

Name _____

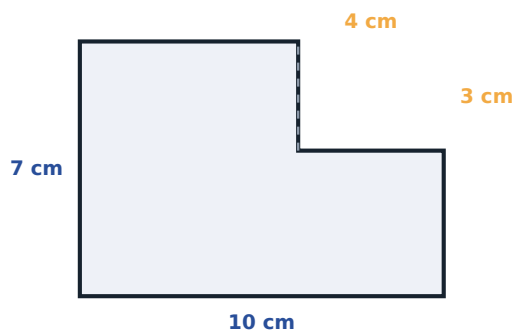
Date _____

15.2 Compound shapes — worked answers

Find the area and perimeter of shapes made from rectangles, by splitting them up or by subtracting from an enclosing rectangle. · 53 questions

A · Fluency — Split it, or subtract from the whole.

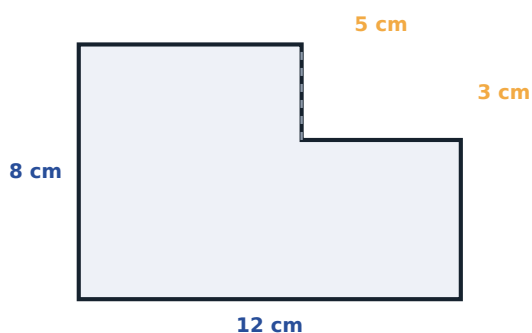
- 1 Find the **area** of this L-shape, in square centimetres.



Answer: 58

Subtract the missing corner from the whole rectangle: $10 \times 7 = 70 \text{ cm}^2$ for the whole, $4 \times 3 = 12 \text{ cm}^2$ for the bite, and $70 - 12 = 58 \text{ cm}^2$.

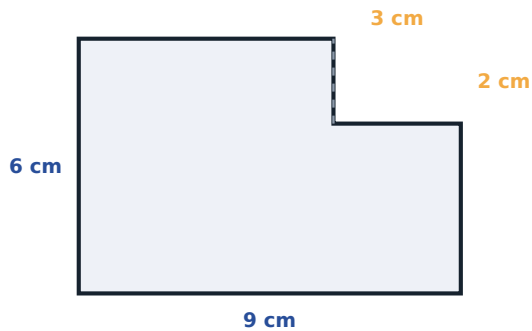
- 2 Find the **area** of this L-shape, in square centimetres.



Answer: 81

Subtract the missing corner from the whole rectangle: $12 \times 8 = 96 \text{ cm}^2$ for the whole, $5 \times 3 = 15 \text{ cm}^2$ for the bite, and $96 - 15 = 81 \text{ cm}^2$.

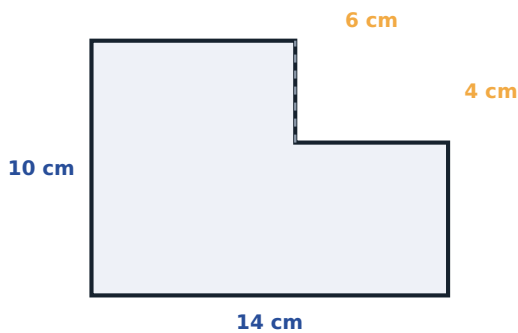
- 3 Find the **area** of this L-shape, in square centimetres.



Answer: 48

Subtract the missing corner from the whole rectangle: $9 \times 6 = 54 \text{ cm}^2$ for the whole, $3 \times 2 = 6 \text{ cm}^2$ for the bite, and $54 - 6 = 48 \text{ cm}^2$.

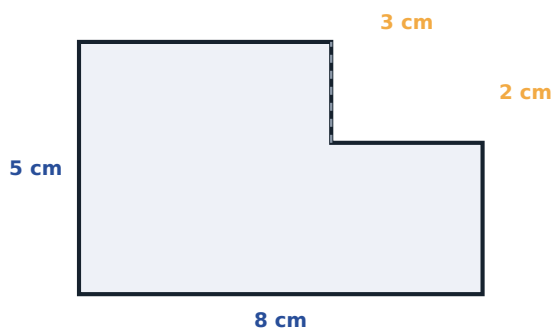
- 4 Find the **area** of this L-shape, in square centimetres.



Answer: 116

Subtract the missing corner from the whole rectangle: $14 \times 10 = 140 \text{ cm}^2$ for the whole, $6 \times 4 = 24 \text{ cm}^2$ for the bite, and $140 - 24 = 116 \text{ cm}^2$.

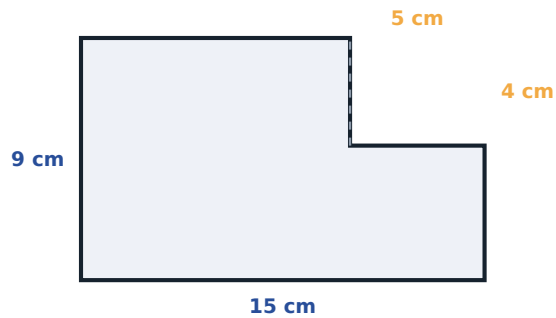
- 5 Find the **area** of this L-shape, in square centimetres.



