

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE METHODS IN MATHEMATICS (LINKED PAIR)

F

Foundation Tier Unit 2 Geometry and Algebra

Tuesday 8th November 2016 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- 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 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 15 and 21. 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.

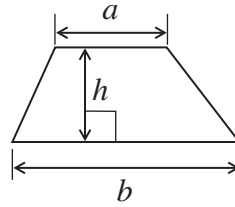
Advice

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

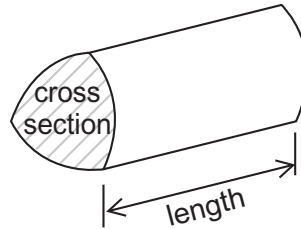


Formulae Sheet: Foundation Tier

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 number that is a multiple of **both** 3 and 7 **[1 mark]**

10

12

28

42

1 (b) Circle the number that is 50% **more** than 60 **[1 mark]**

30

65

90

110

1 (c) Circle the number that is 1 **less** than a square number. **[1 mark]**

7

26

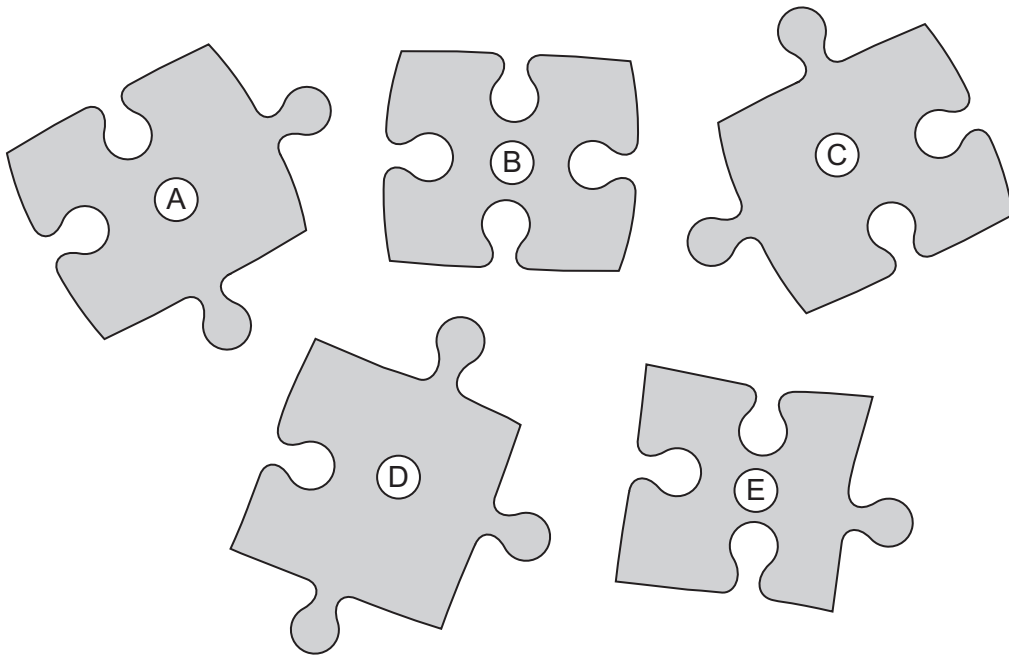
48

98

Turn over for the next question



2 Here are five jigsaw pieces.



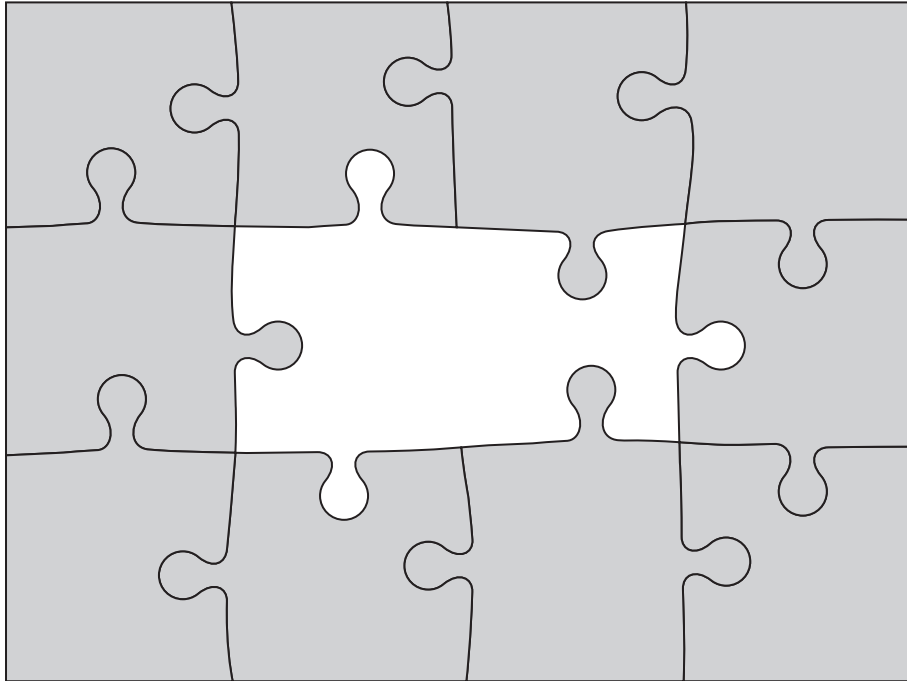
2 (a) Which **two** pieces are exactly the same shape?

