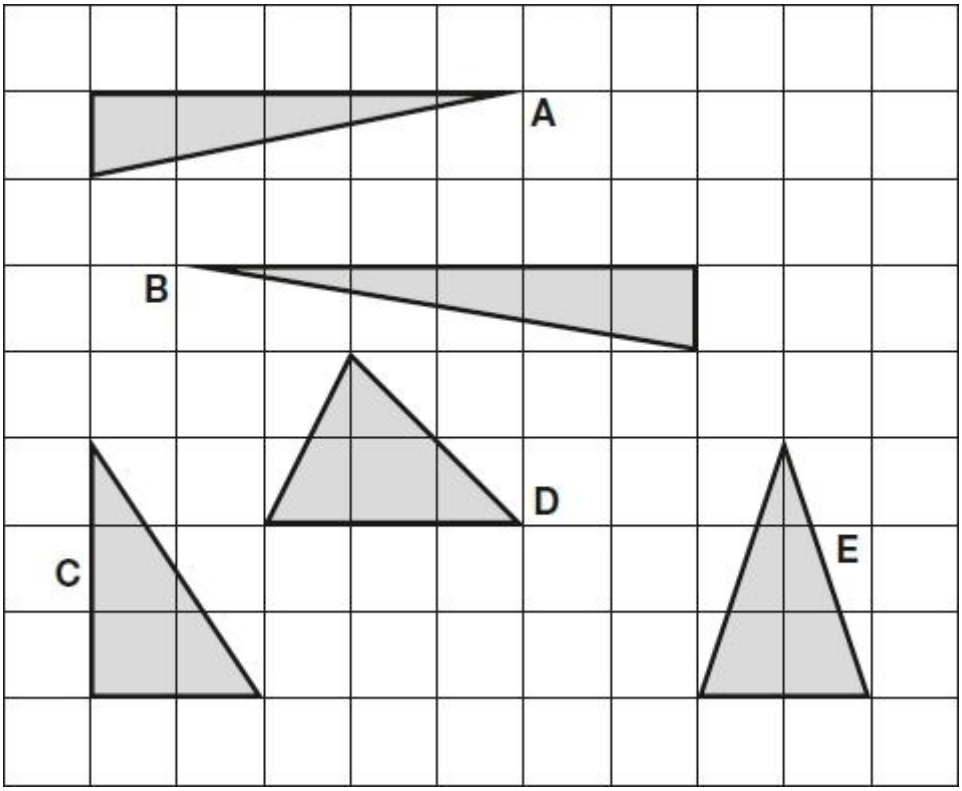
Maths Reasoning Activity Area and Perimeter

Warming up*

Q1.

Here are five triangles on a square grid.



Four of the triangles have the same area.

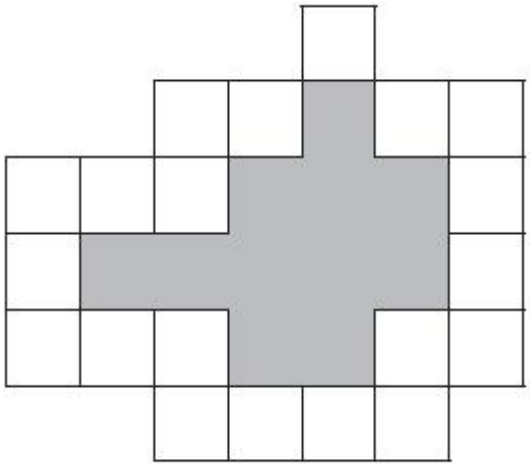
Which triangle has a **different** area?

_____

1 mark

Q2.

Here is a set of 20 squares around a shaded space.



What is the area of the shaded space?

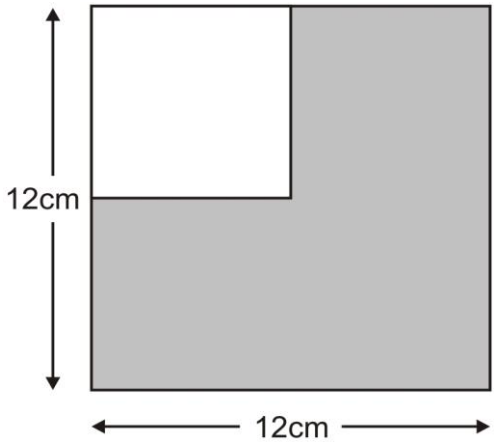
squares

1 mark

Q3.

