

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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	
TOTAL	



General Certificate of Secondary Education  
Foundation Tier  
November 2014

# Methods in Mathematics (Linked Pair)

93652F

F

## Unit 2 Geometry and Algebra

Wednesday 12 November 2014 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 spaces 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  $\pi$  button, take the value of  $\pi$  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 12, 16 and 20. These questions are indicated with an asterisk (\*).
- You may ask for more answer paper, tracing paper and graph paper.
- These must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

### Advice

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



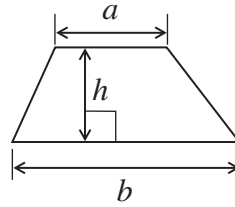
N 0 V 1 4 9 3 6 5 2 F 0 1

WMP/Nov14/93652F/E5

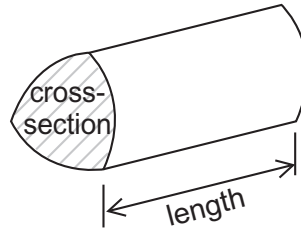
93652F

**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 (a)** Circle the **two** numbers with a difference of 11

[1 mark]

15            24            27            35            49

**1 (b)** Circle the square number.

[1 mark]

15            24            27            35            49

**1 (c)** Circle the number that is a multiple of **both** 2 and 3

[1 mark]

15            24            27            35            49

**1 (d)** Circle the number that is a factor of 60

[1 mark]

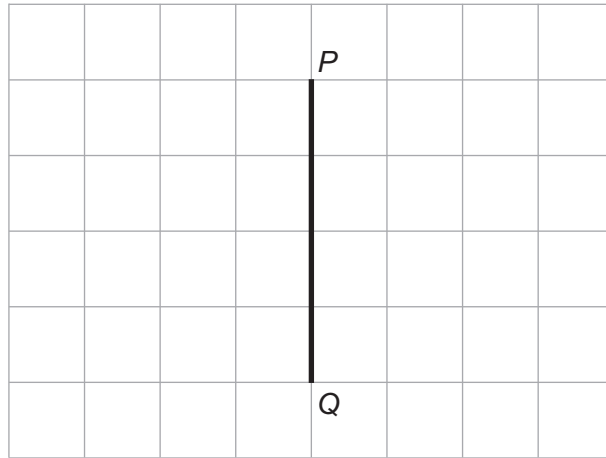
15            24            27            35            49

**Turn over for the next question**



2 (a) Draw a line that is at right angles to  $PQ$ .

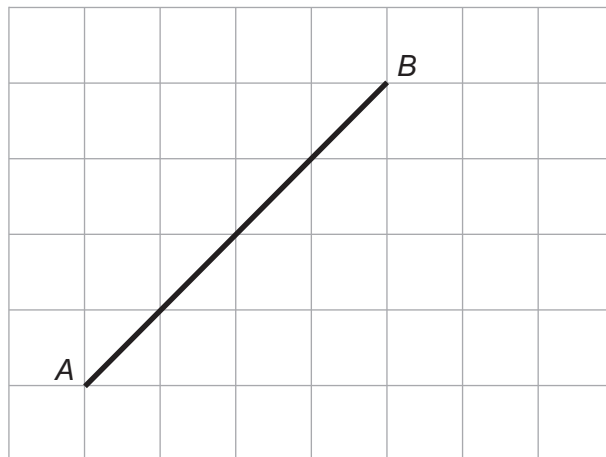
[1 mark]



2 (b) Draw a line that is

parallel to  $AB$   
**and**  
half as long as  $AB$ .

[2 marks]



**3 (a)** Here is a number sequence.

1            3            6            10            15            .....

Write down the **next** number in the sequence.

**[1 mark]**

Answer .....

**3 (b)** Here is part of a number sequence.

....            ....            7            11            15            19            23

7 is the **third** number in the sequence.

Work out the first number of the sequence.

**[2 marks]**

.....  
.....

Answer .....

**Turn over for the next question**



**4** Circle the word that makes each sentence true.

**4 (a)** The diameter of a circle is a straight line that passes through the ..... **[1 mark]**

arc

centre

chord

radius

**4 (b)** The distance around the circle is the .....

**[1 mark]**

circumference

chord

radius

tangent

**4 (c)** The shaded area in the circle below is a .....

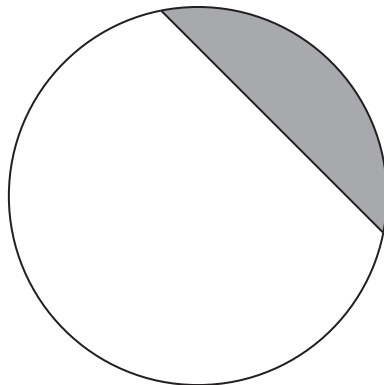
**[1 mark]**

chord

sector

segment

tangent



5 A, B and C are positive, whole numbers.  
 $D = 7$

- $A + B = D$
- $C + B = 5$
- $D - C = C - B$

Fill in the values of A, B and C in the table.

