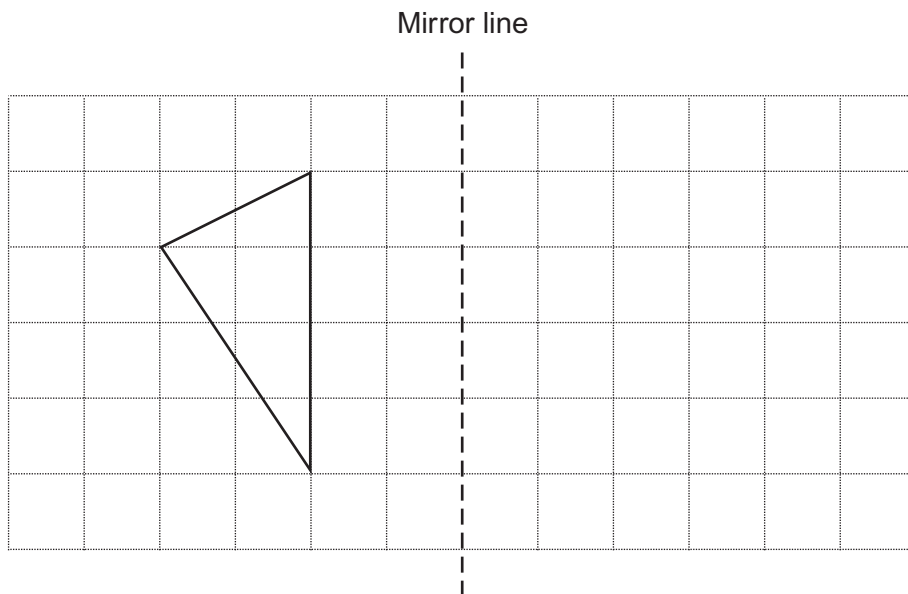
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(4 marks)

- 4 (a) A triangle is shown on the grid.

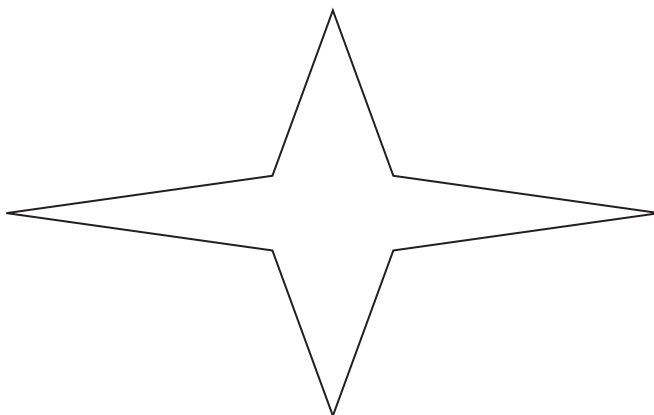


Reflect the triangle in the mirror line.

(2 marks)



4 (b) How many lines of symmetry does the shape below have?



Answer (1 mark)

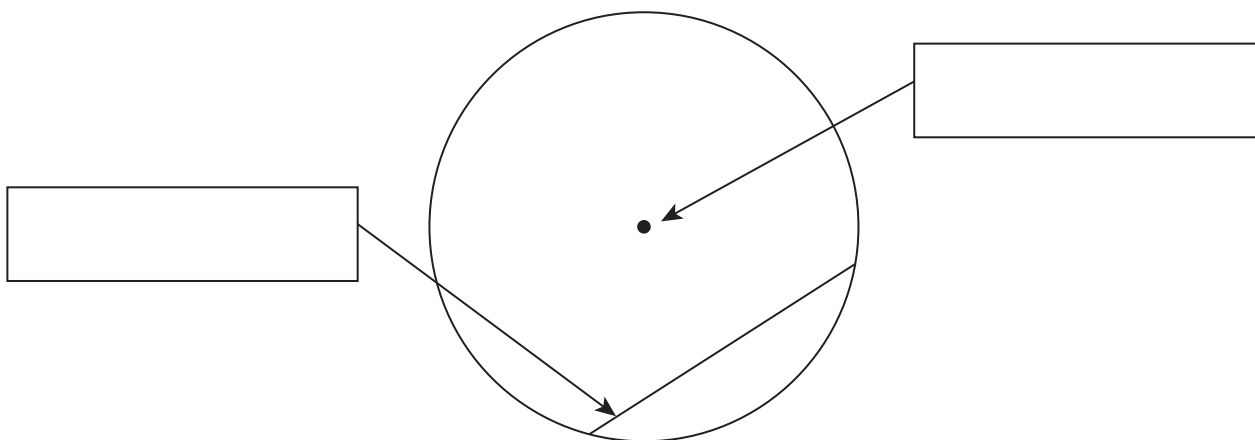
4 (c) Choose **two** words from the list to name the parts of the circle shown.