[1 mark]

Answer _____ and _____



2 (b) Which **two** pieces will complete this puzzle?



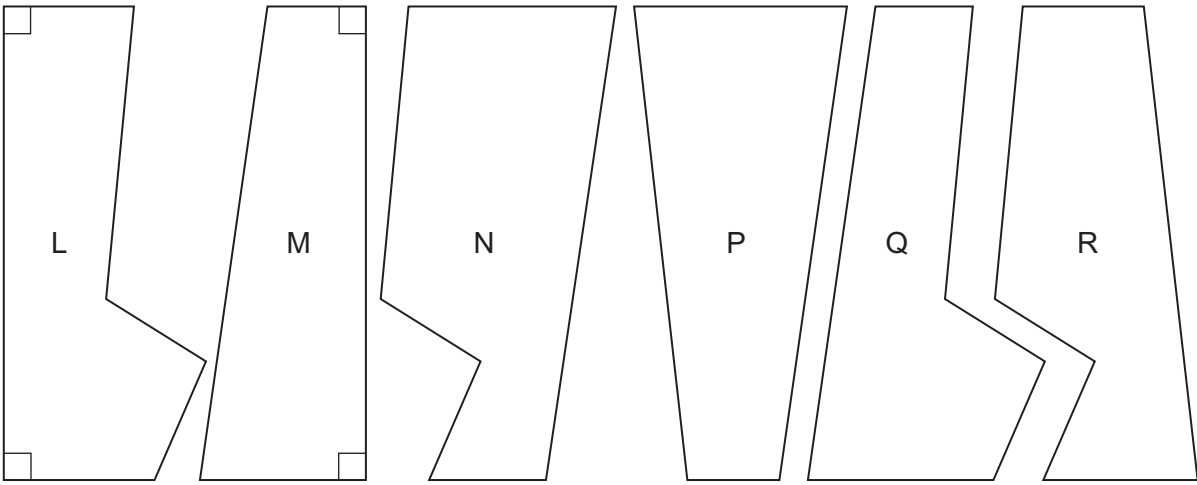
[1 mark]

Answer _____ and _____

Question 2 continues on the next page



- 2 (c)** Here are six shapes.
The shapes will fit **exactly** into the rectangle below.
Shape L has already been fitted.



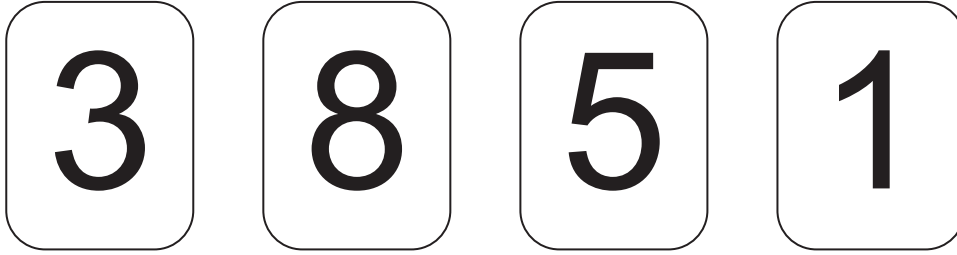
Work out a possible order so that the shapes fit exactly inside the rectangle.