[3 marks]

.....

.....

.....

.....

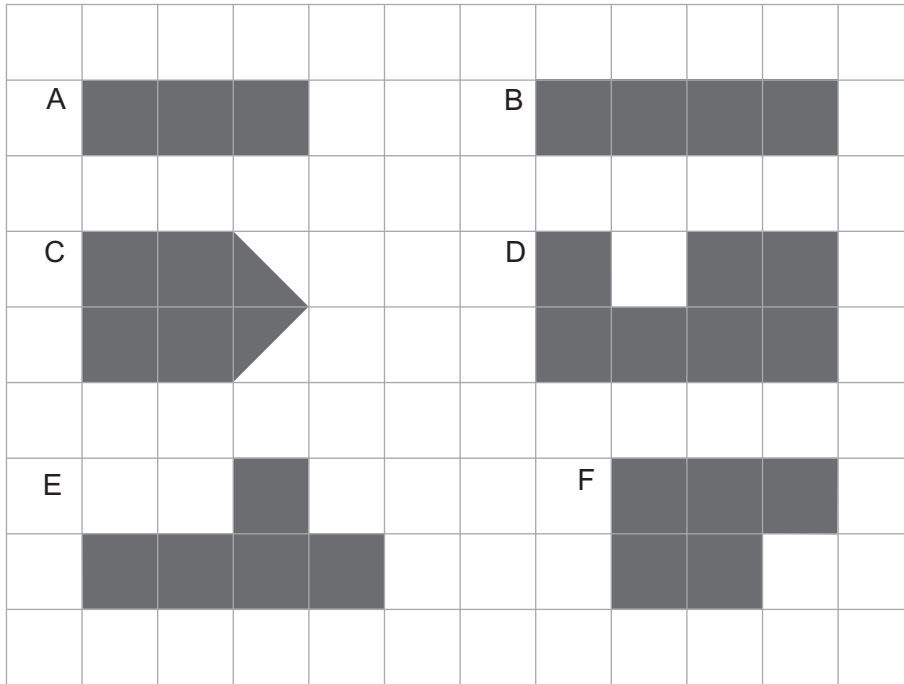
.....

A	B	C	D
			7

Turn over for the next question



6 Shapes A, B, C, D, E and F are drawn on a centimetre grid.



6 (a) Which **two** shapes have the same perimeter? [1 mark]

.....

Answer ..... and .....

6 (b) Which **three** shapes each have an area of 5 cm<sup>2</sup>? [2 marks]

.....

Answer ..... and ..... and .....

6 (c) Which shape has exactly **one** line of symmetry? [1 mark]

Answer .....

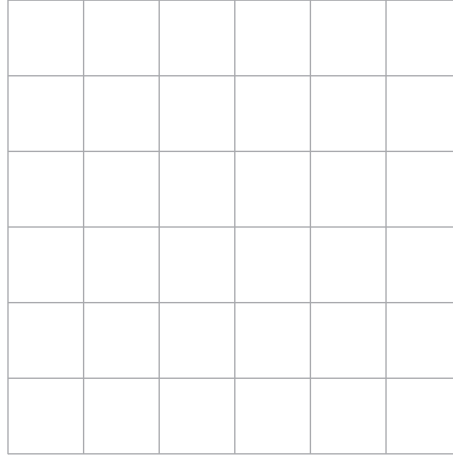




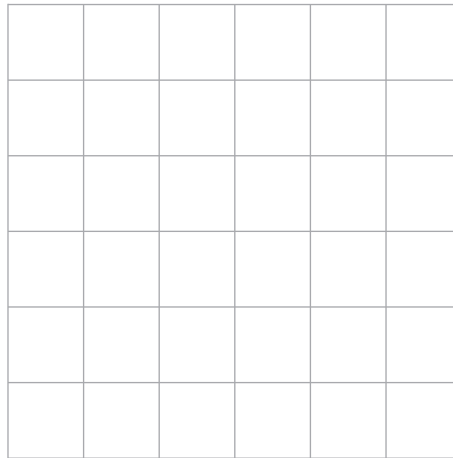
**6 (d)** Show how shapes B, D and E can fit together to make a square.

**[1 mark]**

Use this grid for practice.



