![AQA]

GCSE
METHODS IN MATHEMATICS (LINKED PAIR)

F

Foundation Tier   Unit 2   Geometry and Algebra

Tuesday 14 June 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 10, 14 and 19. 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.
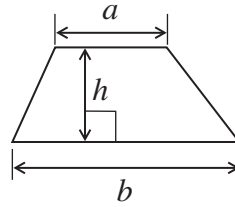- You are expected to use a calculator where appropriate.

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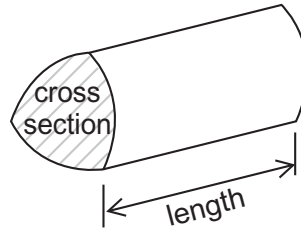- In all calculations, show clearly how you work out your answer.

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Formulae Sheet: Foundation Tier

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

Volume of prism = area of cross section × length

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

1 (a) Circle the multiple of 7

[1 mark]

12   14   17   27

1 (b) Circle the factor of 48

[1 mark]

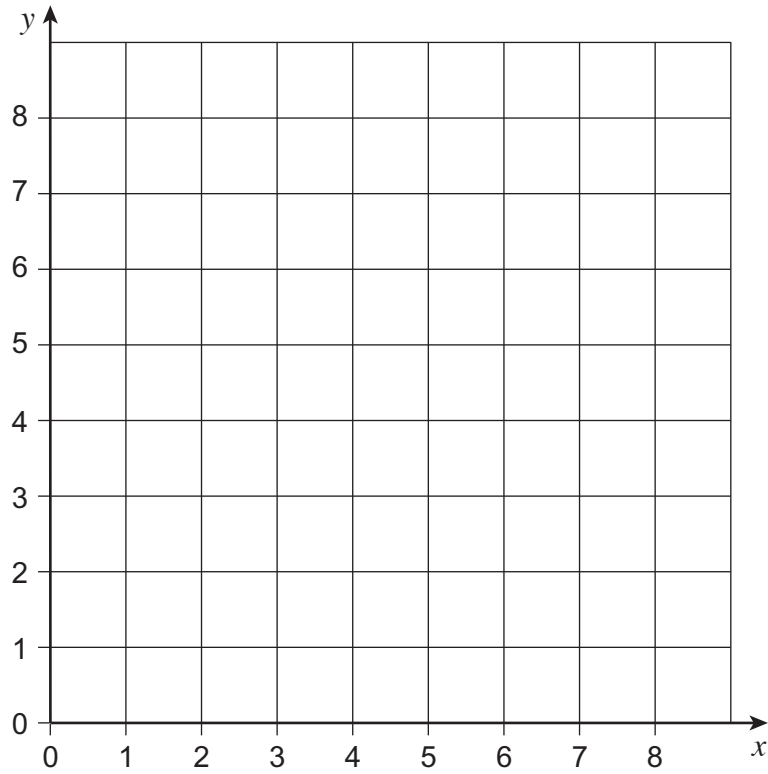12   18   28   96

1 (c) Circle the prime number.

[1 mark]

9   13   15   49

Turn over for the next question

3

Turn over ▶

0 3

2

A is the point (1, 4)

M (4, 5) is the midpoint of *AB*.

Work out the coordinates of *B*.

[3 marks]

_____

_____

_____

_____

Answer (_____ , _____)

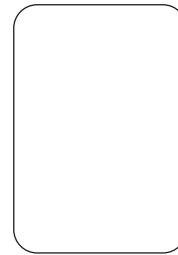**3** Here are four number cards.

6 **2** **9** **7**
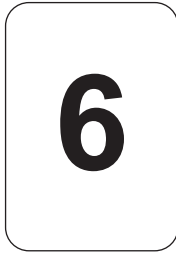
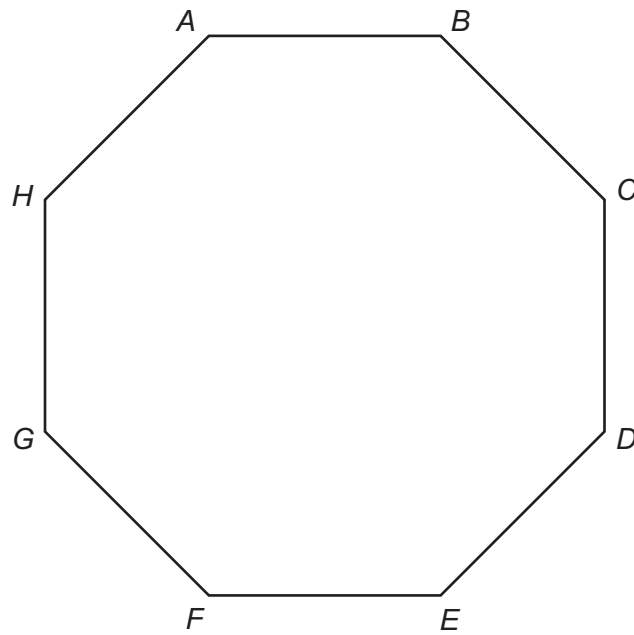**3 (a)** Use all the cards to make the **largest** possible number.