Circumference

Chord

Centre

Tangent



(2 marks)



5 The calendar shows July 2012.

July 2012

July 2012						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

5 (a) Harvey has a birthday on 13th July.

What day of the week is this?

Answer (1 mark)

5 (b) Mia goes on holiday on Saturday 28th July.
She comes back two weeks later.

On what date does she come back?

.....

Answer (1 mark)

5 (c) How many Wednesdays are there in **August** 2012?

.....

Answer (1 mark)




6 A shop sells cakes and scones.





Cakes

60p each 

  2 for £1.00

Scones

 70p each

4 for £2.50  
 

6 (a) What is the least amount of money needed to buy seven cakes?

.....
.....

Answer £ (2 marks)

6 (b) Bert buys some scones.
Ernie buys some cakes.
They both spend **exactly** the same amount of money.

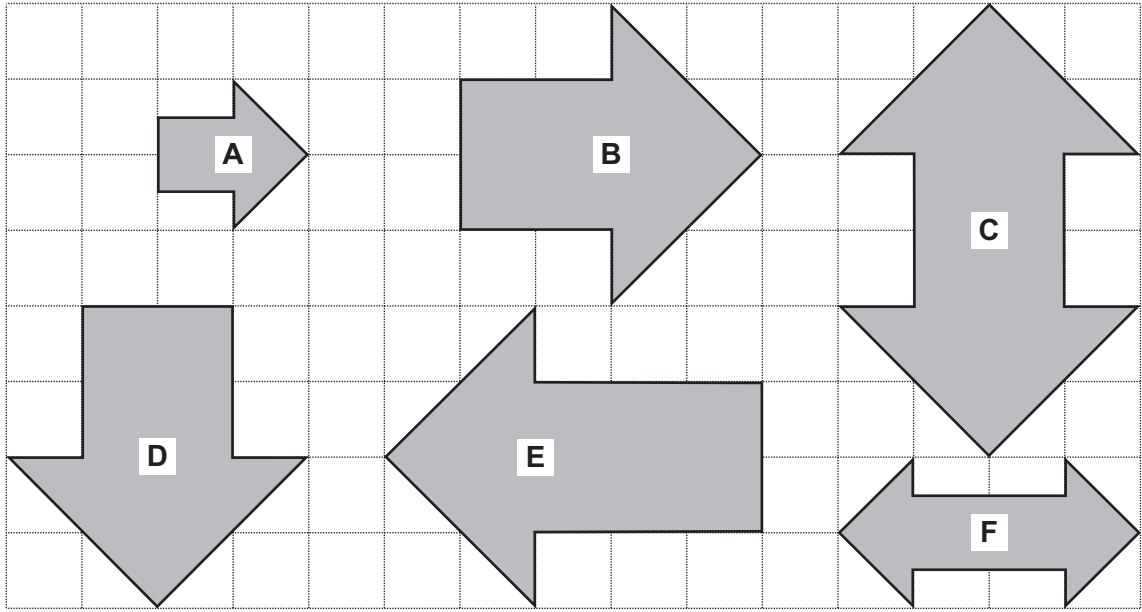
Work out a possible value for the number of scones Bert buys.

.....
.....
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Answer (3 marks)



7 Six shapes are shown on the grid.



7 (a) Which **two** shapes are congruent?

Answer and (1 mark)

7 (b) What is the order of rotational symmetry of shape C?

Answer (1 mark)

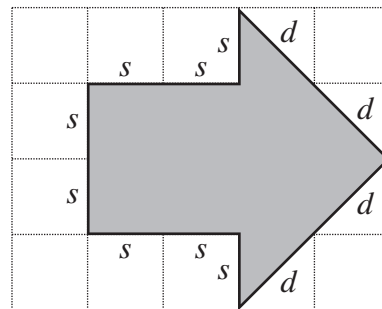
7 (c) The side of a small square has a length of s cm.



The diagonal of a small square has a length of d cm.



Shape B has a perimeter of $8s + 4d$ cm.



Write down the perimeter of shape C in terms of s and d .

.....

Answer cm (2 marks)



7 (d) Shape B is an enlargement of shape A.

What is the scale factor of the enlargement?

.....