Use this grid for your answer.



**Turn over for the next question**



7 (a) Which operation completes this calculation?

$$6 \square 3 + 3 = 5$$

Circle your answer.

[1 mark]

+

−

×

÷

7 (b) Work out the missing number.

$$3 \times 8 - 4 = (\square - 2) \times 4$$

[2 marks]

.....

.....

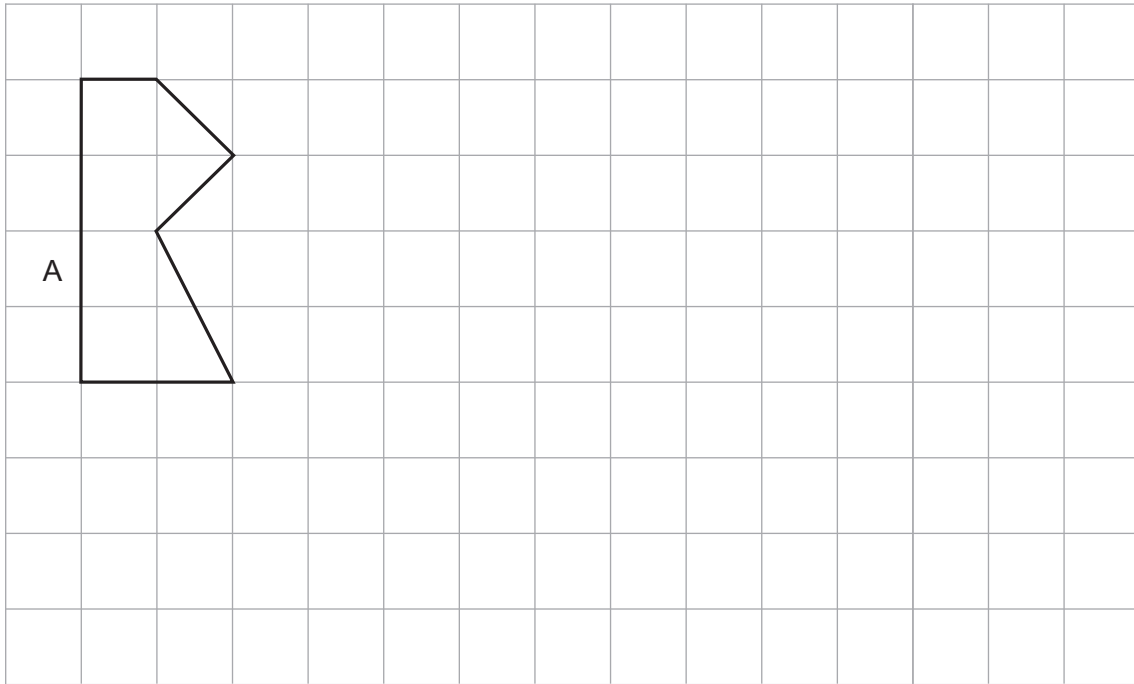
.....

Answer .....



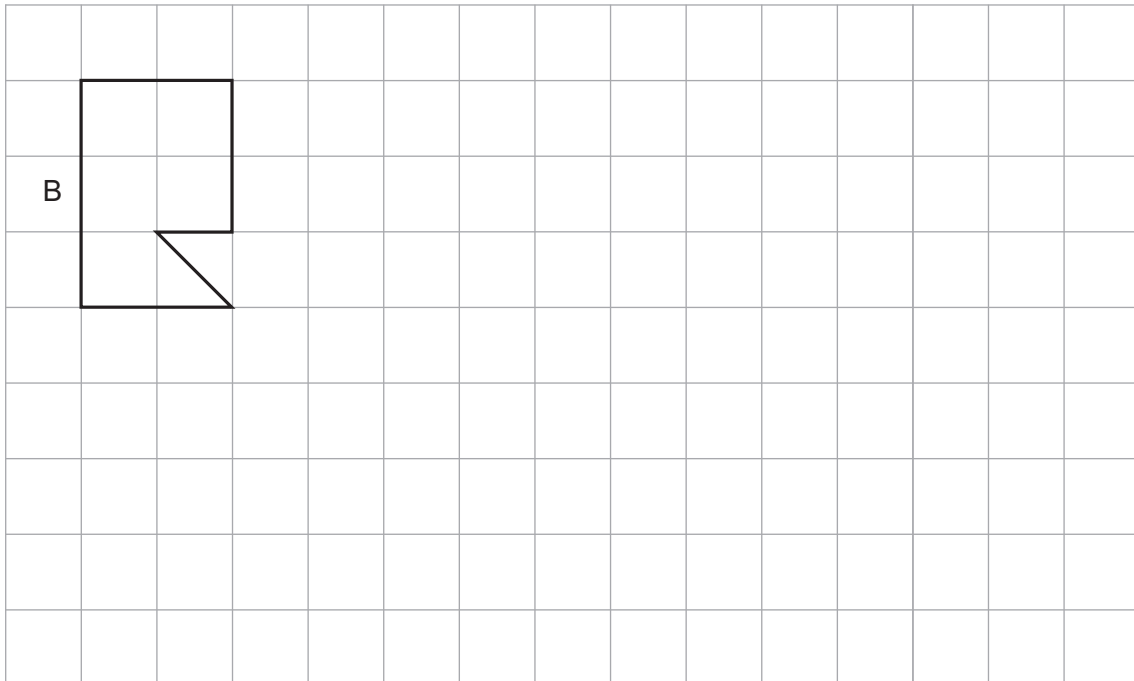
8 (a) On the grid, draw a shape **congruent** to shape A.