[1 mark]

3 (b) Use all the cards to make the **smallest** possible **even** number.

[2 marks]

4 Here is a regular octagon.

4 (a) Write down the side parallel to side *AH*.

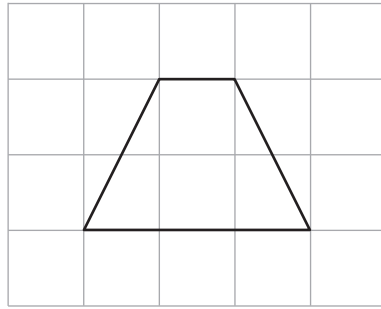**[1 mark]**

Answer _____

4 (b) Write down a side perpendicular to side *HG*.

[1 mark]

Answer _____

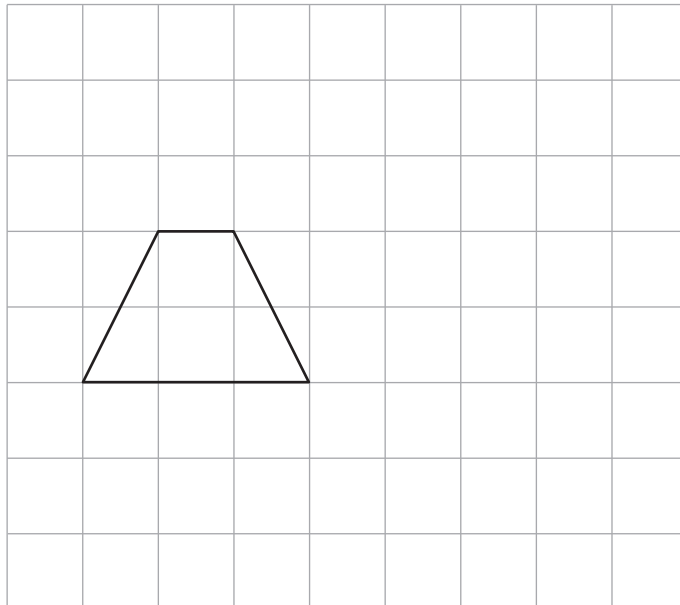**5 (a)** Here is a trapezium drawn on a grid.

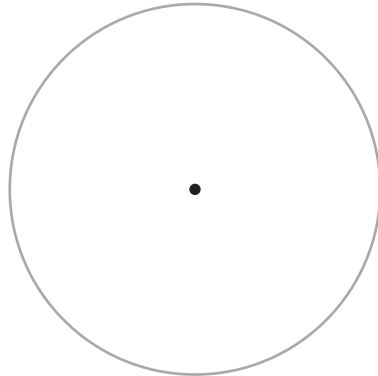Write down one fact about the symmetry of **this** trapezium.

[1 mark]

Answer _____

5 (b) On the grid below, show how the trapezium in part (a) will tessellate.
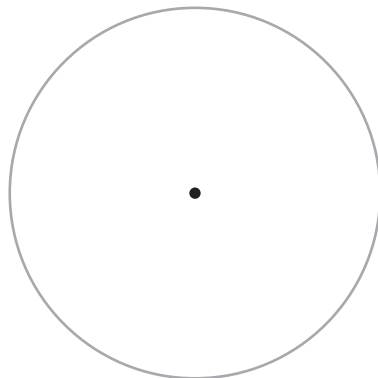Draw at least **five** more trapeziums.

[2 marks]

Turn over ▶

5

6 (a) Draw a diameter on this circle.
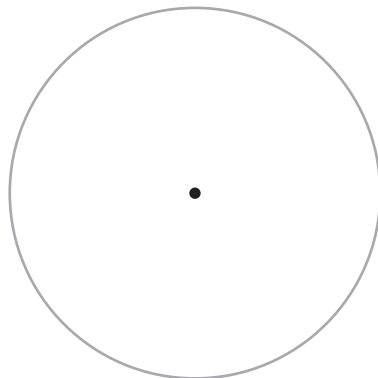
[1 mark]

6 (b) Draw and shade in a segment on this circle.

[1 mark]

6 (c) Draw and shade in a sector on this circle.

[1 mark]

7 Here are two boxes of matches.

**Box A
Contains
50 matches
(to the nearest 10)**

**Box B
Contains
100 matches
(to the nearest 10)**
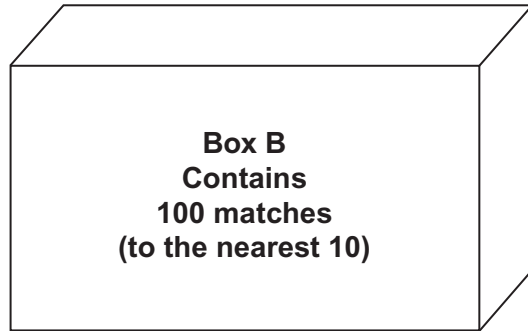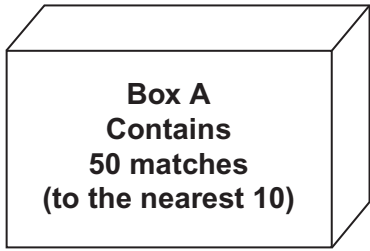
7 (a) Write down the **largest** possible number of matches in box A.

