

Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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16 – 17	
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TOTAL	



General Certificate of Secondary Education
Foundation Tier
June 2011

Methods in Mathematics (Linked Pair Pilot)

93652F

Unit 2 **Geometry and Algebra**

F

Tuesday 21 June 2011 1.30 pm to 3.00 pm

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 4, 16 and 18. 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.



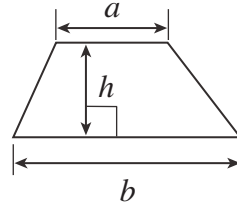
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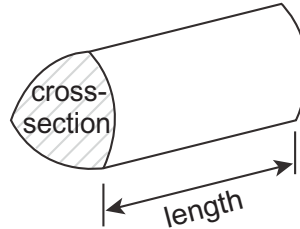
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Formulae Sheet: Foundation Tier

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

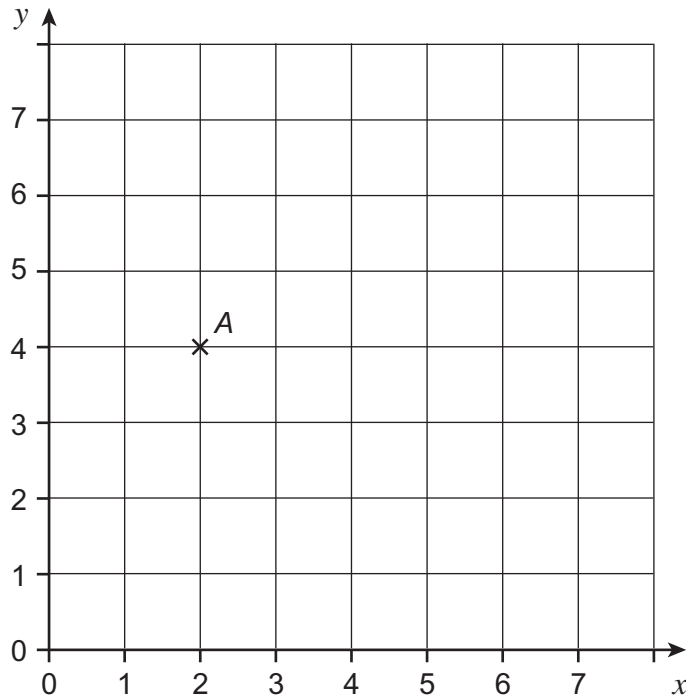


Volume of prism = area of cross-section \times length



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

- 1** Point A is shown on the grid.



- 1 (a)** Write down the coordinates of point A .

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

- 1 (b)** Plot the point B at $(5, 4)$.

(1 mark)

- 1 (c)** Draw a square using A and B as two of the corners.

Write down the coordinates of the other two corners.

Answer (..... ,) and (..... ,) (2 marks)



2 Josh buys a magazine for 72p.
He pays with a £1 coin and is given change.

2 (a) What are the coins if he is given exactly seven coins?

.....
.....

Answer (2 marks)

2 (b) What are the coins if he is given the smallest possible number of coins?

.....
.....

Answer (1 mark)

3 (a) Round 3478 to the nearest 10.

.....

Answer (1 mark)

3 (b) Round 3478 to the nearest 100.

.....

Answer (1 mark)

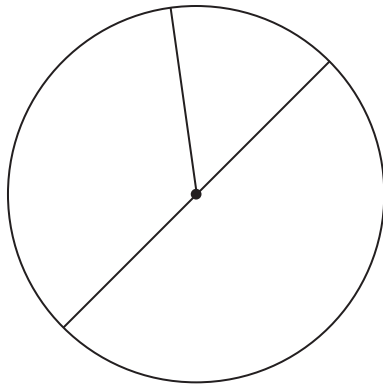
3 (c) Use the digits 3, 4, 7, 8 to make the biggest possible **even** number.

.....

(2 marks)



- *4 (a) The diagram shows a diameter and a radius of a circle.