[1 mark]



8 (b) On the grid, draw a shape **similar** to shape B.

[1 mark]



**9 (a)** Solve  $4a = 30$

[1 mark]

.....

$a =$  .....

**9 (b)** Solve  $\frac{b}{3} = 12$

[1 mark]

.....

$b =$  .....

**9 (c)** Solve  $2c - 6 = 11$

[2 marks]

.....

.....

$c =$  .....



**10 (a)** Use your calculator to work out  $3.8^3$   
Write down your full calculator display.

**[1 mark]**

Answer .....

**10 (b)** Write your answer to (a) correct to one decimal place.

**[1 mark]**

.....

Answer .....

**Turn over for the next question**

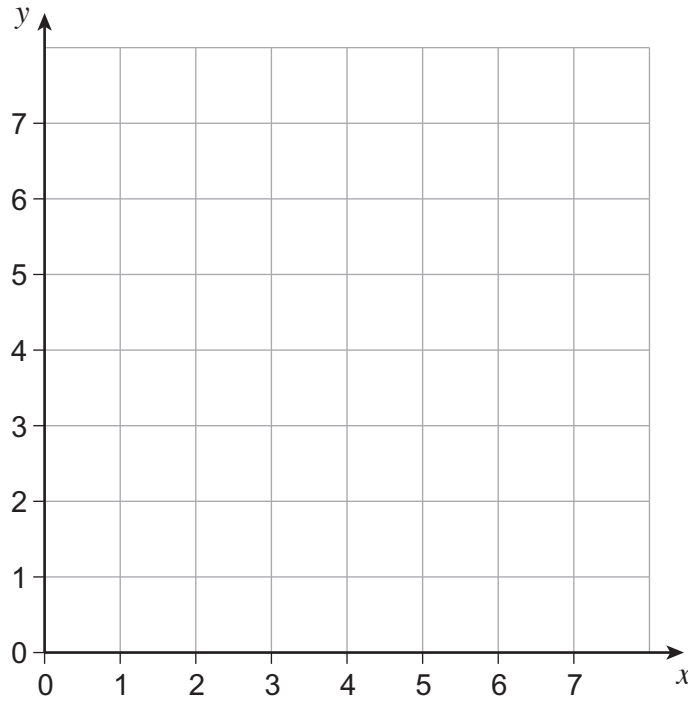
6
---

**Turn over ►**



- 11 Three of the vertices of a rectangle are at  $(1, 2)$ ,  $(7, 2)$  and  $(1, 6)$ .  
Work out the coordinates of the **centre** of the rectangle.

[3 marks]



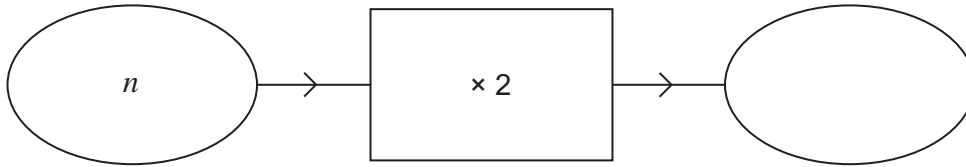
Answer (..... , .....)



12 Here are three number machines.

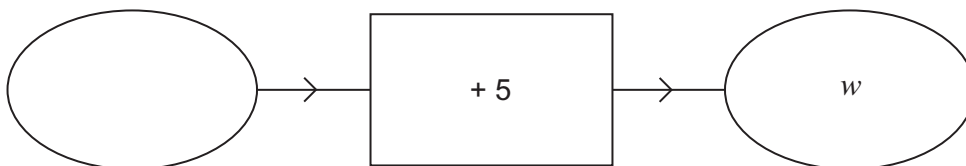
\*12 (a) Fill in an algebraic expression for the output.