Answer (1 mark)

7 (e) Shape A will tessellate.

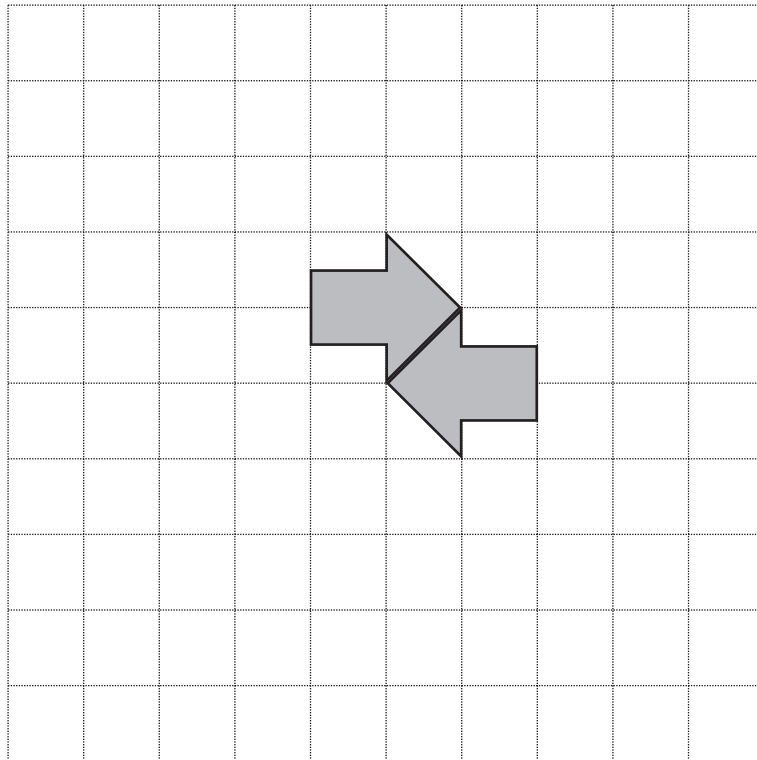
7 (e) (i) Explain what it means when a shape will tessellate.

.....

.....

(1 mark)

7 (e) (ii) Draw at least 5 more of shape A on the grid below to show how it will tessellate.



(1 mark)



8 When a square number, n , is rounded to the nearest 10, it has a value of 30.

What is the value of n ?

.....
.....

Answer (2 marks)

9 Solve the equations

9 (a) $x - 4 = 11$

.....

Answer $x =$ (1 mark)

9 (b) $2y + 3 = 1$

.....
.....

Answer $y =$ (2 marks)

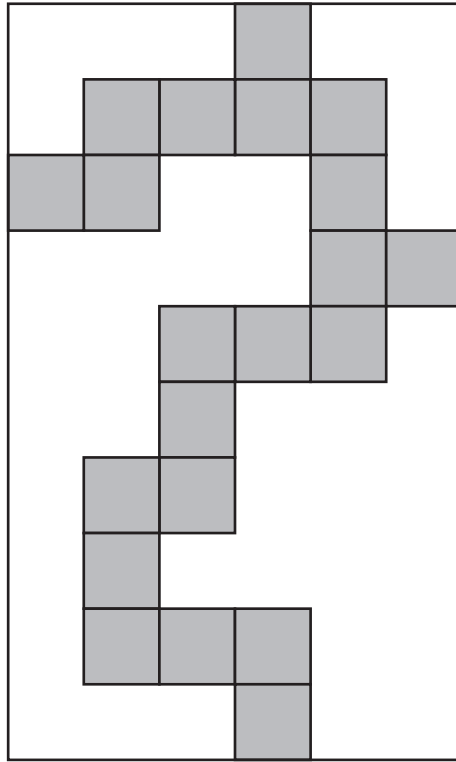
9 (c) $3(p + 2) = 18$

.....
.....
.....
.....

Answer $p =$ (3 marks)



10 Each small shaded square has an area of 4 cm^2 .



Not drawn accurately



Area = 4 cm^2

Calculate the **unshaded** area inside the large rectangle.

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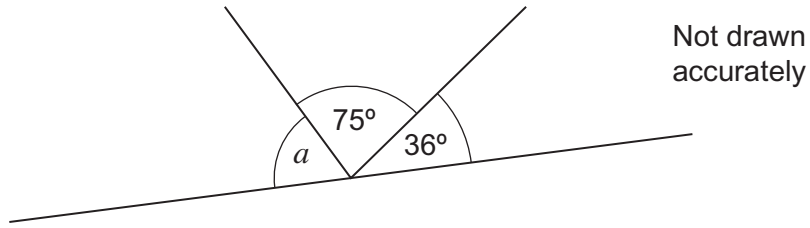
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Answer cm^2 (4 marks)



11 (a) Work out the size of angle a .

