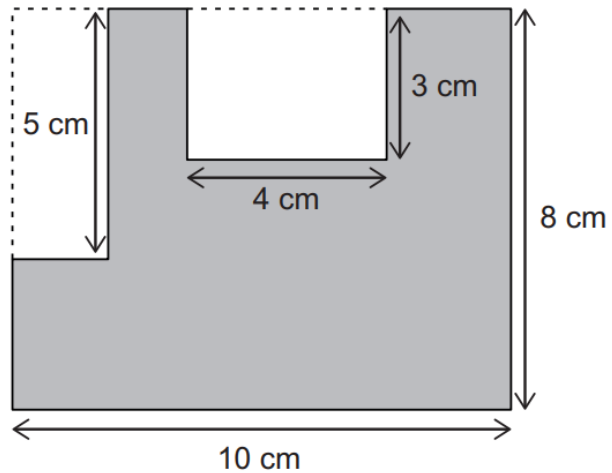




Topic 12 - Perimeter and Area

1



[diagram not to scale]

A large rectangle has sides 8 cm and 10 cm.

Two small rectangles are removed from this large rectangle.

This leaves the shaded shape.

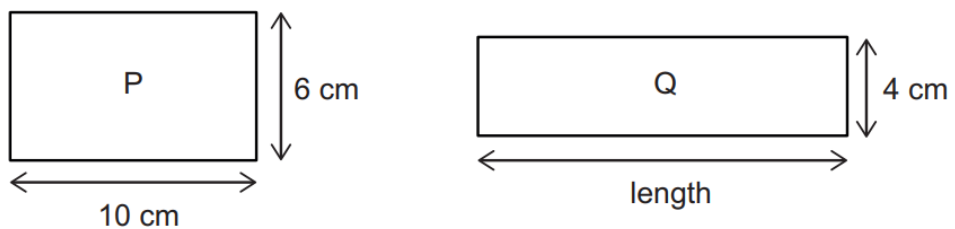
What is the perimeter of the shaded shape?

- A** 30 cm
- B** 36 cm
- C** 39 cm
- D** 40 cm
- E** 42 cm



2

Rectangles P and Q both have the same area.



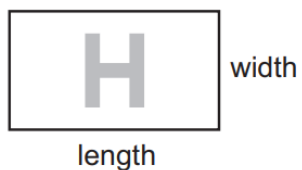
[diagram not to scale]

What is the length of rectangle Q?

- A 8 cm
- B 12 cm
- C 15 cm
- D 32 cm
- E 60 cm



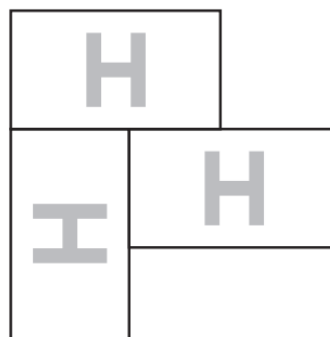
3



Harry is making shapes out of identical rectangular cards with the letter H on.
He makes shape X, then adds another card to make shape Y, as shown.



shape X



shape Y

[diagrams not to scale]

The perimeter of shape X is 64 cm and the perimeter of shape Y is 82 cm.

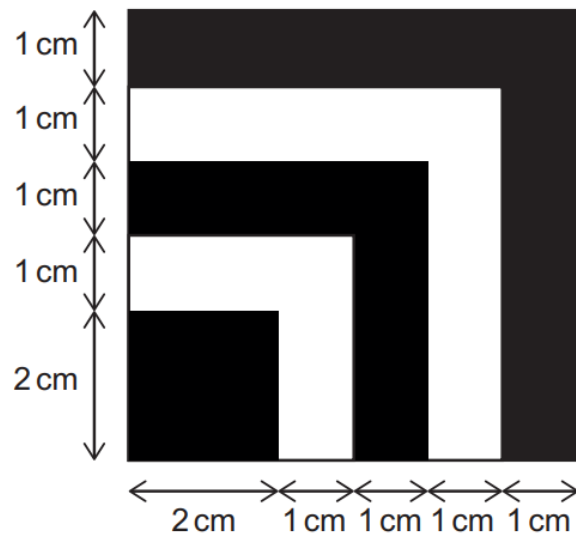
What is the **width** of each of Harry's rectangles?

- A 3 cm
- B 4 cm
- C 5 cm
- D 8 cm
- E 9 cm



4

Here is a shape made of black and white parts:



[diagram not to scale]

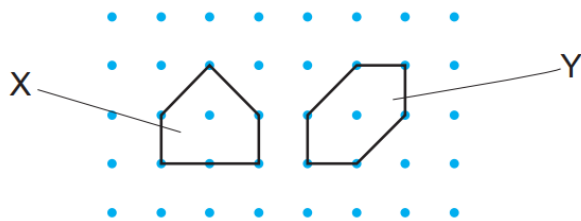
What is the total area that is black?

- A 14 cm^2
- B 15 cm^2
- C 20 cm^2
- D 22 cm^2
- E 24 cm^2



5

The shapes X and Y are drawn on a square grid.