[1 mark]

Answer _____

7 (b) Work out the **smallest** possible number of matches that could be in both boxes altogether.
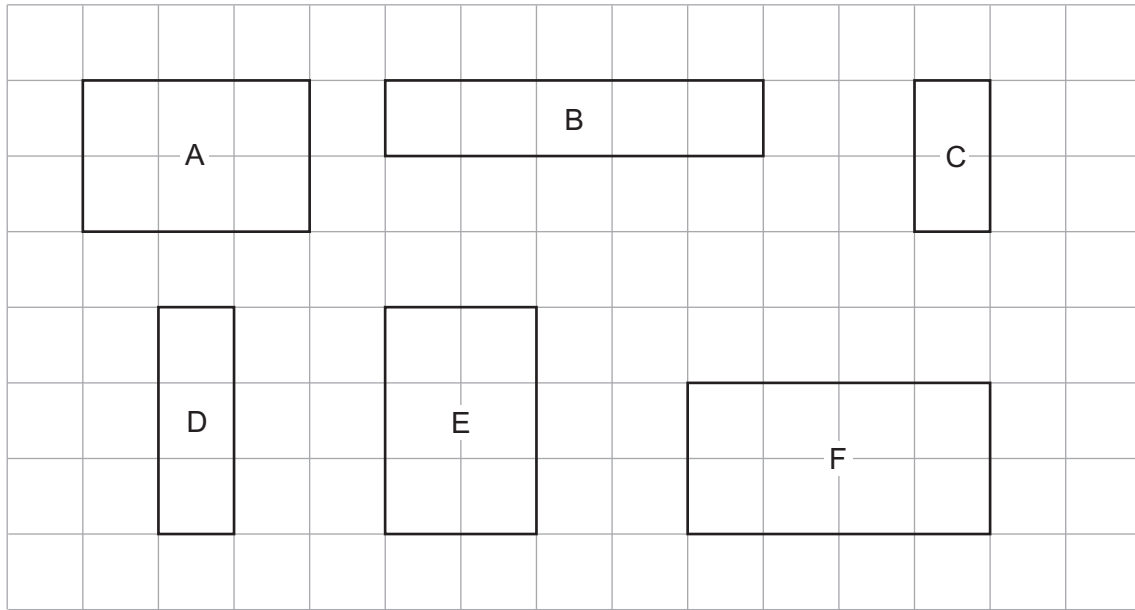You **must** show your working.

[2 marks]

_____

_____

_____

Answer _____

Turn over for the next question

6

8 Here are six rectangles drawn on a centimetre grid.

8 (a) Write down the letters of the **two** congruent rectangles.

[1 mark]

Answer _____ and _____

8 (b) Write down the letters of the **two** rectangles with a perimeter of 12 cm

[1 mark]

Answer _____ and _____

8 (c) Tick a box to say whether these statements are true or false.

[2 marks]

All of the rectangles have rotational symmetry of order 2   True ☐   False ☐

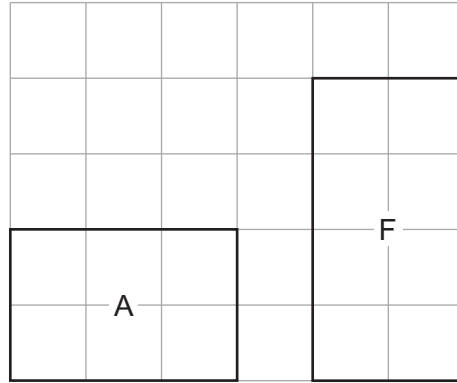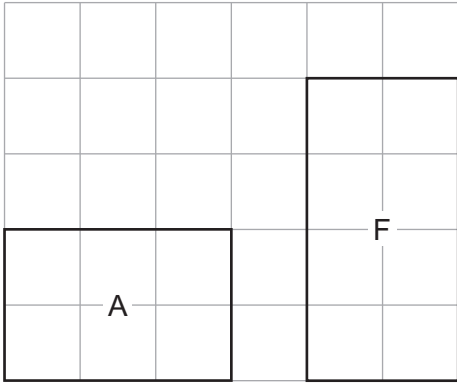All of the rectangles have 4 lines of symmetry.   True ☐   False ☐

8 (d) The six rectangles can be fitted exactly into a 6 cm by 5 cm grid.
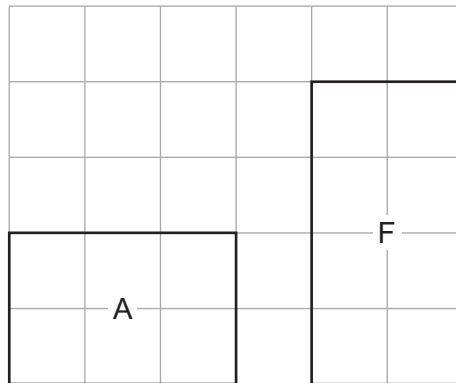Two of the rectangles have been fitted already.