[2 marks]

Answer L , _____ , _____ , _____ , _____ , _____



3 Here are four numbered cards.



3 (a) Write down the smallest 4-digit number that can be made with the four cards. [1 mark]

Answer _____

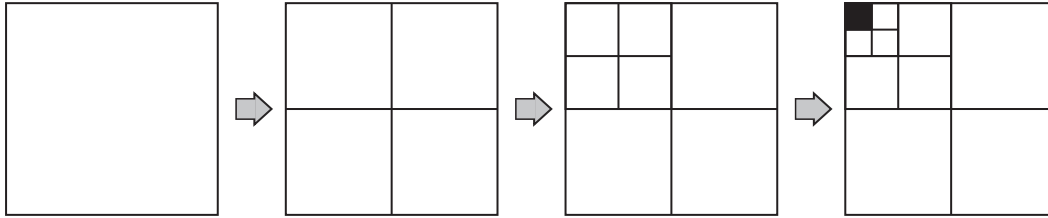
3 (b) How many 4-digit numbers greater than 8000 can be made with the four cards? [2 marks]

Answer _____

Turn over for the next question



- 4 (a) A square is divided into smaller squares as shown.
One of the smaller squares is shaded.



Work out the fraction of the **original** square that is shaded.

[1 mark]

Answer _____

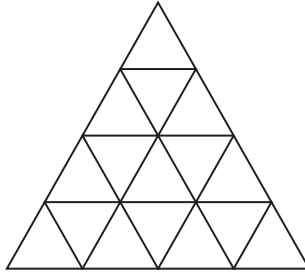


4 (b) This pattern is made from 16 small equilateral triangles.

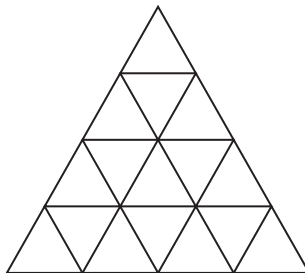
Shade **five** small triangles so that the pattern has exactly **one** line of symmetry.

[2 marks]

Use this pattern for practice.



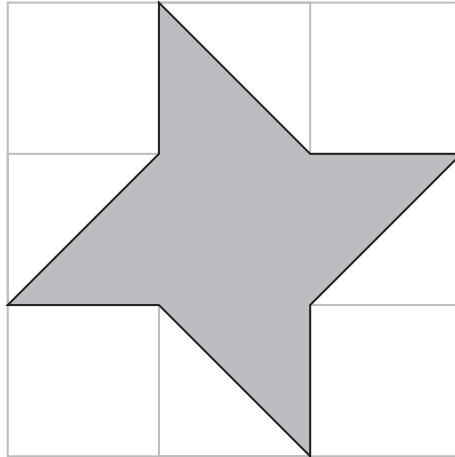
Answer on this pattern.



Turn over for the next question



5 Here is a shape drawn on a grid of 2 cm squares.



5 (a) Circle the number of lines of symmetry of the shape.

[1 mark]

0 1 2 3 4

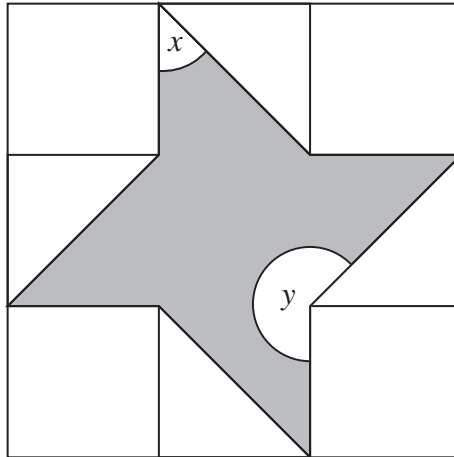
5 (b) Circle the order of rotational symmetry of the shape.

[1 mark]

0 1 2 3 4



Here is the same shape with two angles marked.



5 (c) Work out the size of angle x .

[1 mark]

Answer _____ degrees

5 (d) What type of angle is y ?
Circle your answer.

[1 mark]

acute obtuse reflex right

5 (e) Each square of the grid is 2 cm by 2 cm

Work out the area of the shape.