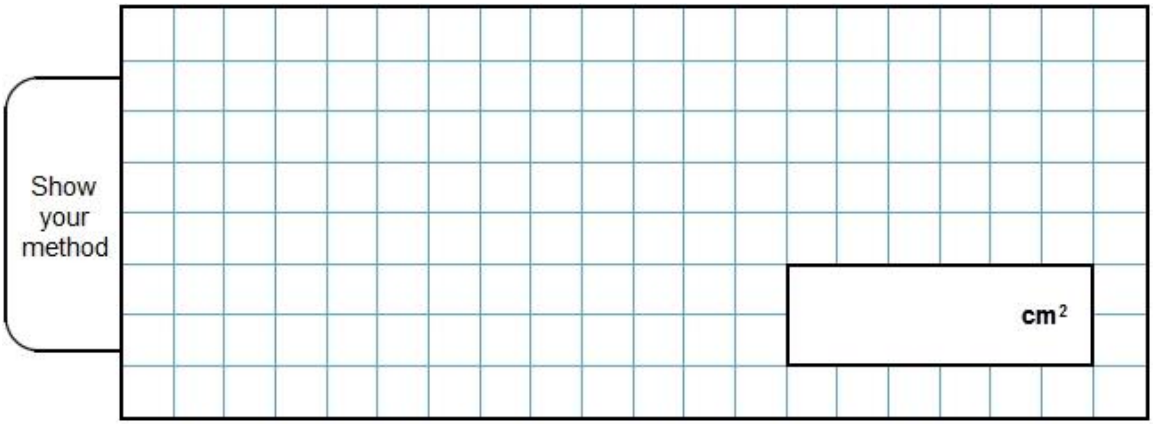
A white square is painted in one corner of a grey square.

Each side of the white square is **half** the length of a side of the grey square.



Not actual size

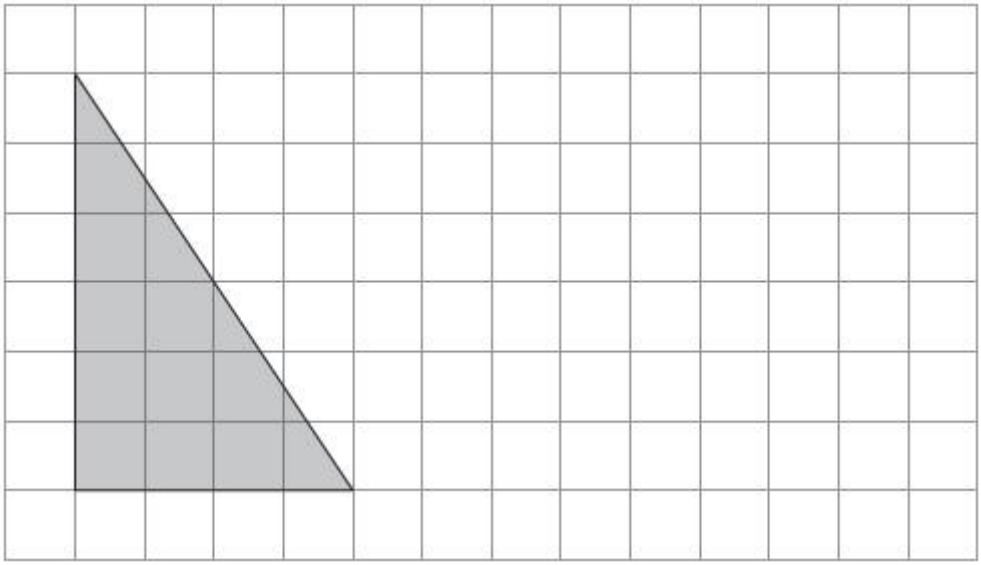
What is the **area** of the grey section?



Q4.

Draw a rectangle on the grid that has **half** the area of the shaded triangle.

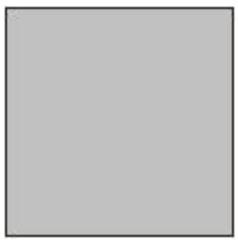
Use a ruler.



1 mark

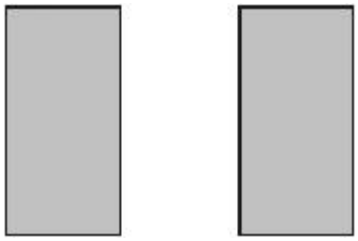
Q5.

The perimeter of a square is 72 centimetres.

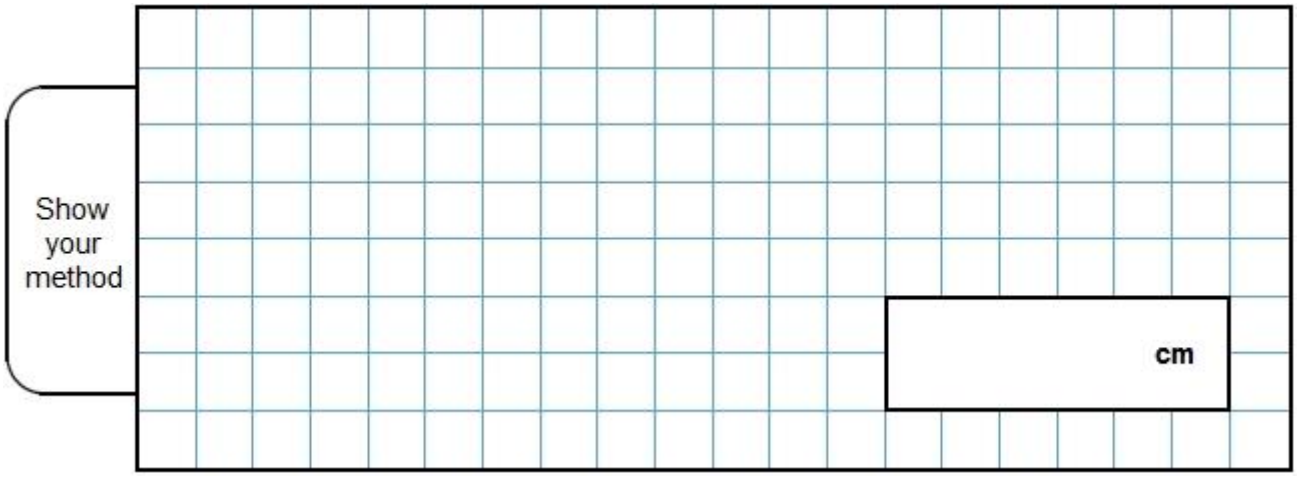


Not actual size

The square is cut in half to make two identical rectangles.