Show how the other four rectangles could fit into the grid.

[2 marks]

Practise on these grids.

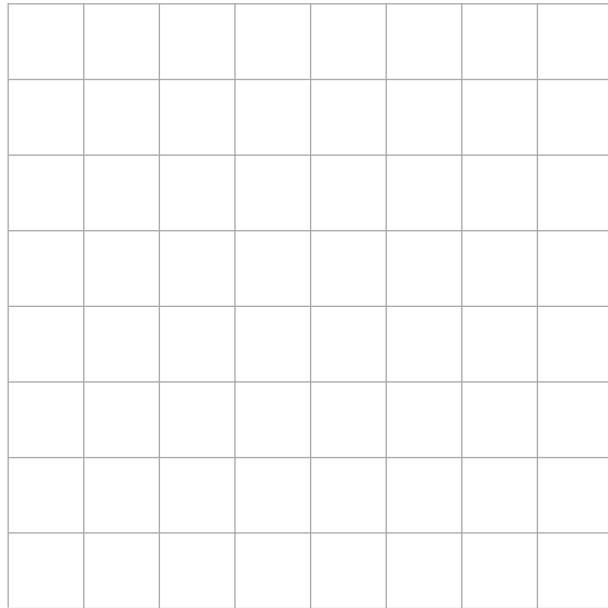Put your answer on this grid.
Remember to label your rectangles.
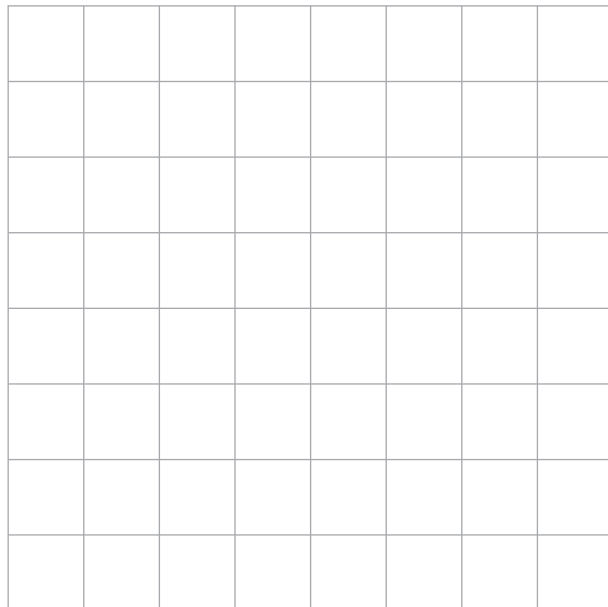
Turn over for the next question

Turn over ▶

9 (a)   On the centimetre grid draw an isosceles triangle.

[1 mark]

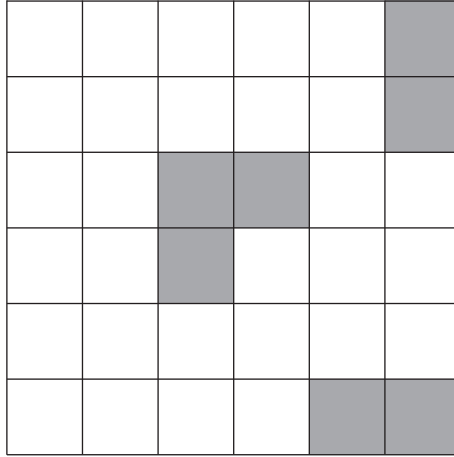**9 (b)**   On the centimetre grid draw a square with an area of 25 cm^2

[1 mark]

9 (c)   Here is another centimetre grid.

Shade **five** more squares so that the grid has rotational symmetry of order 4
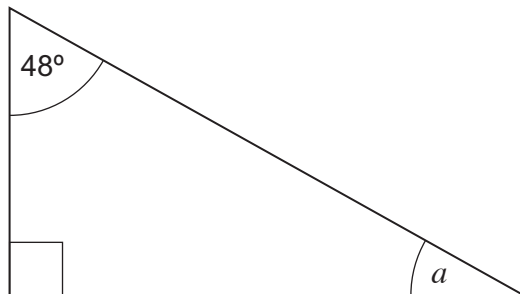
[2 marks]

*10   Write down the size of angle a.

Give a reason for your answer.

[2 marks]

Not drawn accurately

Answer _____ degrees

Reason _____

_____

Turn over ▶

6

11   In each part, match the statement to the expression.
Circle your answer.

11 (a)   Six times x.

[1 mark]

$\dfrac{x}{6}$ $x + 6$ $6x$ x^6

11 (b)   Three less than x.

[1 mark]

$3 - x$ $3x$ $\dfrac{x}{3}$ $x - 3$

11 (c)   One-quarter of x.

[1 mark]

$x \div 0.25$ $\dfrac{4}{x}$ $\dfrac{x}{4}$ $4x$

12 (a) Work out $\sqrt{3^2 + 4^2}$

[1 mark]

Answer _____

12 (b) Which is greater 2×5^3 or 3^5?
You **must** show your working.