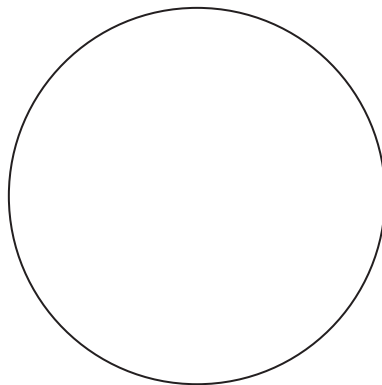


Write down a rule that connects the diameter and the radius.

.....
.....

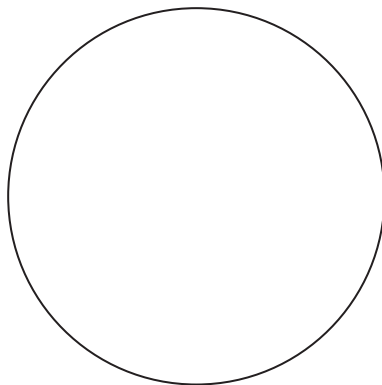
(1 mark)

- 4 (b) On this circle draw a chord.



(1 mark)

- 4 (c) On this circle shade in an area that represents a segment.



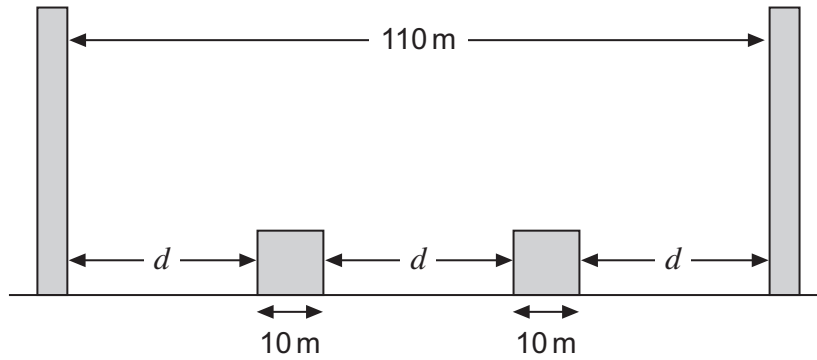
(1 mark)

10

Turn over ►



- 5 Two posts are 110 m apart.
Two blocks are placed between the two posts.
The blocks are 10 m wide.
The blocks are equally spaced between the posts.



Not drawn
accurately

Calculate the distance d .

.....

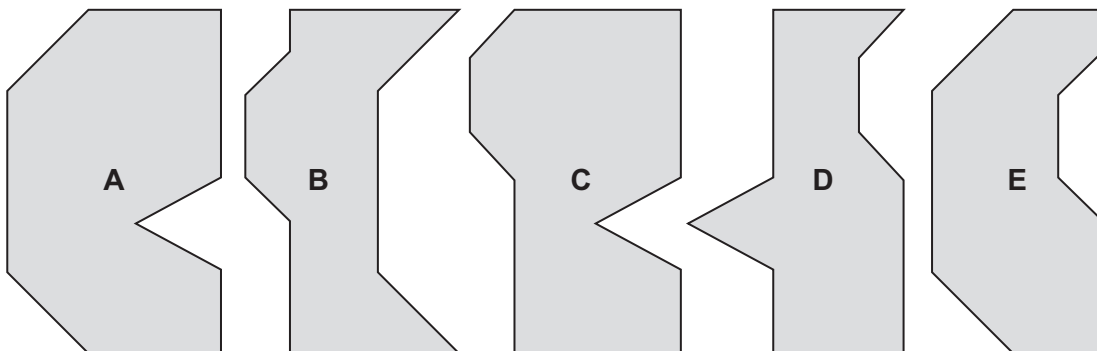
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Answer m (3 marks)

- 6 Here are five shapes.



In a certain order, the shapes fit together with no gaps.

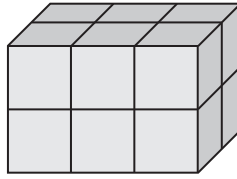
Write the letters in this order.