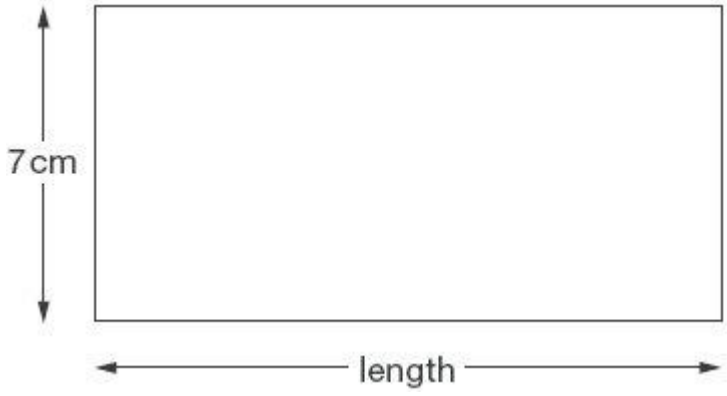


What is the perimeter of **one** rectangle?



2 marks

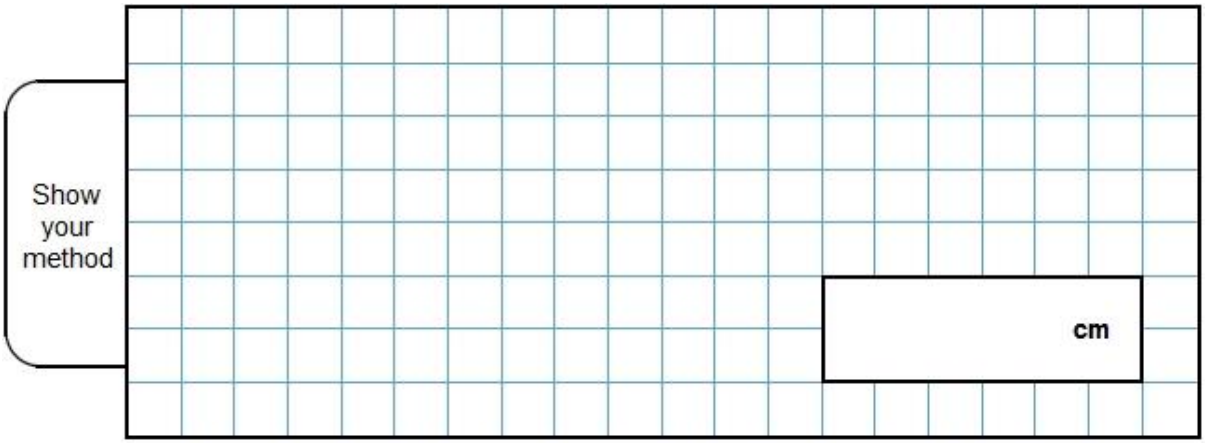
Q6.



Not actual size

The perimeter of this rectangle is 50 centimetres.

Calculate the length of the rectangle.



2 marks

Q7.

The following quadrilaterals all have a **perimeter of 36 cm**.

Here is a table to show the length of each side.

Complete the table.

One quadrilateral is done for you.

	Side lengths			
square	9 cm	9 cm	9 cm	9 cm
rectangle	3 cm			
rhombus	9 cm			
kite	10 cm			

2 marks

Q8.

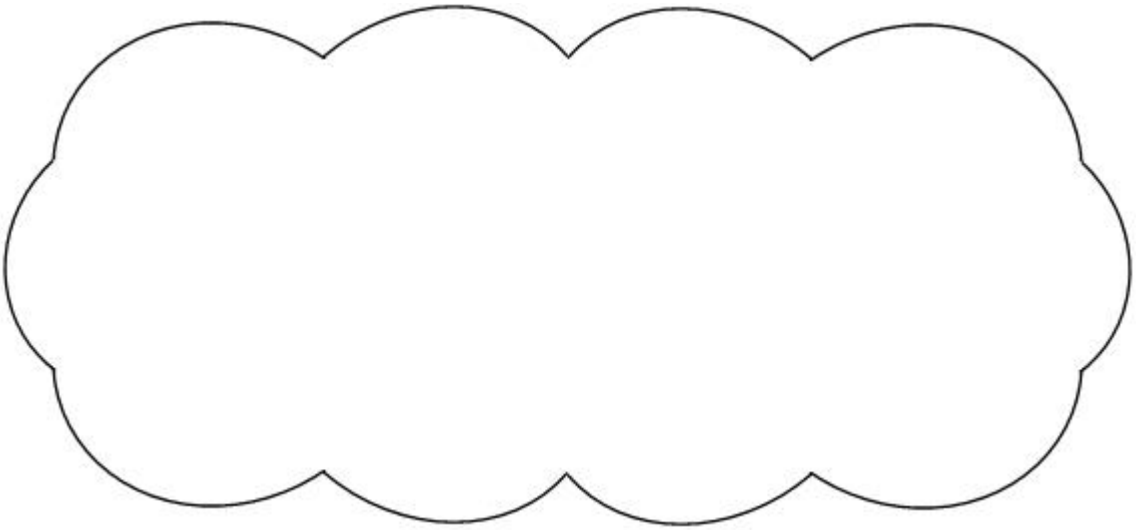
Megan says,

'If two rectangles have the same perimeter, they must have the same area.'