[1 mark]



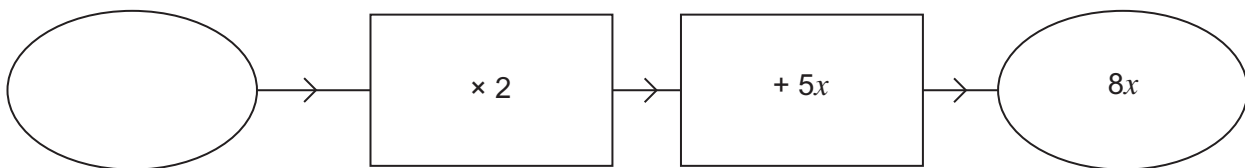
12 (b) Fill in an algebraic expression for the input.

[1 mark]

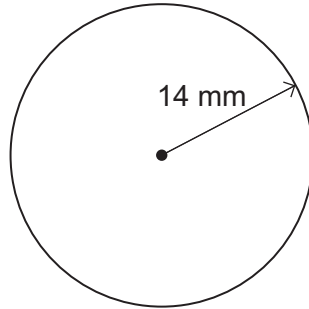


12 (c) Fill in an algebraic expression for the input.

[2 marks]



**13** Calculate the area of a circle with radius 14 mm  
State the units of your answer.



Not drawn  
accurately

**[3 marks]**

.....

.....

.....

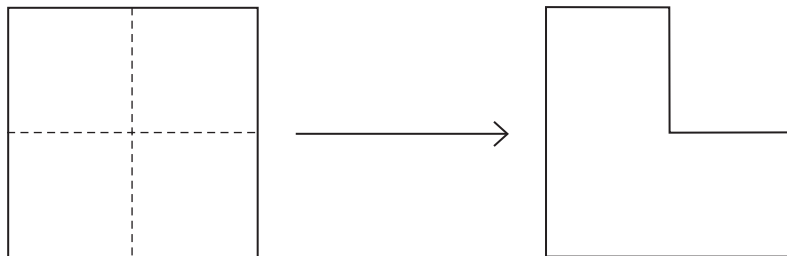
Answer .....





14 A square is split into 4 quarters.  
One of these quarters is removed.  
The remaining **area** is  $108 \text{ cm}^2$

Not drawn  
accurately



Area =  $108 \text{ cm}^2$

Work out the **perimeter** of the original square.

[4 marks]

.....

.....

.....

.....

Answer ..... cm

Turn over for the next question

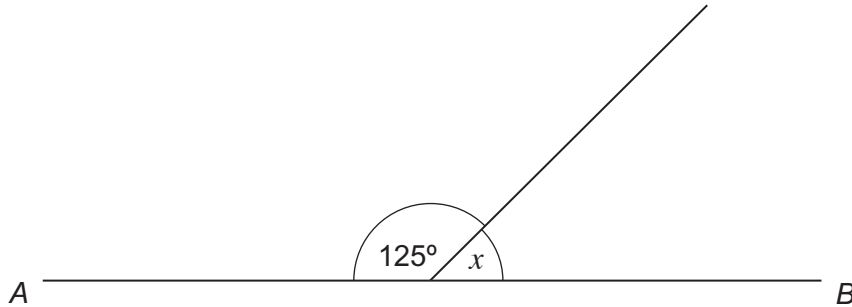


15 (a)  $AB$  is a straight line.

Work out the size of angle  $x$ .

[1 mark]

Not drawn  
accurately

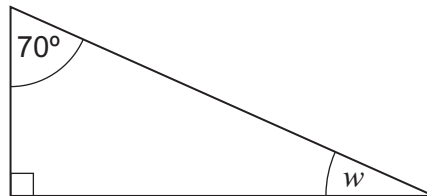


Answer ..... degrees

15 (b) Work out the size of angle  $w$ .

[1 mark]

Not drawn  
accurately

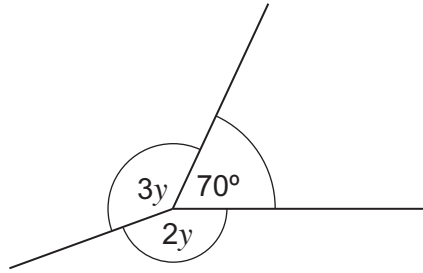


Answer ..... degrees



15 (c) Work out the value of  $y$ .

[3 marks]



Not drawn accurately

.....

.....

.....