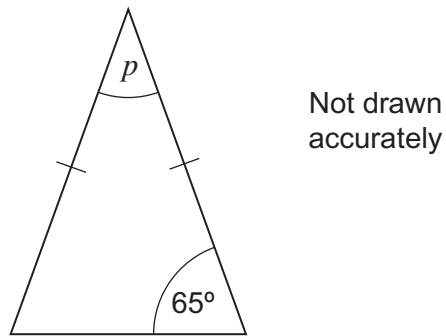


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Answer degrees (2 marks)

11 (b) Work out the size of angle p .

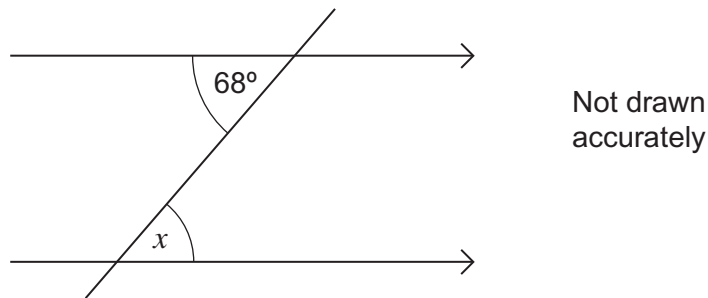


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Answer degrees (2 marks)

*11(c) Write down the size of angle x .
Give a reason for your answer.

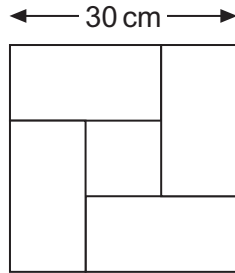


Answer degrees

Reason (2 marks)



***12** Rectangular and square blocks are used to make a patio.
 They are fitted together to make a larger square.
 The length of the rectangle is twice its width.
 The side of the larger square is 30 cm.



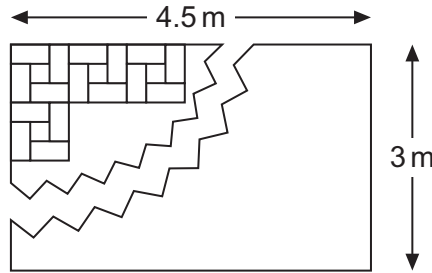
Not drawn accurately

12 (a) What is the area of the small square block in the middle?

.....

Answer cm² (2 marks)

12 (b) The patio is 3 metres by 4.5 metres.
 Large squares, as shown above, are used to make the patio.



Not drawn accurately

How many small square blocks and rectangular blocks are needed to make the patio?

.....

Answer Small square blocks

Rectangular blocks (4 marks)



13 (a) Simplify $4a + 7a - 3a$

.....

Answer (1 mark)

13 (b) Simplify $5x + 7y - 2x + 3y$

.....

.....

Answer (2 marks)

14 P is a two-digit prime number.
 Q is a **different** two-digit prime number.
Both P and Q are less than 60.

The number half-way between P and Q is also a prime number.

Work out a possible pair of values for P and Q .

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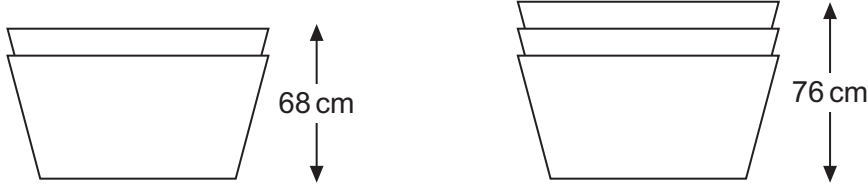
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Answer $P =$ $Q =$ (3 marks)



15 Sanjit stacks boxes as shown.

When two boxes are stacked they have a height of 68 centimetres.
When three boxes are stacked they have a height of 76 centimetres.



Not drawn
accurately

15 (a) What is the height when five boxes are stacked?

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Answer cm (3 marks)

15 (b) Work out an expression for the height of n stacked boxes.