Answer , , , , (2 marks)



7 A cuboid is made from centimetre cubes.

Not drawn
accurately



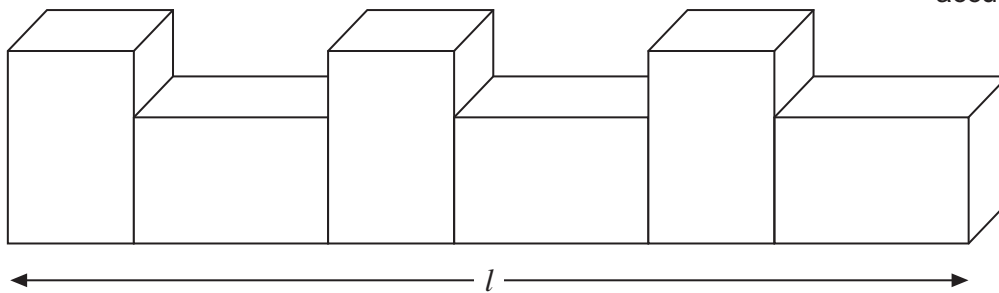
7 (a) What is the volume of the cuboid?
State the units of your answer.

.....
.....

Answer (2 marks)

7 (b) Six of these cuboids are put together as shown.

Not drawn
accurately



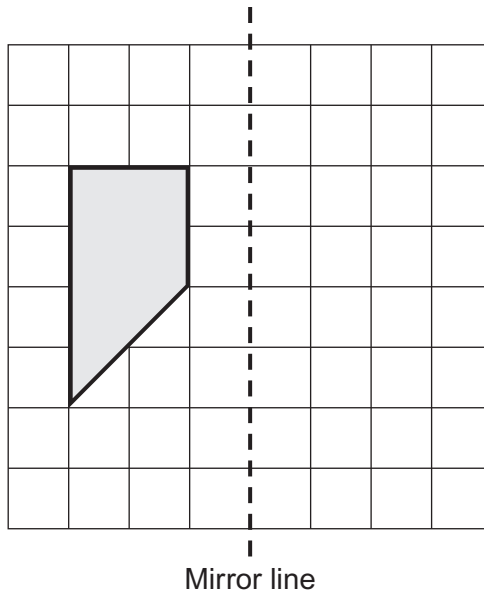
Work out the length l .

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

Answer cm (2 marks)



8 (a) Reflect the shape in the mirror line.



(2 marks)

8 (b) This symbol is used to represent 'drip dry' on washing instructions.



8 (b) (i) How many lines of symmetry does the symbol have?

Answer (1 mark)

8 (b) (ii) What is the order of rotational symmetry of the symbol?

Answer (1 mark)



9 Two numbers add up to 10
The numbers multiply together to give 22.75

What are the two numbers?

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

Answer and (3 marks)

10 One-sixth of a number is 30.

What is one-fifth of the same number?

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

Answer (3 marks)

11 (a) Write down the next two terms of this sequence.

26 20 14 8

Answer and (2 marks)

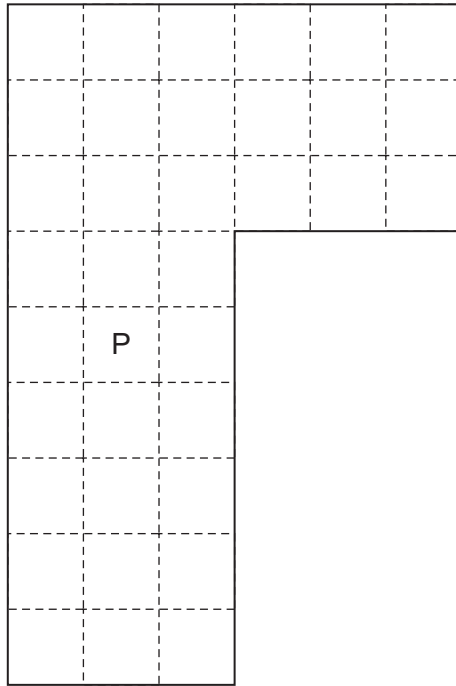
11 (b) Is -63 a term in this sequence?
Give a reason for your answer.