Answer ..... degrees

\*16 Work out which is the greater 24% of 360 or  $\frac{4}{5}$  of 110  
You **must** show your working.

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

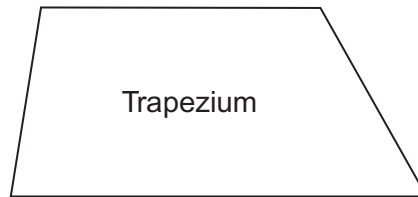
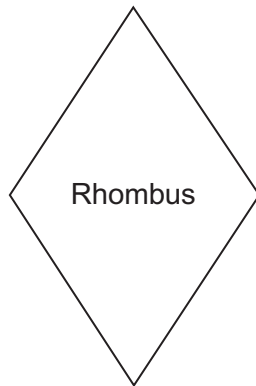
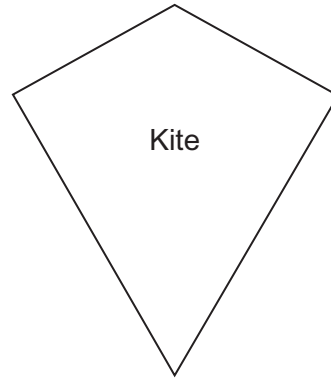
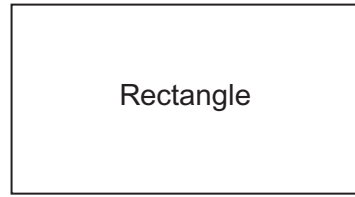
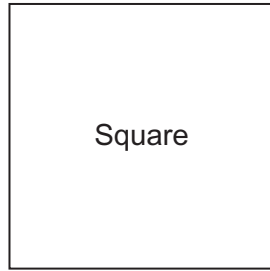
Answer .....

9
---

Turn over ►



17 Here are six quadrilaterals.



17 (a) Write down the names of the **two** quadrilaterals that have  
rotational symmetry of order 2  
**and**  
diagonals of different lengths.

[2 marks]

Answer ..... and .....



**17 (b)** Three of the quadrilaterals are

kite

rectangle

parallelogram

The kite could be the odd one out.  
Give a reason why.

[1 mark]

.....

.....

.....

**17 (c)** Tick the **one** property that these quadrilaterals have in common.

rectangle

square

rhombus

[1 mark]

All four sides the same length

All four angles  $90^\circ$

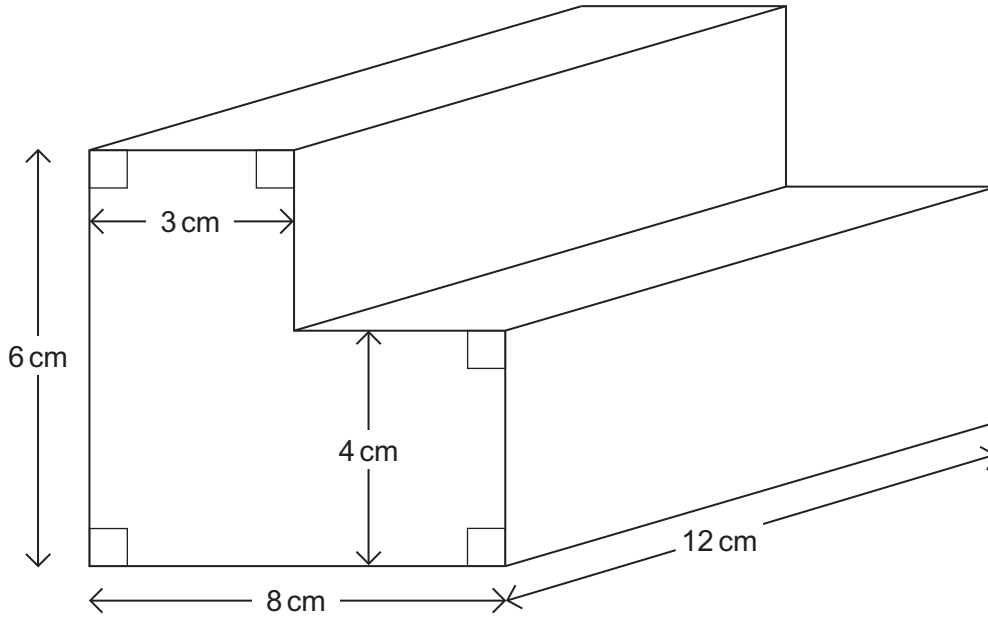
Diagonals bisect each other

No lines of symmetry

**Turn over for the next question**



18 The diagram shows a prism.



Work out the volume of the prism.  
You **must** show your working.