[2 marks]

Answer _____ cm^2



6 (a) Solve $4x = 11$

[1 mark]

$$x = \underline{\hspace{10em}}$$

6 (b) Solve $y + 5 = 3$

[1 mark]

$$y = \underline{\hspace{10em}}$$

6 (c) Solve $2t - 7 = 16$

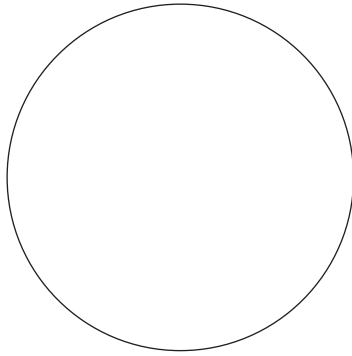
[2 marks]

$$t = \underline{\hspace{10em}}$$



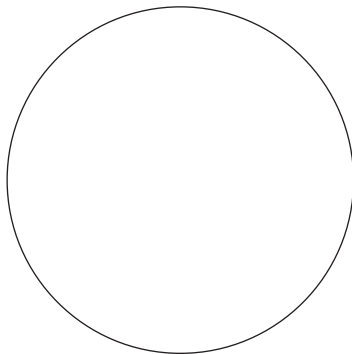
7 (a) Draw a chord on this circle.

[1 mark]



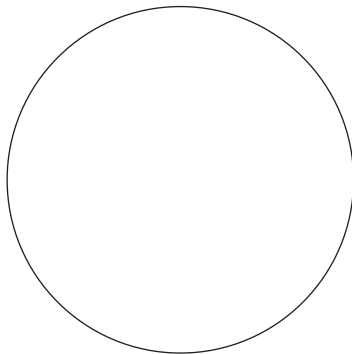
7 (b) Draw a tangent to this circle.

[1 mark]



7 (c) Draw and shade a segment on this circle.

[1 mark]



7

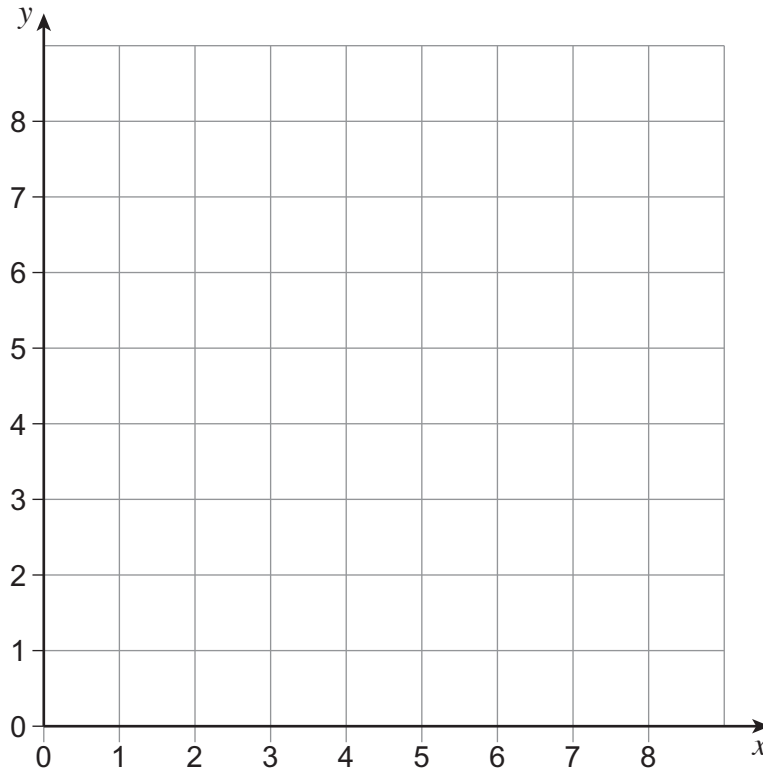
Turn over ►



8 $A(2, 5)$, $B(2, 1)$ and $C(7, 1)$ are the three vertices of a triangle.

8 (a) Draw the triangle on the centimetre grid.

[2 marks]



8 (b) What type of triangle is ABC ?

[1 mark]

Answer _____

8 (c) You are given that the perimeter of ABC is 15.4 cm

Work out the length of AC .

[1 mark]

Answer _____ cm



9 (a) Write down the next term in this sequence.

[1 mark]

7.5 12 16.5 21 25.5 ...

Answer _____

9 (b) Describe the rule for continuing the sequence.

[1 mark]

9 (c) Here are the first five terms of a different sequence.

41 38 35 32 29 ...

The 15th term of this sequence is the first negative term.