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

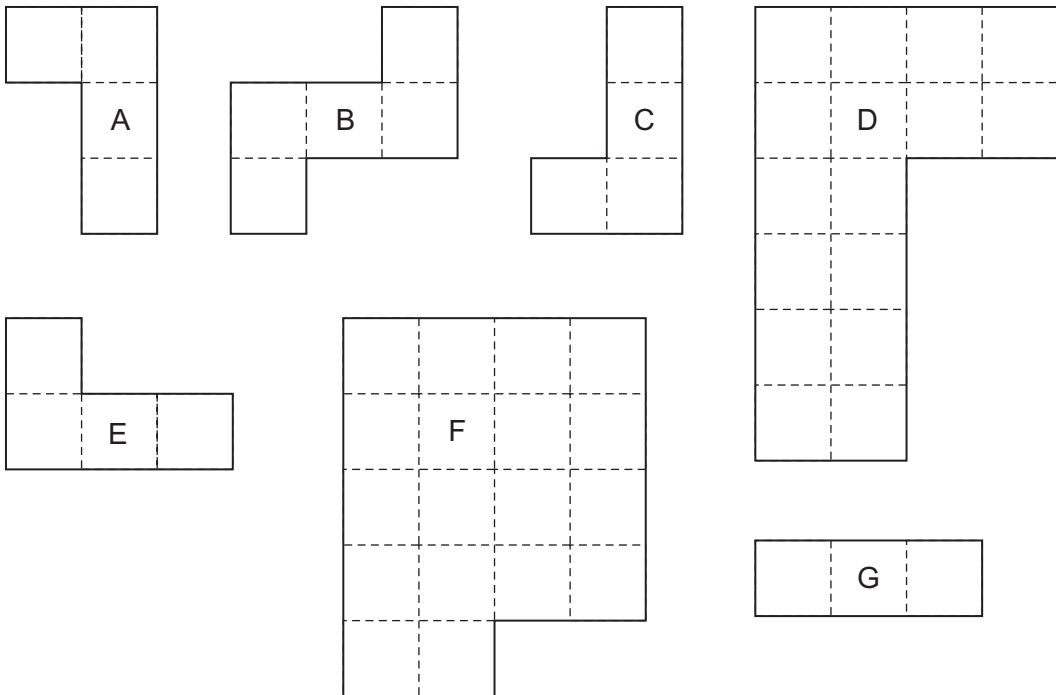
(1 mark)



12 The shape **P** below is cut into six pieces.



The six pieces are shown below with a seventh piece.



12(a) How do you know that shape F was not cut from shape P?

.....

.....

.....

(1 mark)



12 (b) Write down a pair of congruent shapes.

Answer and (1 mark)

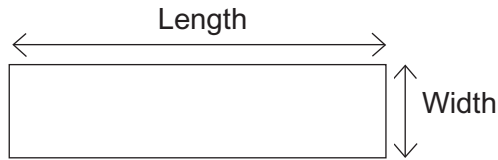
12 (c) Shape P is an enlargement of shape C by a scale factor of 3.

How many times bigger is the area of shape P than the area of shape C?

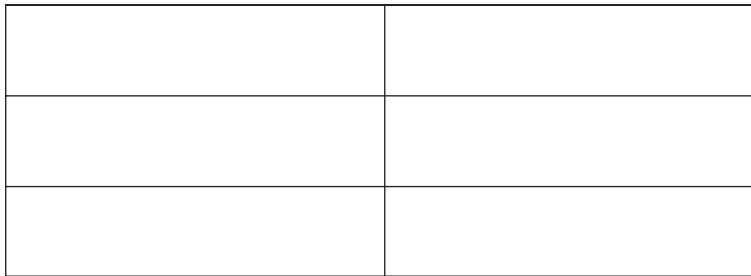
.....

Answer (2 marks)

13 Here is a tile.
The length of the tile is 4 times its width.



Six tiles are put together as shown.



Not drawn accurately

The perimeter of the whole shape is 55 cm.

Work out the width of a tile.

.....

.....

.....

.....

.....

.....

.....

.....