Is she correct?
Circle **Yes** or **No**.

Yes / No

Explain how you know.



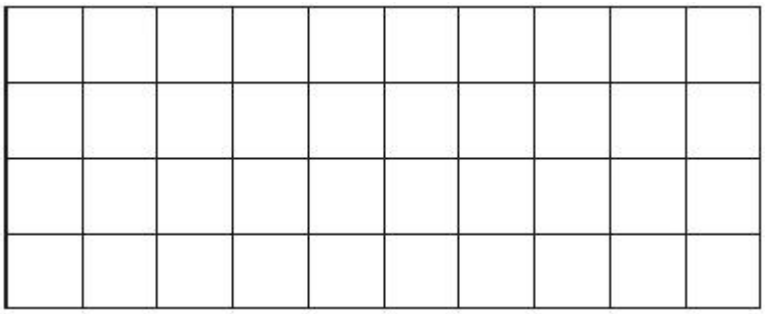
1 mark

Feeling more confident **

Q1.

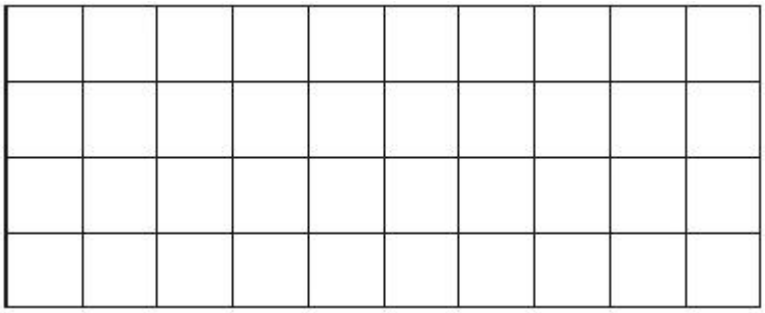
Here is a centimetre square grid.

On the grid draw a **shape** which has an **area** of **10** square centimetres.



1 mark

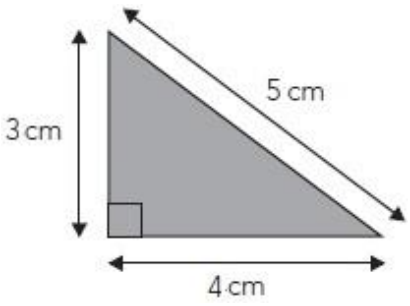
On the grid below draw a **rectangle** which has a **perimeter** of **10** centimetres.



1 mark

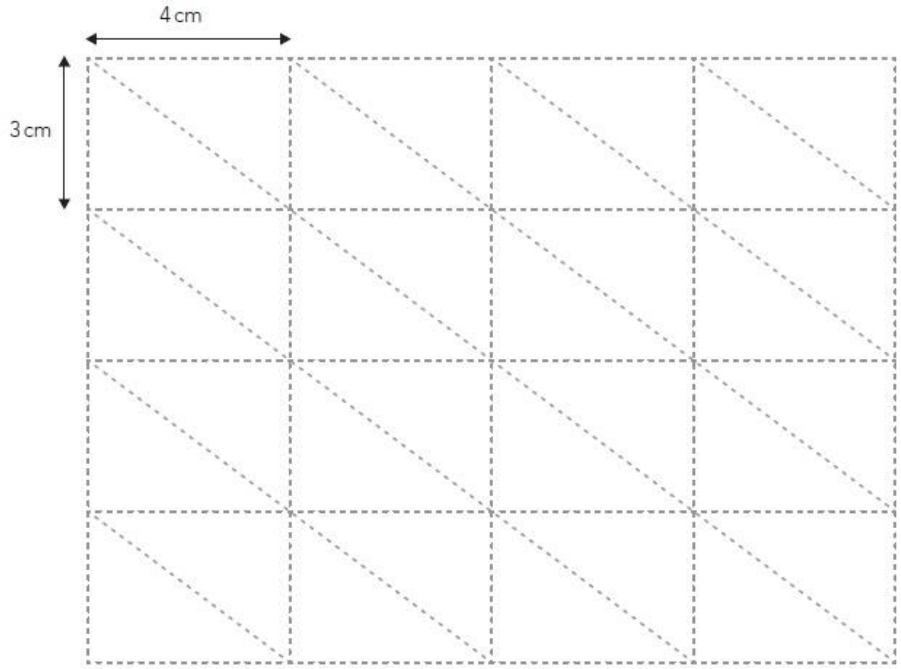
Q2.

The grid below is made of right-angled triangles like this:



Shade triangles on the grid to make a **quadrilateral**.