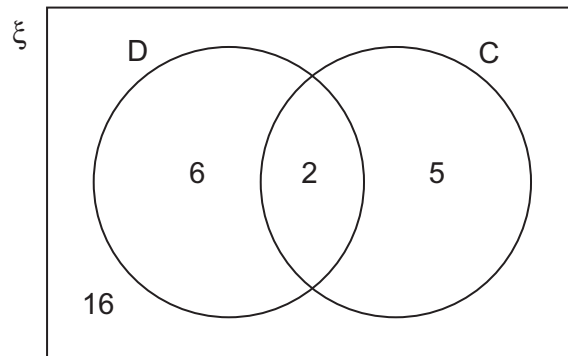
Work out the value of the 15th term.

[2 marks]

Answer _____



- 10** The Venn diagram shows the number of students in a class who own a dog (D), a cat (C) or both.
16 students in the class do not own a cat or a dog.



- 10 (a)** How many students are in the class altogether?

[1 mark]

Answer _____

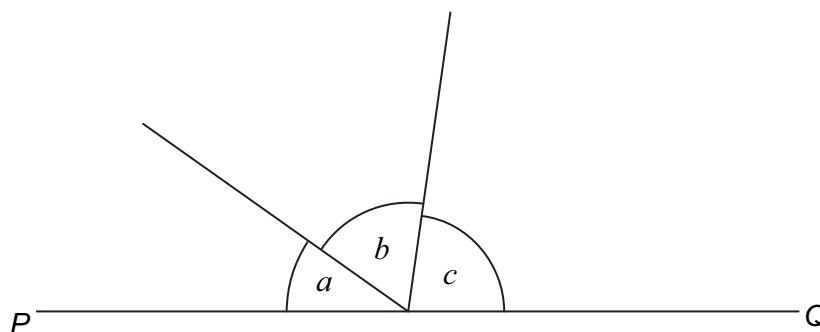
- 10 (b)** How many students do not own a cat?

[1 mark]

Answer _____



- 11 PQ is a straight line.
Angles a , b and c are acute and are measured in degrees.
Angle c is bigger than angle b .
Angle b is bigger than angle a .



Not drawn
accurately

Work out possible values for a , b and c .

[2 marks]

Answer $a =$ _____ $b =$ _____ $c =$ _____

- 12 Which of the following could **not** be rounded to 14.9?
Circle your answer.

[1 mark]

14.85

14.899

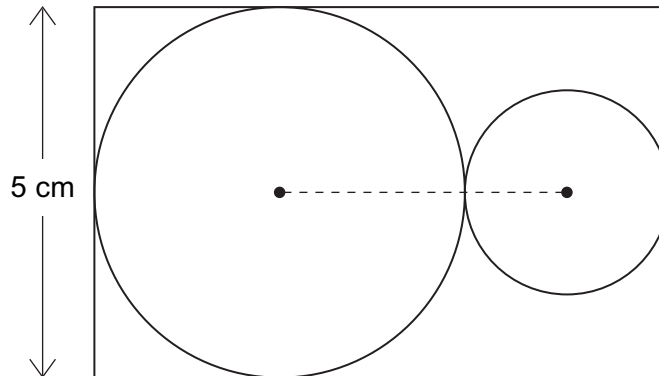
14.945

14.99



13

Two circles fit inside a rectangle as shown.
The line joining the centres is parallel to the long side.
The width of the rectangle is 5 cm



Not drawn
accurately

The perimeter of the rectangle is 26 cm

Work out the **radius** of the smaller circle.

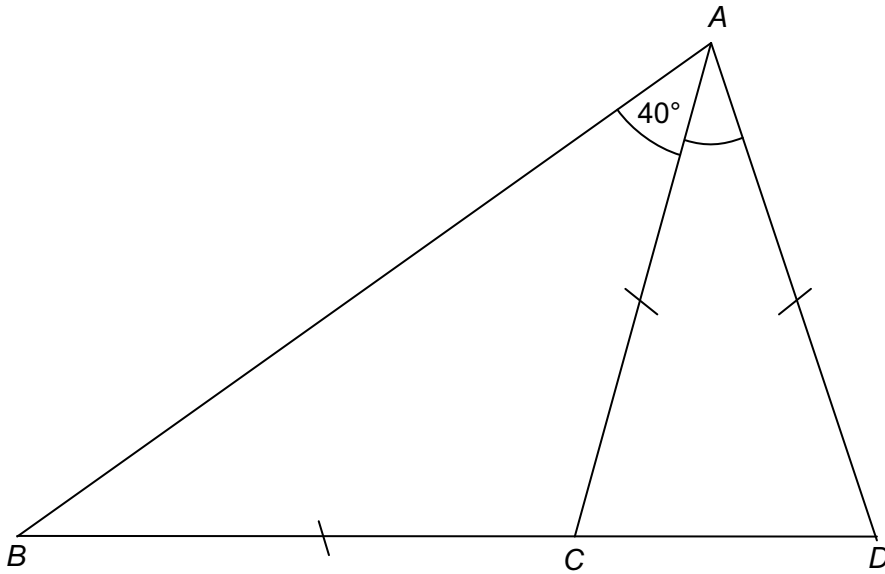
[3 marks]