Answer cm (3 marks)

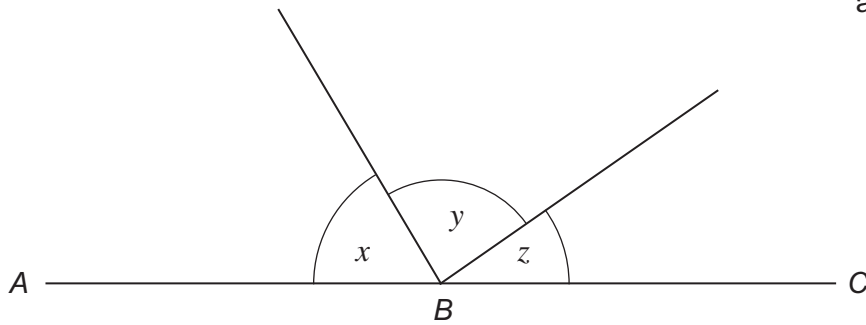
7

Turn over ►



14 ABC is a straight line.
x, y and z are all **different** acute angles.

Not drawn accurately



Write down possible values for the angles x, y and z.

.....

.....

.....

Answer $x =$ degrees

$y =$ degrees

$z =$ degrees (2 marks)

15 (a) Work out $3.8 + \sqrt{2.1}$
Give your answer as a decimal.
Write down your full calculator display.

.....

Answer (1 mark)

15 (b) Give your answer to part (a) to 2 decimal places.

.....

Answer (1 mark)



***16** Increase £480 by 3.5%.

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

Answer £ (3 marks)

17 In a class there are 32 students.

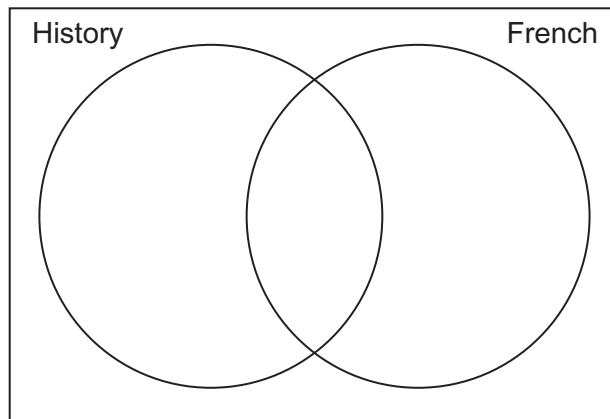
23 take History.

15 take French.

6 do **not** take either of these subjects.

17 (a) Use this information to fill in the Venn diagram below.

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



(3 marks)

17 (b) How many students take French but not History?

.....

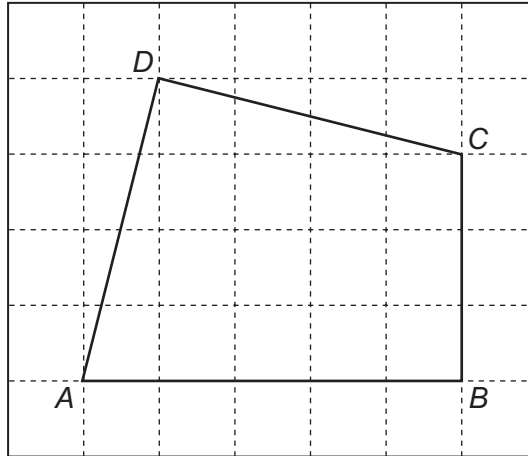
Answer (1 mark)

11

Turn over ►



***18** The quadrilateral ABCD is drawn on a centimetre grid.



18 (a) What is the area of the quadrilateral?

.....

.....

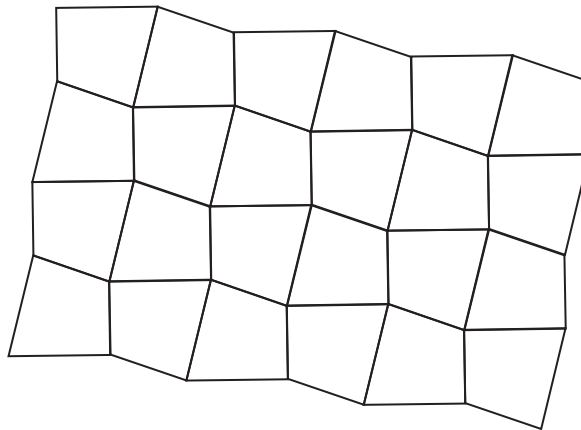
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Answer cm^2 (3 marks)

18 (b) What type of angle is the angle at B?