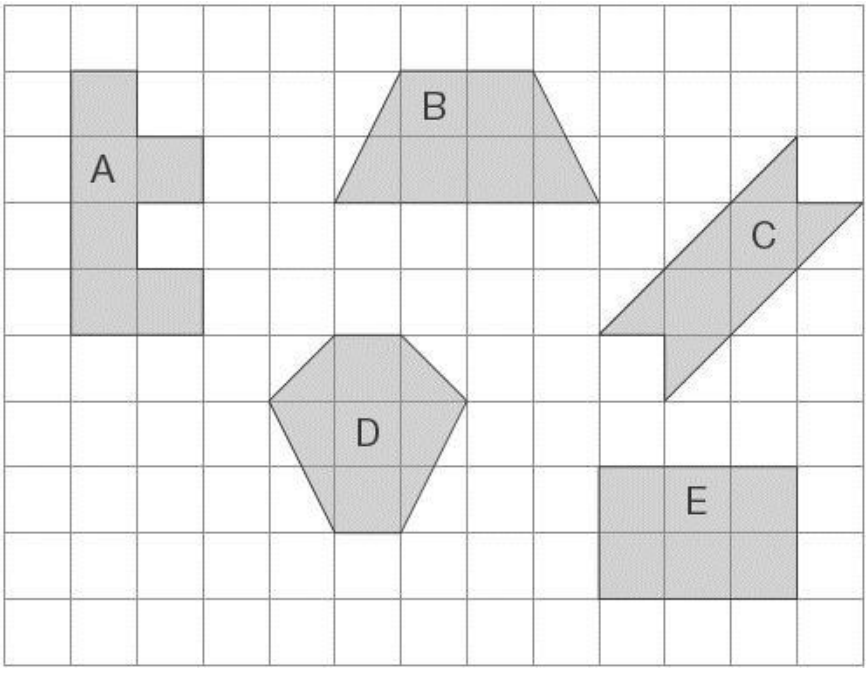
Your quadrilateral must have an area of **24 cm²** and a perimeter of 26 cm.



2 marks

Q3.

Here are some shapes on a 1cm square grid.



What is the **perimeter** of shape A?

cm

1 mark

Write the letter of the shape that has the **smallest area**.

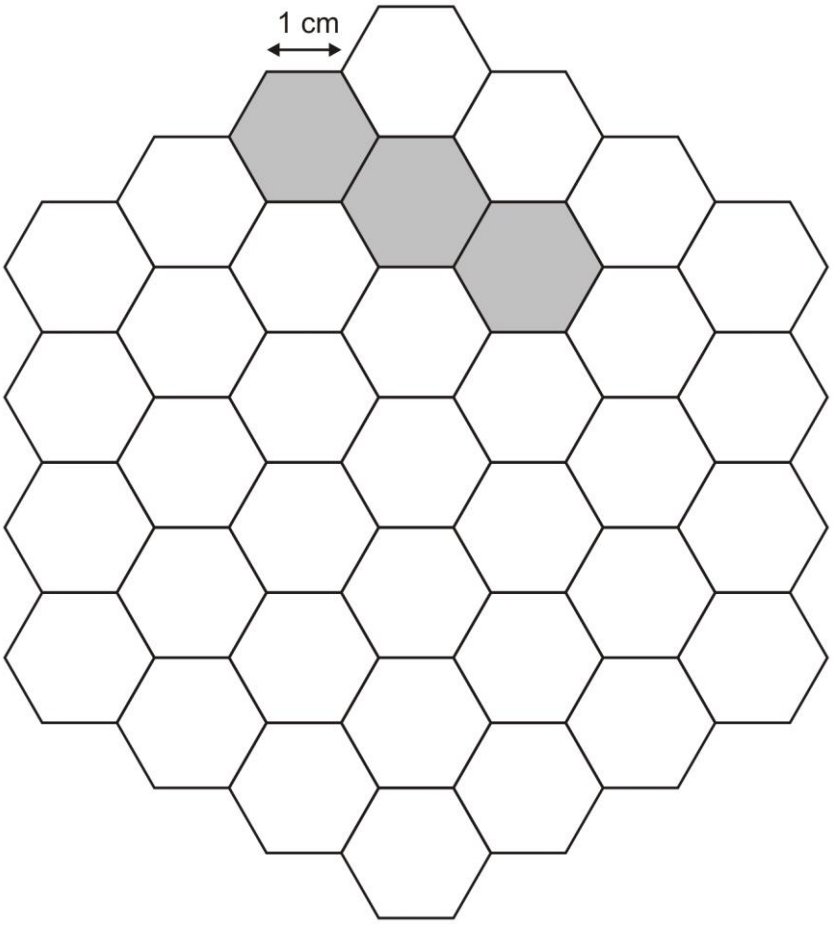
1 mark

Q4.

Here is a grid of regular hexagons.

The shaded shape has an area of 3 hexagons and a perimeter of 14 cm.

Draw another shape on the grid which has an **area** of 4 hexagons and a **perimeter** of 14 cm.