Answer _____ cm



14

BCD is a straight line.
 $AC = AD = BC$
 Angle $CAB = 40^\circ$



Not drawn
accurately

Work out the size of angle CAD .
 You **must** show your working, which may be on the diagram.

[3 marks]

Answer _____ degrees

Turn over for the next question



15 (a) Circle the number that is **not** a prime number.

[1 mark]

5

7

9

11

13

***15(b)** Three prime numbers have a total of 40

Give reasons why one of the three prime numbers must be 2

[2 marks]

15 (c) Three prime numbers have a total of 40
One of the prime numbers is 2

Work out possible values for the other prime numbers.

[2 marks]

Answer _____ and _____



16 A circle has a radius of 6 millimetres.

Calculate the area of the circle.
Give the units of your answer.

[3 marks]

Answer _____

17 Increase 460 by 37%

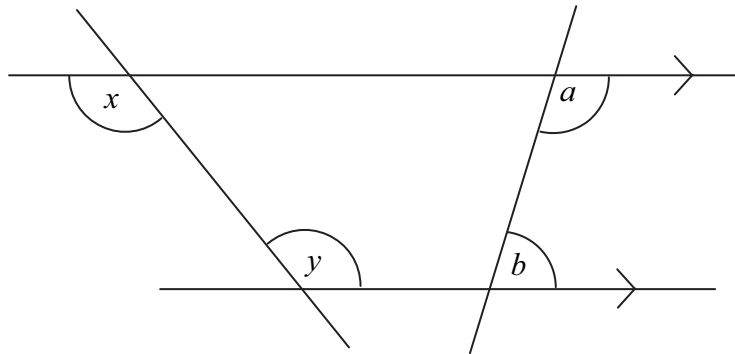
[3 marks]

Answer _____

Turn over for the next question



18 Here are four straight lines, two of which are parallel.



18 (a) Tick the correct reason why angle x is equal to angle y .

[1 mark]

They are alternate angles.

They are vertically opposite angles.

They are corresponding angles.

18 (b) Circle the correct statement for the angles shown.

[1 mark]

$x = a$

$x + b = 180^\circ$

$a + b = 180^\circ$

$a = b$



- 19 (a)** Which of the following is **not** a factor of 2310?
Circle your answer.

[1 mark]

15

21

55

60

- 19 (b)** Work out 210 as a product of its prime factors.

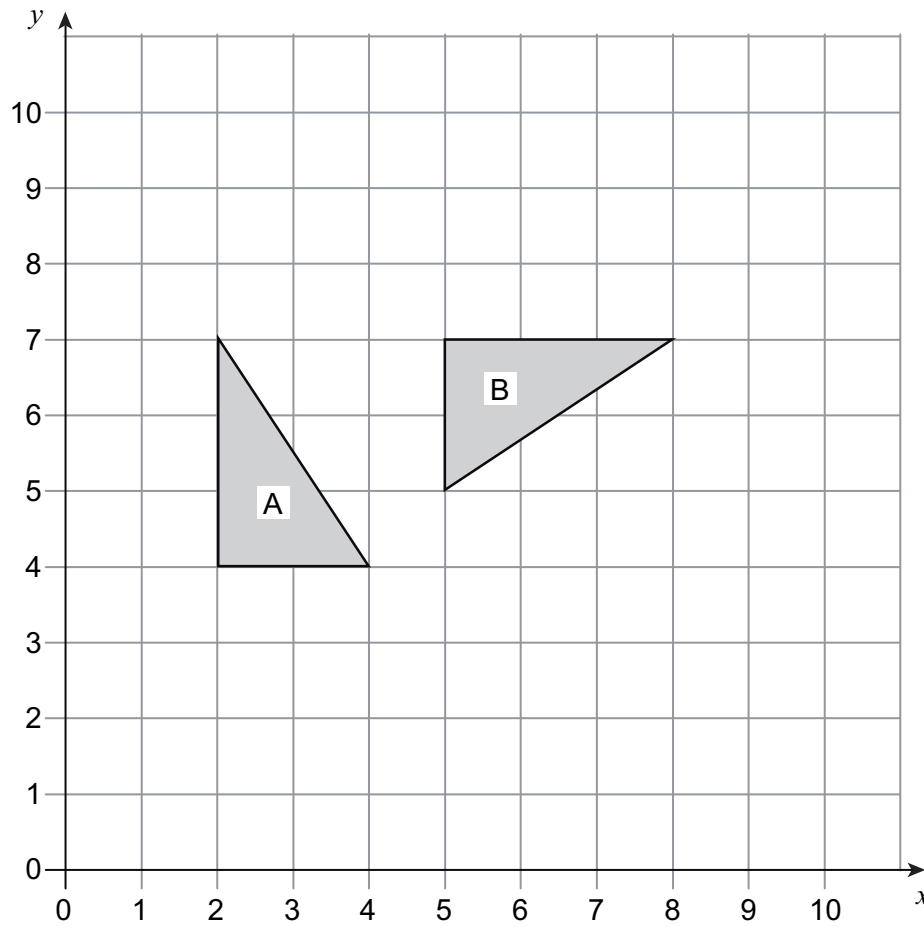
[2 marks]