[2 marks]

_____

_____

_____

_____

_____

13 Decrease 352 by 45%

[3 marks]

_____

_____

_____

_____
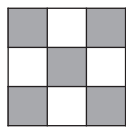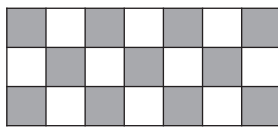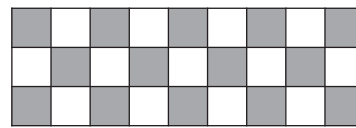
Answer _____

9

14 Patterns are made with grey and white tiles.
Pattern 2 is missing.

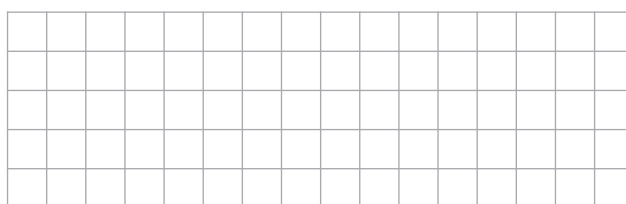Pattern 1　　　　Pattern 2　　　　Pattern 3　　　　Pattern 4

14 (a) Draw Pattern 2 on the grid below.

[1 mark]

*14 (b) Billy says,

"There are 14 grey tiles in Pattern 4 so there must be 28 grey tiles in Pattern 8".

Give reasons why Billy is wrong.

[2 marks]

_____

_____

_____

_____

_____

_____

14 (c)   How many grey tiles are there in Pattern 10?

[1 mark]

_____

_____

Answer _____

14 (d)   The sequence for the number of white tiles in each pattern is

4   7   10   13   ____

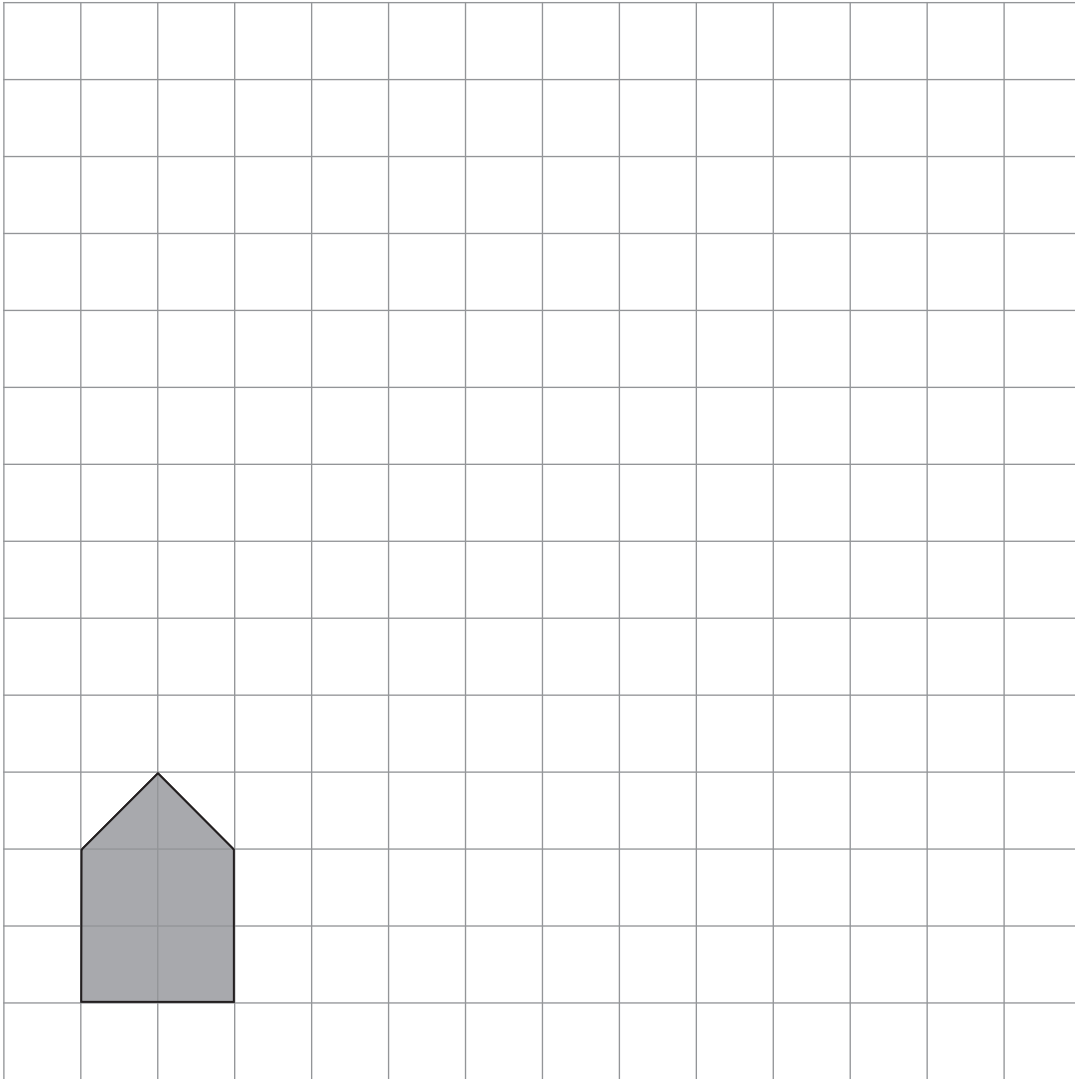Circle the expression that gives the nth term of this sequence.