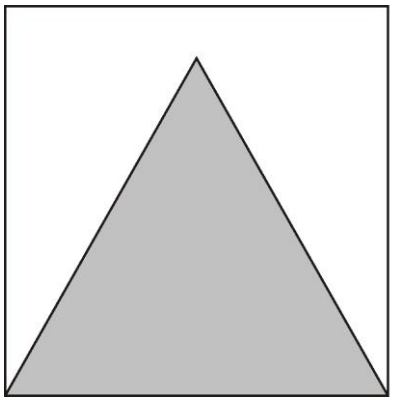


1 mark

Ready for a challenge***

Q1.

Here is an equilateral triangle inside a square.



Not actual size

The perimeter of the triangle is 48 centimetres.

What is the perimeter of the **square**?

Show your method

cm

2 marks

Q2.

An isosceles triangle has a perimeter of 12 cm.

One of its sides is 5 cm.

What could the length of each of the other two sides be?

Two different answers are possible.

Give **both** answers.

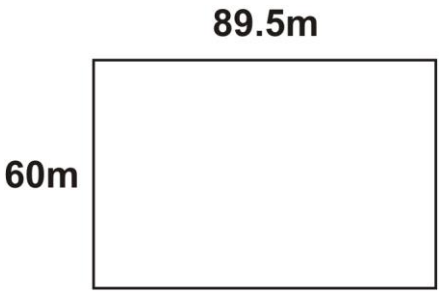
cm and cm

cm and cm

2 marks

Q3.

A field measures 89.5 m by 60 m.



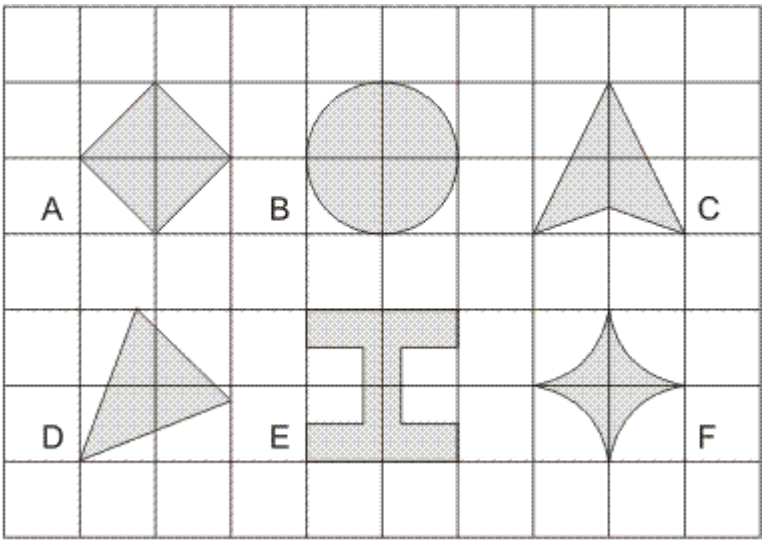
What is the perimeter of the field?

m

1 mark

Q4.

Here are some shapes on a grid.



Which shape has the **longest perimeter**?

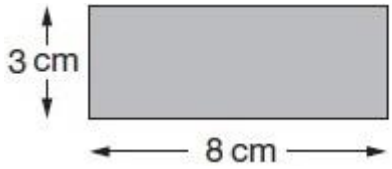
1 mark

Which shape has the **largest area**?

1 mark

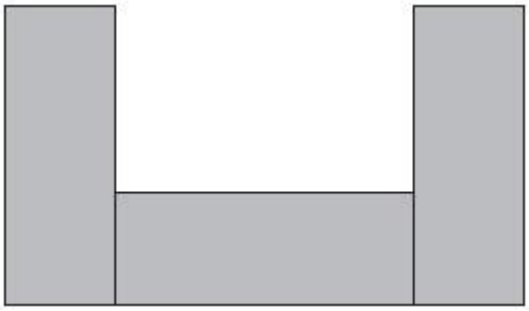
Q5.

Alfie has some rectangles.

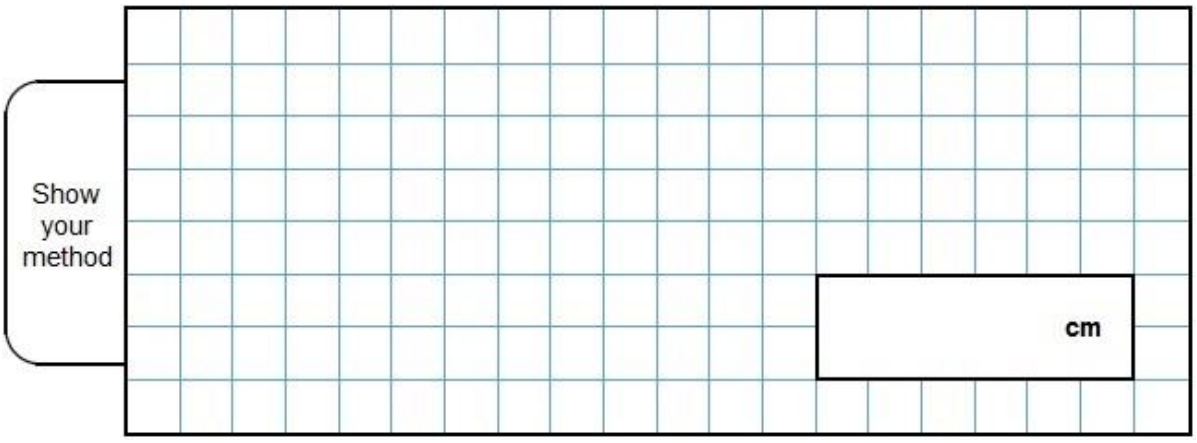


Not actual size

He makes this shape using three of the rectangles.