Answer _____

Turn over for the next question



20 (a) Describe the **single** transformation that maps triangle A to triangle B.



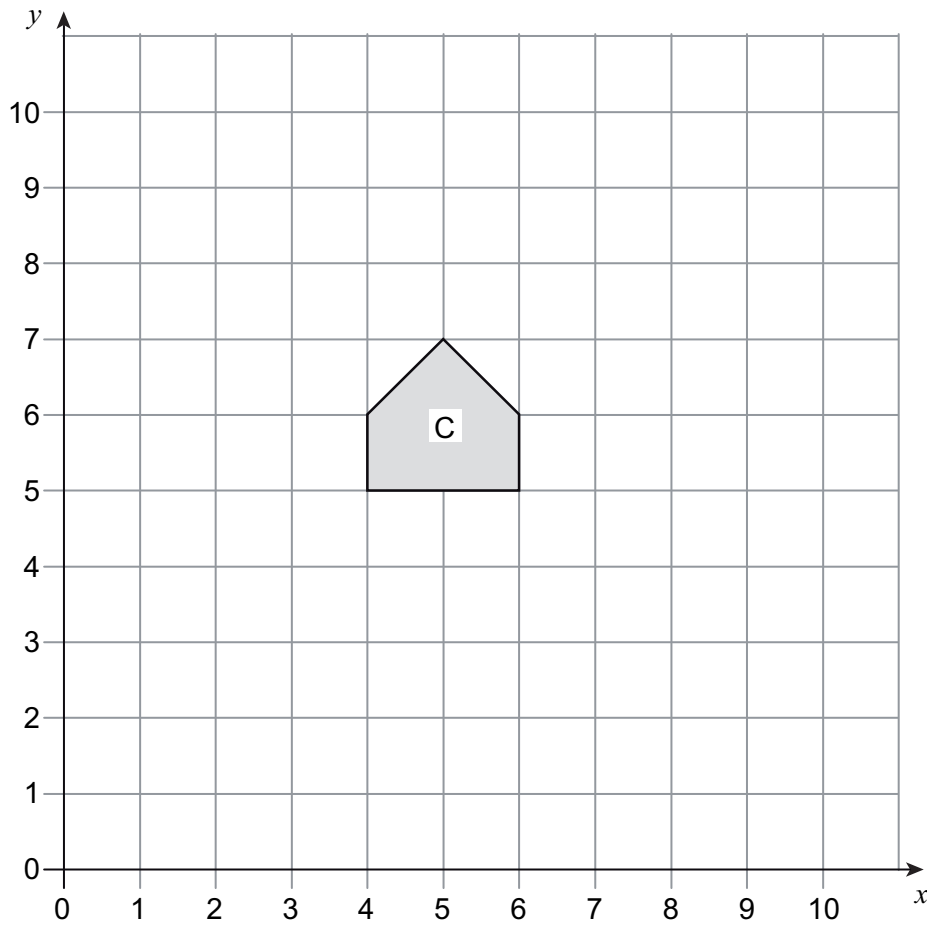
[3 marks]