[1 mark]

$4n$ $4n + 3$ $3n + 1$ $3n - 1$

Turn over for the next question

5

Turn over ▶

15 Enlarge the shape by scale factor 3

[2 marks]

16 (a) Use your calculator to work out $\dfrac{4.23 + 6.17}{3.45 - 1.82}$

[1 mark]

Answer _____

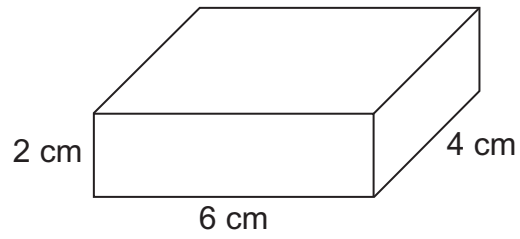**16 (b)** Round 150 to 1 significant figure.

[1 mark]

Answer _____

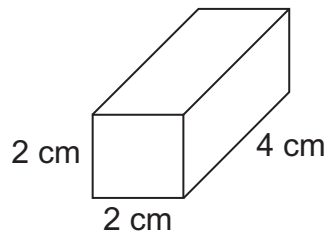**16 (c)** Round 17.99 to 1 decimal place.

[1 mark]

Answer _____

Turn over for the next question

5

Turn over ▶

17   Large cuboids are 6 cm by 4 cm by 2 cm

Small cuboids are 2 cm by 4 cm by 2 cm

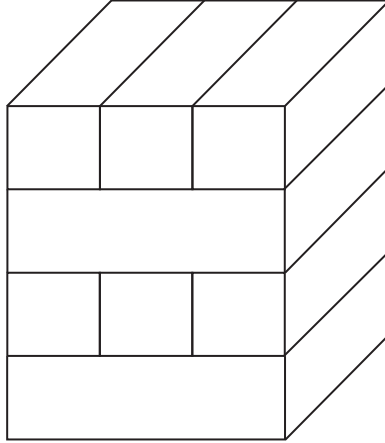**17 (a)**   Show that

the volume of **one** large cuboid is the same as the total volume of **three** small cuboids.

[2 marks]

_____

_____

_____

_____

17 (b)   The large and small cuboids are stacked in alternate layers.
The bottom layer is one large cuboid.
The next layer is made from **three** small cuboids.
Here is a stack of four layers.