Answer (1 mark)

18 (c) Several of the quadrilaterals make a tessellation as shown.



What is meant by a tessellation?

.....

.....

.....

(1 mark)

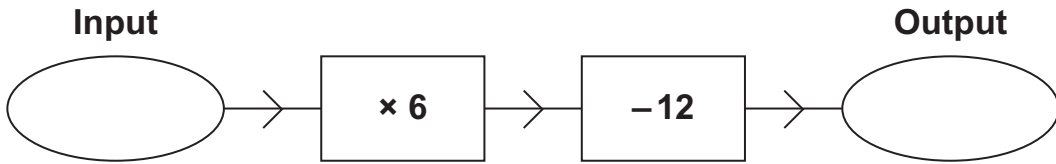


19 Calculate the area of a circle with radius 9 cm.

.....
.....

Answer cm² (2 marks)

20 Here is a number machine.



20 (a) What is the output when the input is 5?

.....
Answer (1 mark)

20 (b) What is the input when the output is 0?

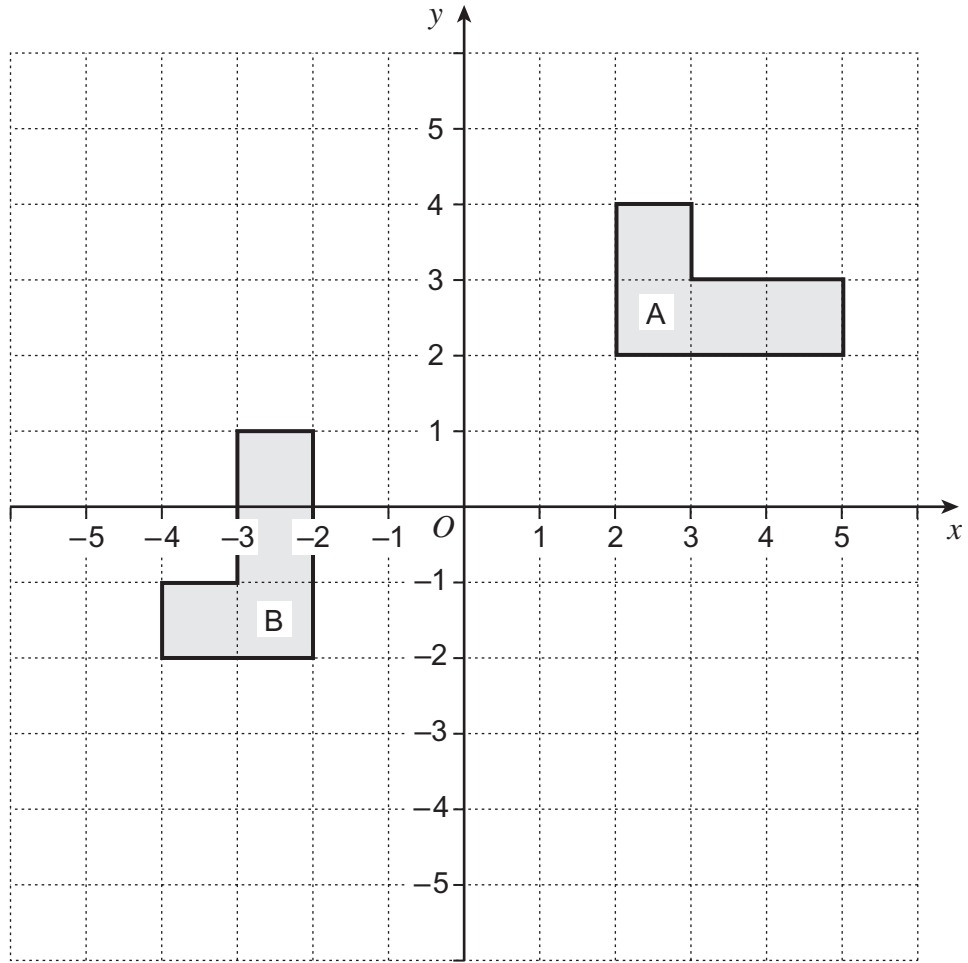
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Answer (1 mark)

20 (c) The output number equals the input number.
Work out the input number.