Answer _____



20 (b) Translate shape C by the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$

[2 marks]

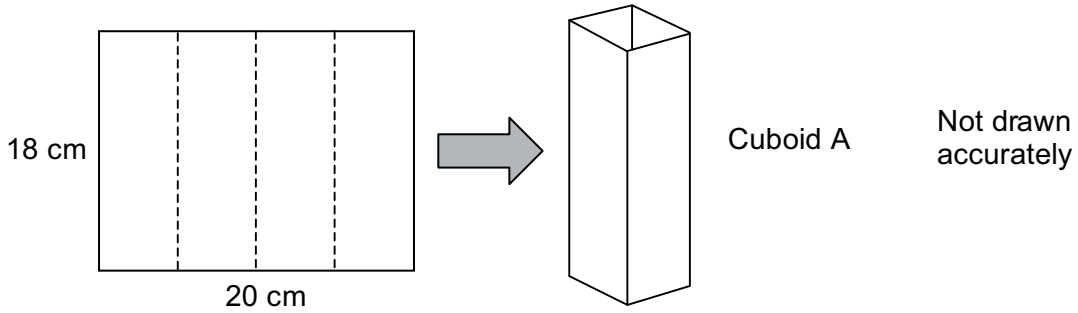


Turn over for the next question

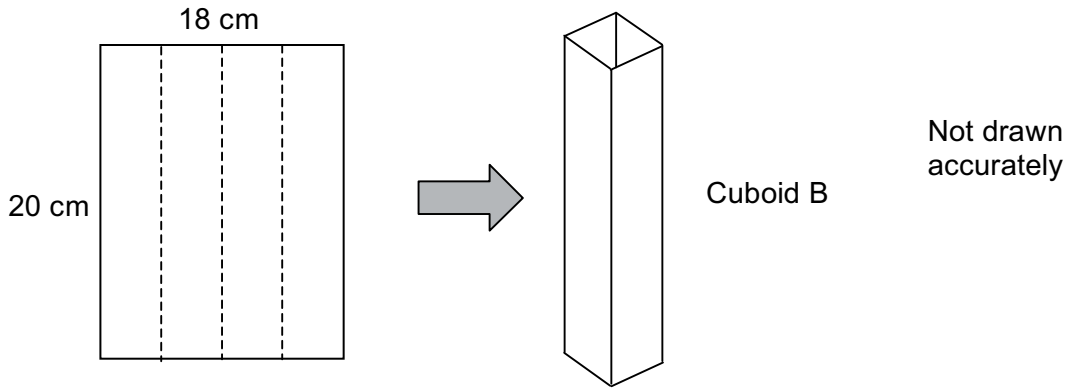


*21

A rectangle of paper is 20 cm by 18 cm
The rectangle is folded along the 20 cm side to make an open cuboid A with a square cross section.



Another 20 cm by 18 cm rectangle of paper is folded along the 18 cm side to make open cuboid B with a square cross section.

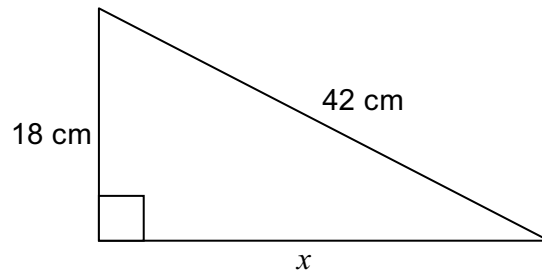


Which cuboid has the greater volume?
You **must** show your working.

[4 marks]



22 Work out the length x .



Not drawn
accurately

[3 marks]

Answer _____ cm

23 Solve $\frac{x}{2} + 5 = 4$

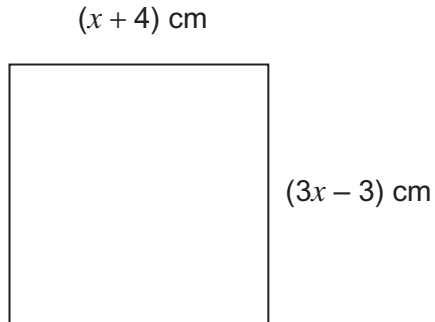
[2 marks]

$x =$ _____

Turn over for the next question



24 Here is a square.



Not drawn
accurately

Work out the area.
Give your answer to the nearest whole number.

[5 marks]

Answer _____ cm^2

END OF QUESTIONS

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