Work out how many **small** cuboids will be used when the stack has a total volume of
816 cm^3
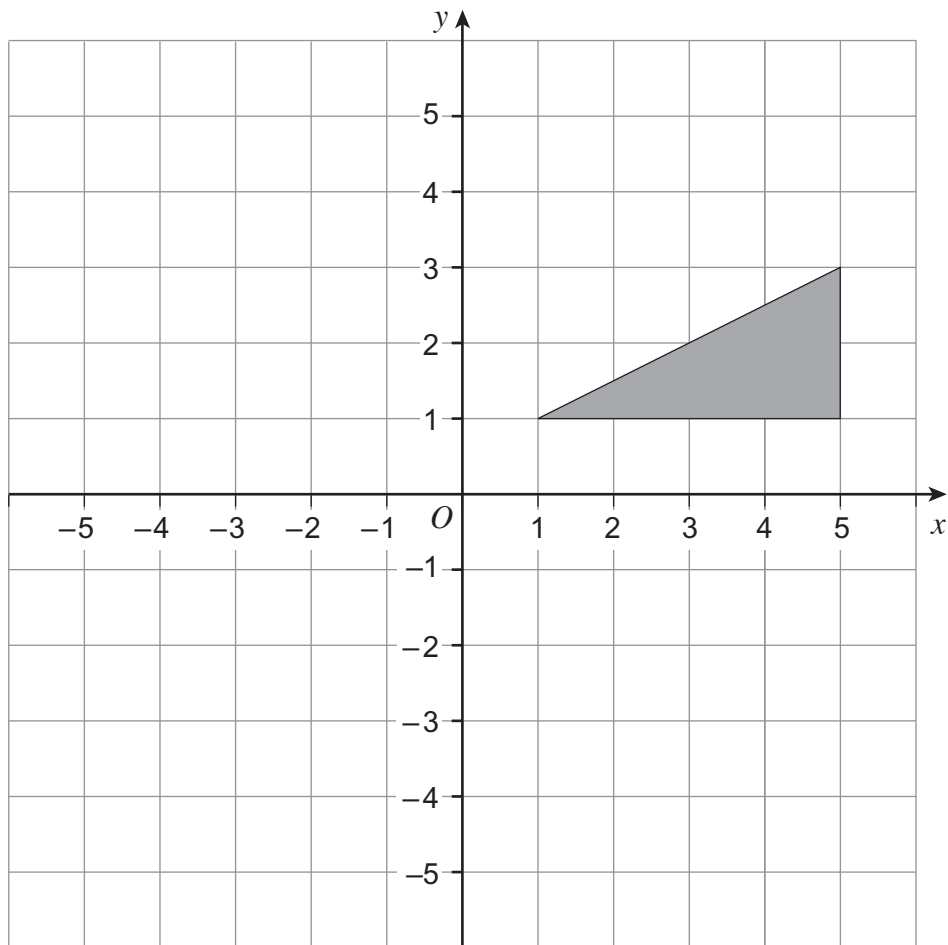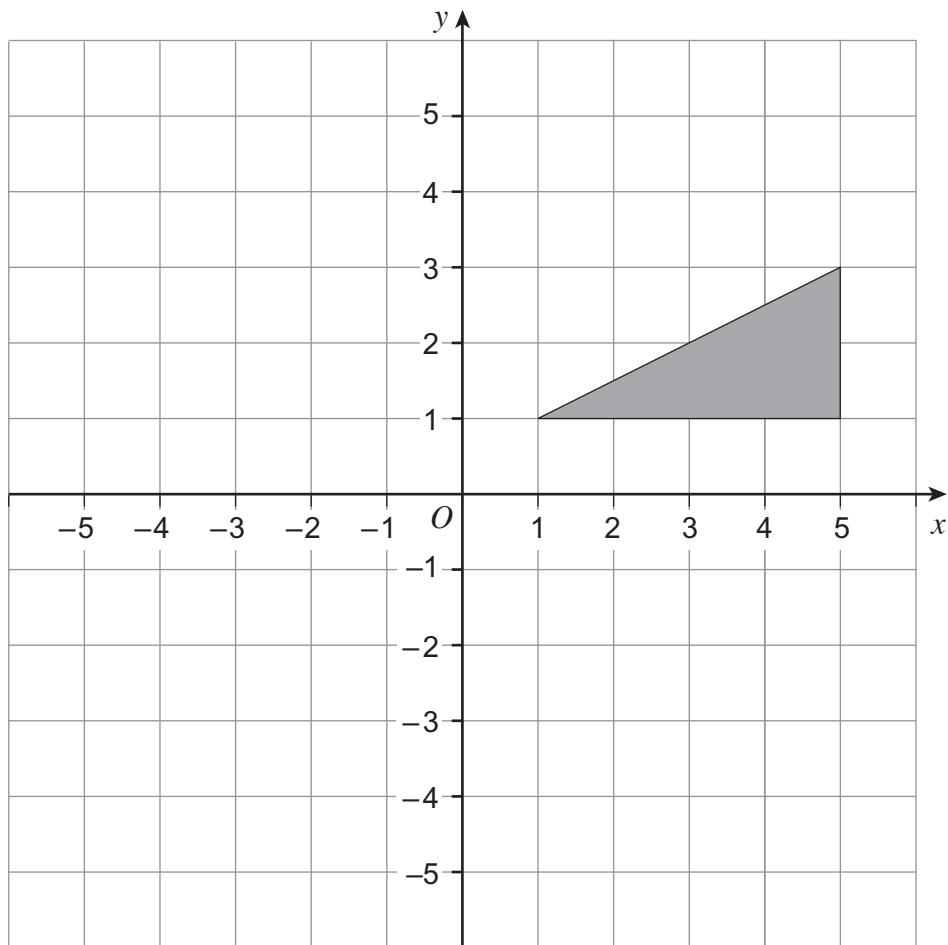You **must** show your working.

[4 marks]

Answer _____

6

18 (a)   Reflect the triangle in the *x*-axis.

[2 marks]

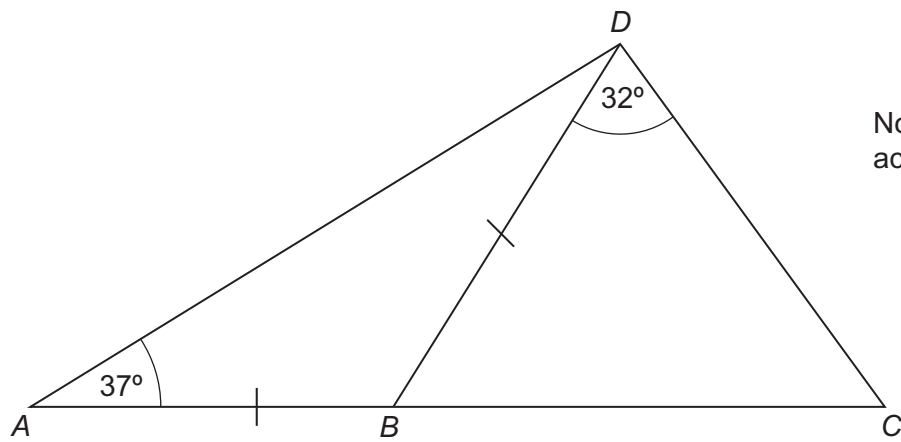**18 (b)** Rotate the triangle 180º about the origin.