.....
.....
Answer (2 marks)



21 Shapes A and B are shown on the grid.



Describe fully the **single** transformation that maps shape A to shape B.

.....

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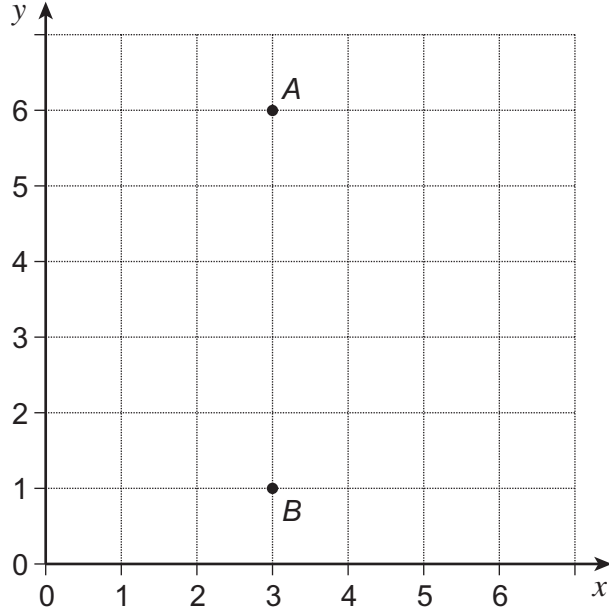
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Answer (3 marks)



22 On this centimetre square grid, *A* and *B* are two vertices of a kite.
 The diagonals of the kite meet at (3, 4).
 The area of the kite is 10 cm².

Draw the kite on the grid.



(3 marks)

23 Solve the equations.

23 (a) $5w = 20$

.....

Answer $w =$ (1 mark)

23 (b) $\frac{10}{x} = 2$

.....

Answer $x =$ (1 mark)

23 (c) $3(y - 2) = 4 - 2y$

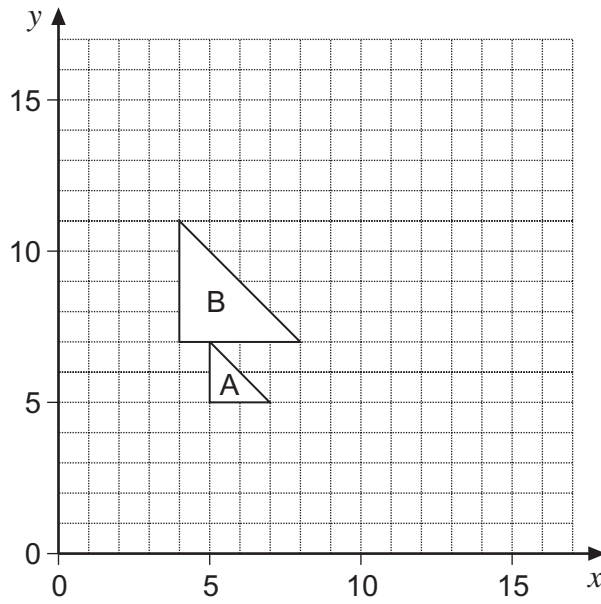
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Answer $y =$ (3 marks)

Turn over ►



24 On the grid are two triangles A and B.



24 (a) Enlarge triangle B by a scale factor of 2 with centre of enlargement (0, 9).
Label the enlarged triangle C.

(2 marks)

24 (b) What is the scale factor and centre of enlargement that maps triangle A to triangle C?

.....

Answer Scale factor.....

Centre (.....,) (2 marks)

END OF QUESTIONS



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