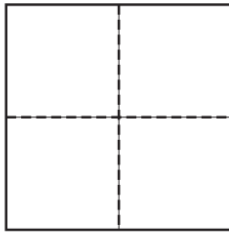
Which of the following statements is/are correct?

- 1 Shape X has a larger perimeter than shape Y.
 - 2 Shapes X and Y have the same perimeter.
 - 3 Shape X has a larger area than shape Y.
 - 4 Shapes X and Y have the same area.
- A** none of them
- B** statement 4 only
- C** statements 1 and 4 only
- D** statements 2 and 3 only
- E** statements 2 and 4 only

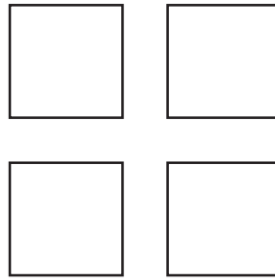


6

The perimeter of a square is 32 cm.



perimeter = 32 cm



The square is cut into four smaller squares, as shown in the diagram.

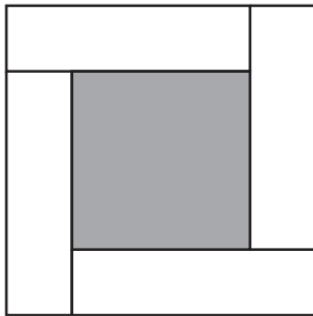
What is the perimeter of one of these pieces?

- A** 8 cm
- B** 12 cm
- C** 16 cm
- D** 20 cm
- E** 24 cm



7

The design below is made of identical white rectangles and a shaded square:



[diagram not to scale]

The width of each rectangle is 4 cm.

The area of each rectangle is 36 cm^2 .

What is the area of the shaded square?

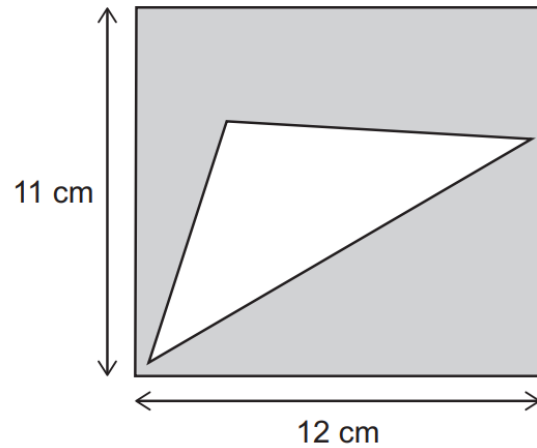
- A** 9 cm^2
- B** 16 cm^2
- C** 25 cm^2
- D** 64 cm^2
- E** 81 cm^2



8

The diagram shows a triangle inside a rectangle.

The area shaded grey is 84 cm^2 .



[diagram not to scale]

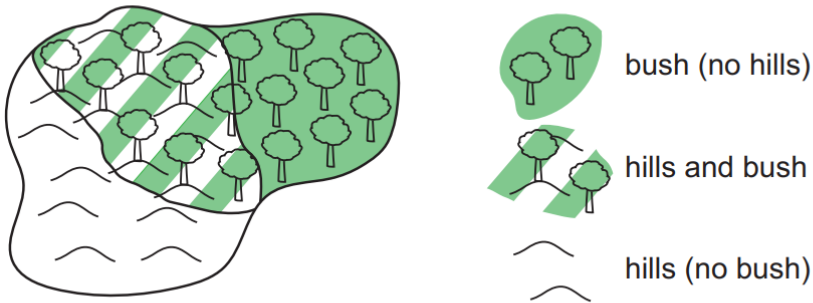
What is the area of the triangle?

- A 33 cm^2
- B 37 cm^2
- C 42 cm^2
- D 48 cm^2
- E 52 cm^2



9

Jedda draws a map of an island showing areas where there are only hills, only bush, or both. These three areas cover the whole island.



The total area of the island is 164 km^2 .

The total area where there are hills is 132 km^2 .

The total area where there is bush is 80 km^2 .

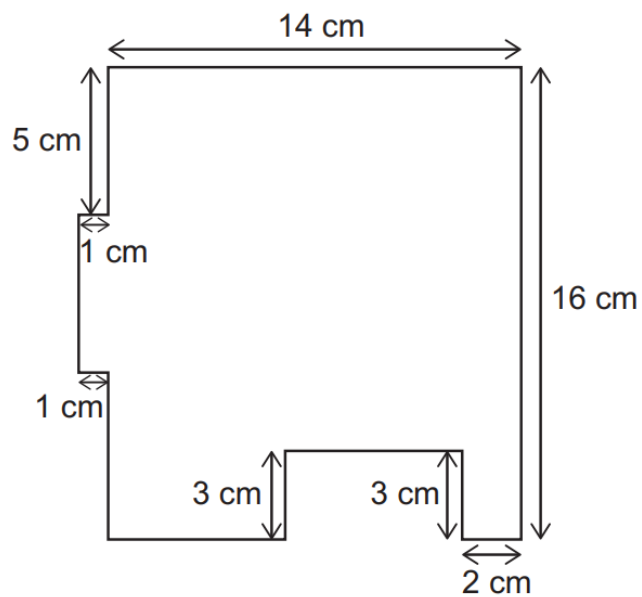
What area of the island has both hills and bush?