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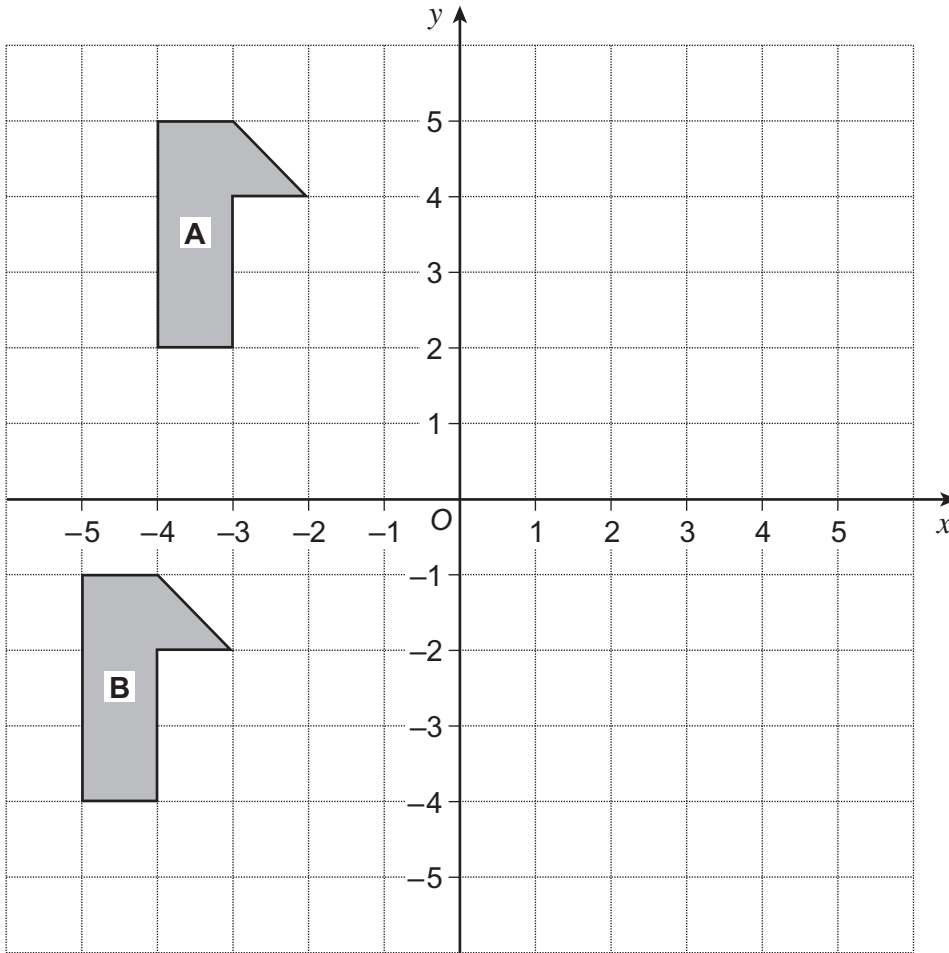
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Answer cm (2 marks)

Turn over for the next question



16 Shapes A and B are shown on the grid.



16 (a) Translate shape A by the vector $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$

Label the new shape C.

(2 marks)

16 (b) Work out the vector that translates shape A to shape B.

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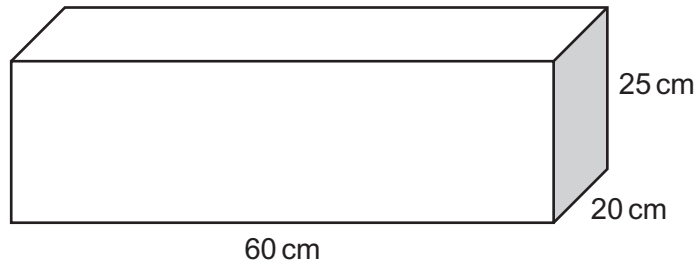
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Answer $\begin{pmatrix} \text{.....} \\ \text{.....} \end{pmatrix}$

(2 marks)



17 Scrap metal with a volume of $630\,000\text{ cm}^3$ is melted down into blocks as shown below.



17 (a) How many blocks can be made?

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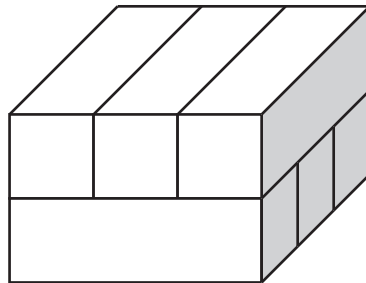
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Answer (3 marks)

17 (b) Blocks are stacked in layers of three as shown.



How high will a stack of 27 blocks be?
Give your answer in metres.

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Answer m (3 marks)

END OF QUESTIONS



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