What is the **perimeter** of Alfie's shape?



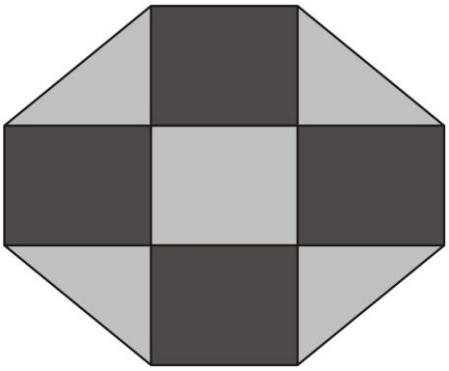
2 marks

Q6.

This plan of a garden is made of rectangles and triangles.

The area of each **rectangle** is **12 square metres.**

What is the **area** of the **whole garden**?

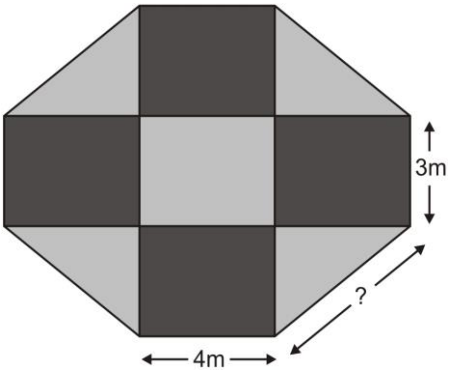


m²

1 mark

The **perimeter** of the garden is **34 metres**.

What is the length of the **longest side** of each triangle?



Show your method

metres

2 marks

Maths Reasoning Activity – Area and perimeter

Answers

Warming up*

Q1.

A

Accept alternative unambiguous positive indications of the correct triangle, e.g. 2 $\frac{1}{2}$ or 2.5.

[1]

Q2.

11

Accept 11 cm²

[1]

Q3.

Award **TWO** marks for the correct answer of 108

If the answer is incorrect, award **ONE** mark for evidence of appropriate method, eg

12 × 12 = 144

$\frac{3}{4}$ of 144

OR

(12 × 12) – (6 × 6)

OR

(12 × 12) + (6 × 6)

OR

(6 × 6) × 3

*Answer need not be obtained for the award of **ONE** mark.*

Up to 2 (U1)

[2]

Q4.

A rectangle with area 6 cm²

A rectangle must be drawn but need not be shaded.

[1]

Q5.

Award **TWO** marks for the correct answer of 54

If the answer is incorrect, award **ONE** mark for evidence of appropriate method, eg:

- 72 ÷ 4 = 18
  18 ÷ 2 = 9
  (18 × 2) + (9 × 2)

OR

- 72 ÷ 4 × 3

*Answer need not be obtained for the award of **ONE** mark.*

Up to 2 (U1)

[2]

Q6.

Award **TWO** marks for the correct answer of 18

If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg

50 ÷ 2 = 25

25 – 7 = wrong answer

OR

7 × 2 = 14

50 – 14 = 36

36 ÷ 2 = wrong answer

*Working must be carried through to reach an answer for the award of **ONE** mark.*

Up to 2

[2]

Q7.

Completes all three rows correctly, eg:

-

rectangle	3cm	3cm	15cm	15cm
rhombus	9cm	9cm	9cm	9cm
kite	10cm	10cm	8cm	8cm

! Measures

Accept Side lengths in each row may be given in any order

Accept correct values with cm omitted eg, for the rectangle:

- *15 3 15*

2

or

Completes two rows correctly

1

[2]

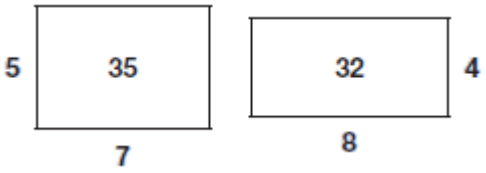
Q8.

Indicates No and gives a correct explanation that includes indicating two different areas, eg:

- A rectangle with sides 6 cm by 2 cm has a perimeter of 16 cm and an area of 12 cm^2 but a rectangle with sides 5 cm and 3 cm has the same perimeter of 16 cm but it has an area of 15 cm^2 which is different so she is not correct

- A square with sides 3 cm by 3 cm and a rectangle with sides 4 cm by 2 cm have the same perimeter of 12 cm but they have different areas of 9 cm^2 and 8 cm^2

Accept minimally acceptable explanation, eg:

- *6 × 2 = 12, 5 × 3 = 15*
- 

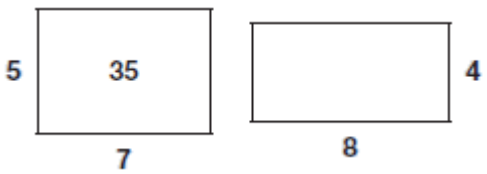
! Ignore any incorrect units given in an otherwise correct explanation, eg:

- *6^2 for 6 cm^2*

! Indicates Yes, or no decision made, but explanation clearly correct

Condone, provided the explanation is more than minimal

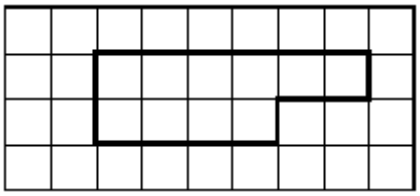
***Do not accept** Incomplete or incorrect explanation, eg:*

- *6 × 2, 5 × 3*
- *Two rectangles, one with sides 6 cm by 5 cm and one with sides 8 cm by 3 cm have the same perimeter of 22 cm but they don't have the same area*
- 

Feeling more confident**

Q1.