- A 24 km^2
- B 32 km^2
- C 48 km^2
- D 52 km^2
- E 84 km^2



10

This shape is made from rectangles.



[diagram not to scale]

What is the perimeter of this shape?

- A 44 cm
- B 52 cm
- C 60 cm
- D 64 cm
- E 68 cm



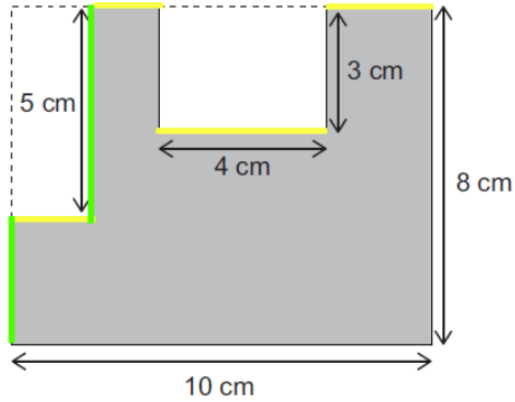
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Answer Key

1	<p>To find the perimeter, we need to work out the total length of the boundary of the shape.</p> <p>We don't know every length but we do know that the highlighted horizontal lines must add up to 10 cm, and the highlighted vertical lines must add up to 8 cm. Then we need to count the bottom and the right of the shape, and the two sides going down into the top of the shape which are each 3 cm long.</p>  <p>So the total perimeter is $10\text{ cm} + 8\text{ cm} + 10\text{ cm} + 8\text{ cm} + 3\text{ cm} + 3\text{ cm} = 42\text{ cm}$. So the correct answer is E 42 cm.</p>
2	<p>To find the area of a rectangle, we multiply the length by the width.</p> <p>Rectangle P has a length of 10 cm and a width of 6 cm so its area is $10 \times 6 = 60\text{ cm}^2$.</p> <p>To find the length of rectangle Q, we have to work out what to multiply 4 cm by to give 60 cm^2. $60 \div 4 = 15$, so $15 \times 4 = 60$. So the length of rectangle Q must be 15 cm, and the correct answer is C 15 cm.</p>



3

The perimeter of shape X is equivalent to four times the length of Harry's rectangle and twice the width.

The perimeter of shape Y is equivalent to four times the length of the rectangle and four times the width.

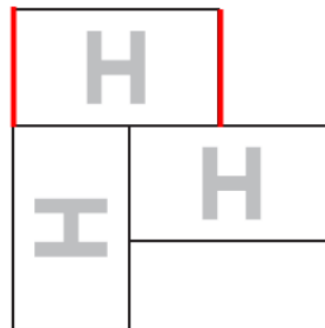
So the difference between the two perimeters is two times the width.

$$82 - 64 = 18$$

$18 \div 2 = 9$. So the width of Harry's rectangle is 9 cm and the correct answer is **E 9 cm**.

Alternatively, we can think about how much the perimeter increases when Harry adds the extra rectangle.

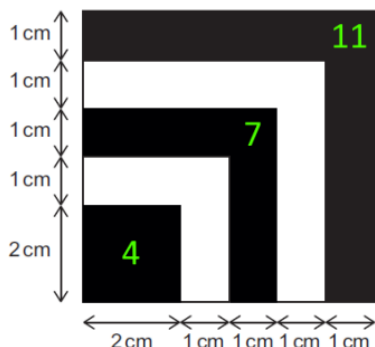
The perimeter added across the top is equivalent to the part of the original perimeter hidden by the extra rectangle, so the only change in perimeter is the two highlighted sections, which is twice the width of the rectangle. So the difference between the original and the new perimeter is twice the width of the rectangle.





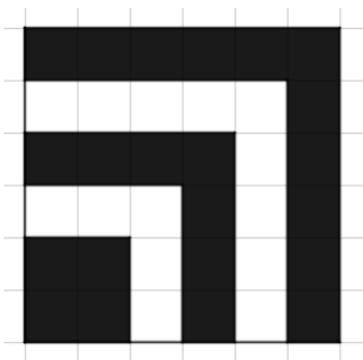
4

The black regions are a 2 by 2 square which has area 4 cm^2 and two L shapes with area 7 cm^2 and 11 cm^2 as shown:



So the total area shaded black is $4 + 7 + 11 = 22$, so the correct answer is **D 22 cm^2** .

Alternatively, the whole shape is a 6 by 6 square with area $6 \times 6 = 36 \text{ cm}^2$. The two white areas are 5 cm^2 and 9 cm^2 , so the black area is $36 - 5 - 9 = 22 \text{ cm}^2$.



Or we could imagine a black 6 by 6 square with a white 5 by 5 square on top of it, and a black 4 by 4 square on top of that and so on. Using square numbers, the area is $36 - 25 + 16 - 9 + 4 = 22 \text{ cm}^2$.

5

E

6

C

7

C

8

D



9	C
10	E