[2 marks]

Turn over for the next question

Turn over ▶

4

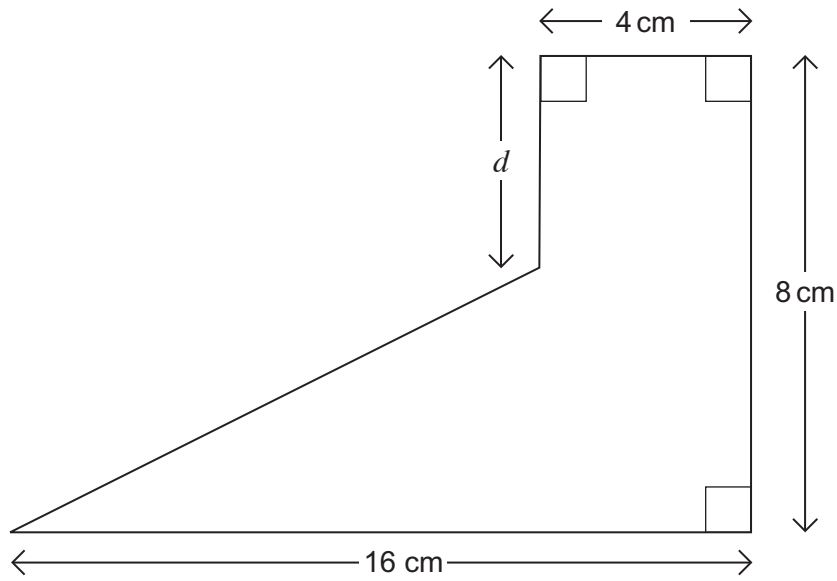*19   *ABC* is a straight line.
       AB = BD

Not drawn
accurately

Show that *DBC* is an isosceles triangle.
You **must** show your working, which may be on the diagram.

[3 marks]

_____

_____

_____

_____

_____

_____

20

4 cm

d

8 cm

Not drawn accurately

16 cm

The area of the shape is 65 cm^2

Work out the length d.
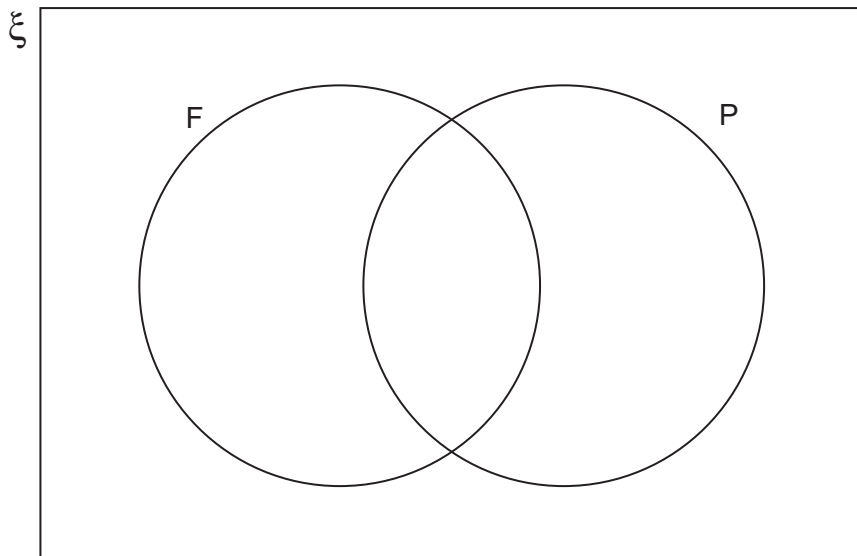
[5 marks]

Answer _____ cm

Turn over ▶

21   Write the numbers from 1 to 15 in this Venn Diagram.

[2 marks]

ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15}

Set F = Factors of 15

Set P = Prime numbers

ξ

F   P

22   A square and a circle have the same area.
The radius of the circle is 10 cm

Work out the length of the side of the square.
Give your answer to 1 decimal place.

[3 marks]

_____

_____

_____

_____

Answer = _____ cm

23   Work out the Least Common Multiple of 21 and 24

[2 marks]

_____

_____

_____

_____

Answer _____

Turn over for the next question

7

Turn over ▶

Do not write outside the box

24   Here is a parallelogram.
All angles shown are in degrees.
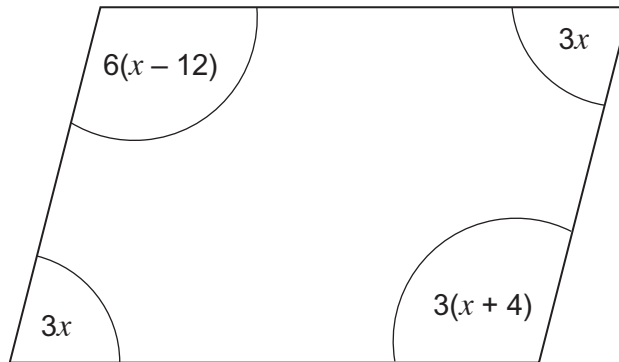
Not drawn
accurately

Work out the value of x.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

END OF QUESTIONS

4