(a) Any shape with an area of 10 cm^2, eg

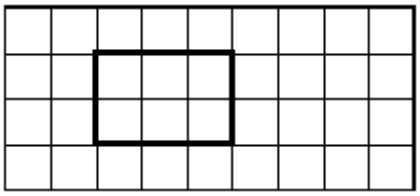


The shape need not be aligned with the grid.

Accept slight inaccuracies in drawing provided intention is clear.

1

(b) Any rectangle with a perimeter of 10 cm, eg



The rectangle need not be aligned with the grid.

Accept slight inaccuracies in drawing provided the intention is clear.

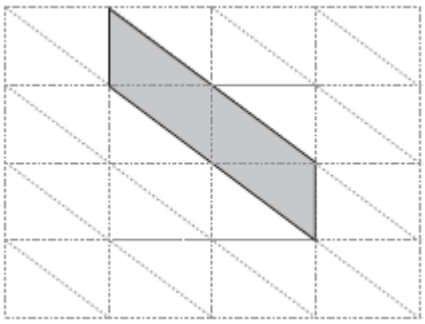
1

[2]

Q2.

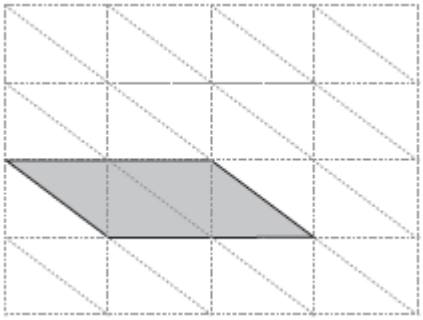
Shows a correct quadrilateral, eg

•



OR

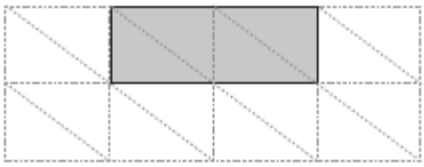
•



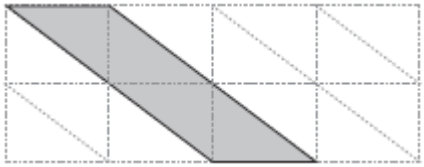
2
U1

or

Shows a quadrilateral with an area of 24 cm^2 but not a perimeter of 26 cm, eg

- 

OR

- 

1

! Shading omitted

Accept provided the quadrilateral drawn is unambiguous

! Lines not ruled or accurate

Accept slight inaccuracies in drawing provided the pupil's intention is clear

[2]

Q3.

(a) 14

1

(b) C

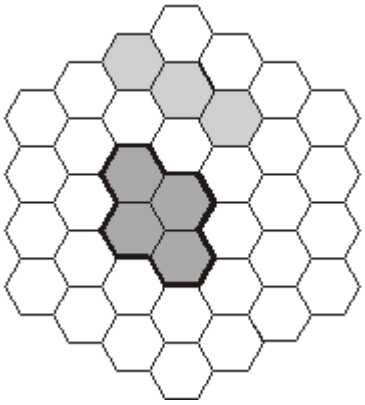
Accept 5

1

[2]

Q4.

Shape drawn on grid as shown:



Accept: shape in any position or orientation.

Accept: slight inaccuracies in drawing provided the intention is clear.

Accept: alternative unambiguous indications of the correct shape provided the intention is clear.

Accept: mathematically correct answers involving fractions of a hexagon.

Shape need not be shaded.

[1]

Ready for a challenge***

Q1.

Award **TWO** marks for the correct answer of 64

If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg

48 ÷ 3 = 16

16 ÷ 4 = wrong answer

*Calculation must be performed for the award of **ONE** mark.*

Up to 2 (U1)

[2]

Q2.

Award **TWO** marks for two different answers as shown:

5	and	2	**or**	2	and	5

AND

3.5	and	3.5

If the answer is incorrect, award **ONE** mark for any one of the above answers.

The two answers may be given in either order.

***Do not** accept '5 and 2' **AND** '2 and 5' for two marks.*

Up to 2

[2]

Q3.

299

[1]

Q4.

(a) E

1

(b) B

1

[2]

Q5.

Award **TWO** marks for the correct answer of 54

If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg

8 × 4 = 32

3 × 4 = 12

5 × 2 = 10

32 + 12 + 10 = wrong answer

*Working must be carried through to reach an answer for the award of **ONE** mark.*

Up to 2

[2]

Q6.

(a) 84

1

(b) Award **TWO** marks for the correct answer of 5.

If the answer is incorrect, award **ONE** mark for an appropriate calculation such as:

- (34 – 6 – 8) ÷ 4 = incorrect answer.

up to 2

[1]