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

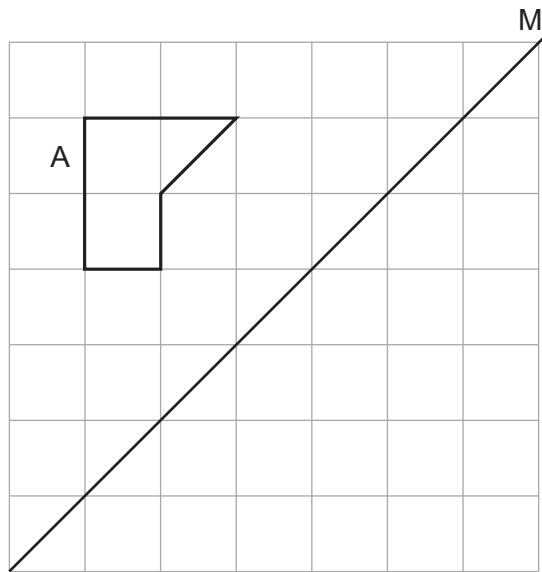
.....

Answer ..... cm<sup>3</sup>



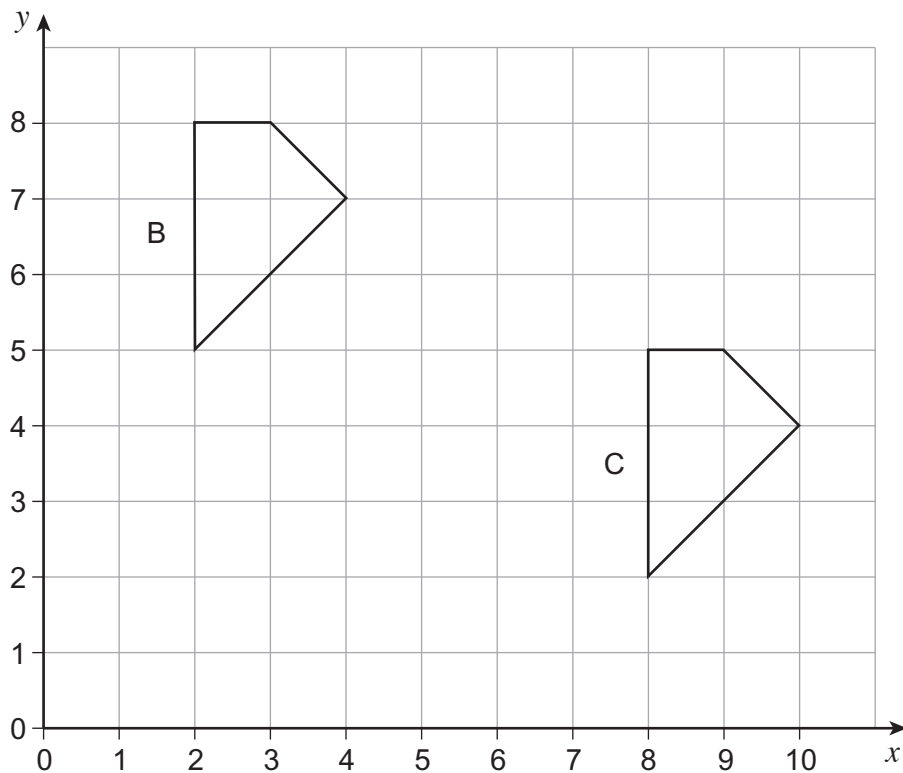
19 (a) Reflect shape A in the mirror line, M.

[2 marks]



19 (b) Write down the vector that maps shape B to shape C.

[2 marks]



Answer  $\begin{pmatrix} \dots \\ \dots \end{pmatrix}$

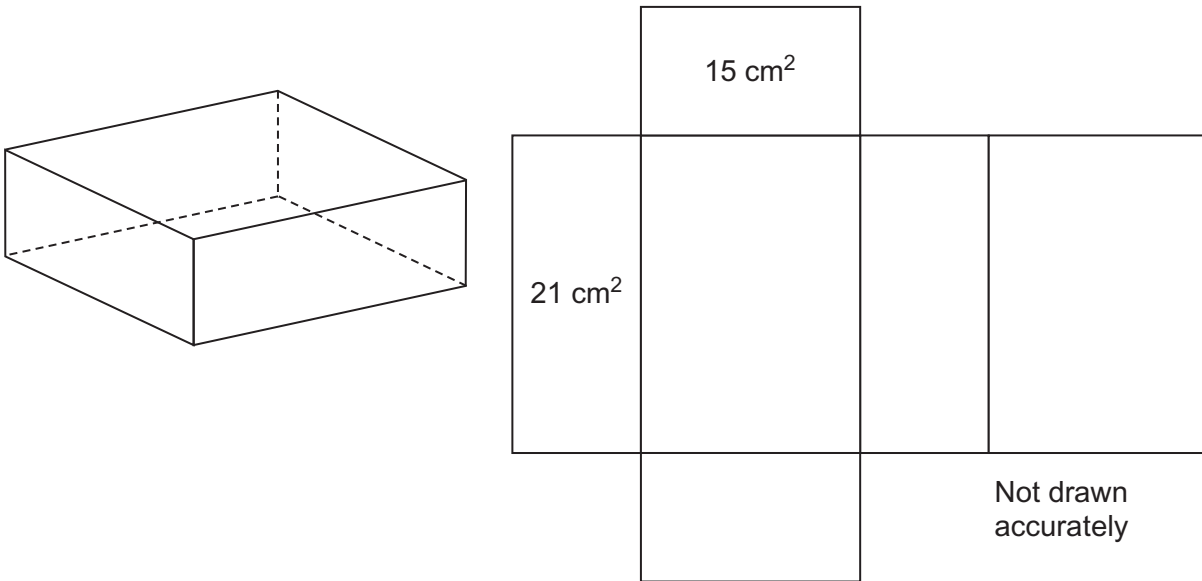
8

Turn over ►



**\*20**

A cuboid has a net as shown.  
The areas of two of the faces are shown on the net.  
The lengths of the sides of the cuboid are whole numbers of centimetres greater than 1



Work out the **total** surface area of the cuboid.  
You **must** show your working.

**[4 marks]**

.....

.....

.....

.....

.....

.....

.....

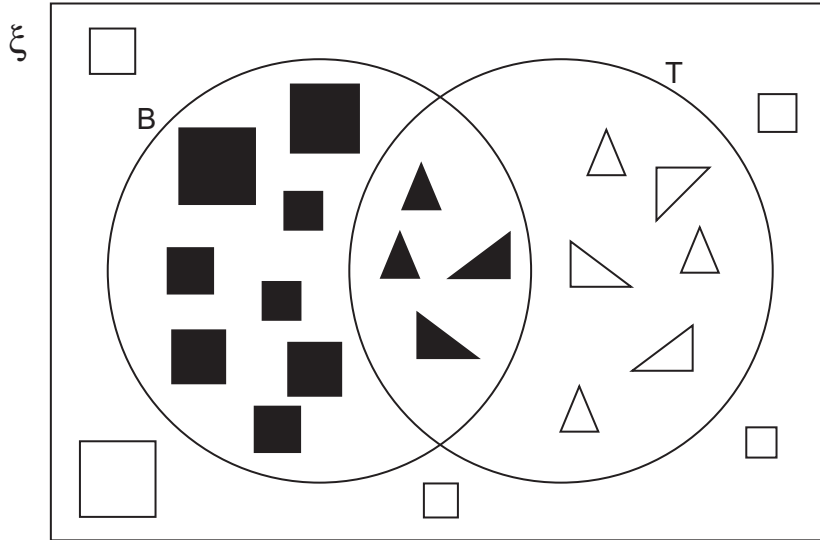
Answer ..... cm<sup>2</sup>





21 In the Venn diagram,

$\xi$  = square and triangular shapes  
 B = black shapes  
 T = triangular shapes



21 (a) How many shapes are black or triangular or both?

[1 mark]

Answer .....

21 (b) More **black** shapes are added to the Venn diagram.

The ratio black squares : black triangles does not change.

What is the smallest number of shapes that could have been added?  
 You **must** show your working.

[2 marks]

.....  
 .....

Answer .....

Turn over for the next question



**22** Written as a product of prime factors       $2014 = 2 \times 19 \times 53$

Work out **all** the factors of 2014

**[3 marks]**

.....

.....

.....

.....

.....

.....

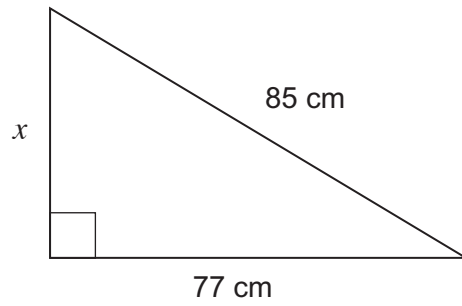
.....

Answer .....

.....



23 Work out the length of  $x$ .



Not drawn  
accurately

[3 marks]

.....

.....

.....

.....

Answer ..... cm

**END OF QUESTIONS**



**There are no questions printed on this page**

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