Answer: 34

Subtract the missing corner from the whole rectangle: $8 \times 5 = 40 \text{ cm}^2$ for the whole, $3 \times 2 = 6 \text{ cm}^2$ for the bite, and $40 - 6 = 34 \text{ cm}^2$.

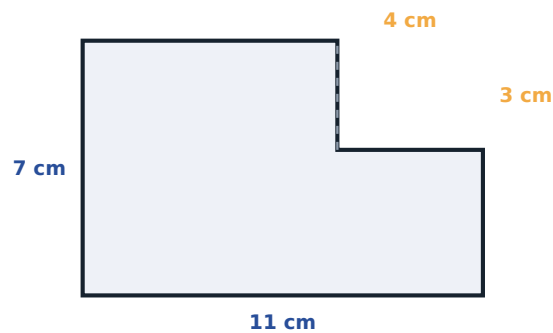
- 6 Find the **area** of this L-shape, in square centimetres.



Answer: 115

Subtract the missing corner from the whole rectangle: $15 \times 9 = 135 \text{ cm}^2$ for the whole, $5 \times 4 = 20 \text{ cm}^2$ for the bite, and $135 - 20 = 115 \text{ cm}^2$.

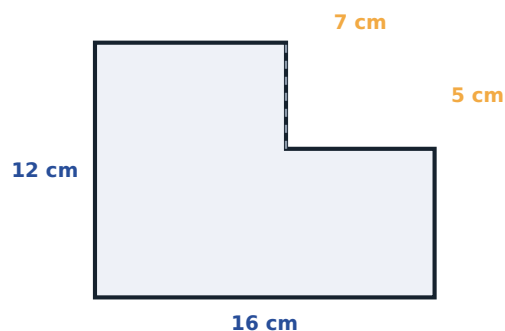
- 7 Find the **area** of this L-shape, in square centimetres.



Answer: 65

Subtract the missing corner from the whole rectangle: $11 \times 7 = 77 \text{ cm}^2$ for the whole, $4 \times 3 = 12 \text{ cm}^2$ for the bite, and $77 - 12 = 65 \text{ cm}^2$.

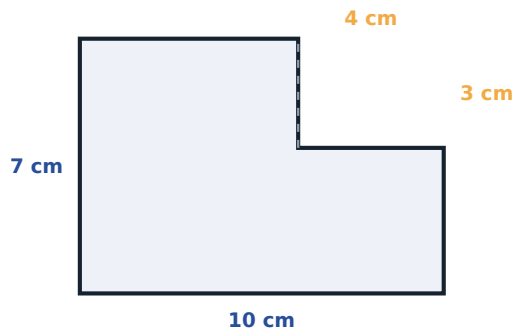
- 8 Find the **area** of this L-shape, in square centimetres.



Answer: 157

Subtract the missing corner from the whole rectangle: $16 \times 12 = 192 \text{ cm}^2$ for the whole, $7 \times 5 = 35 \text{ cm}^2$ for the bite, and $192 - 35 = 157 \text{ cm}^2$.

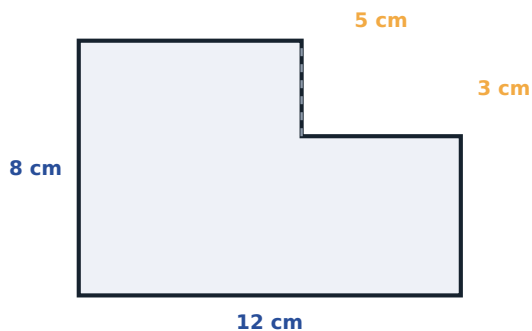
- 9 Find the **perimeter** of this L-shape, in centimetres.



Answer: 34

Walk round it: $10 + 4 + 4 + 3 + 6 + 7 = 34$ cm. It is the same as the perimeter of the whole 10 by 7 rectangle — the two cut edges replace exactly the two they removed.

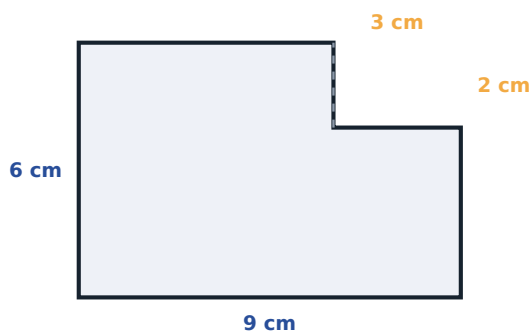
- 10 Find the **perimeter** of this L-shape, in centimetres.



Answer: 40

Walk round it: $12 + 5 + 5 + 3 + 7 + 8 = 40$ cm. It is the same as the perimeter of the whole 12 by 8 rectangle — the two cut edges replace exactly the two they removed.

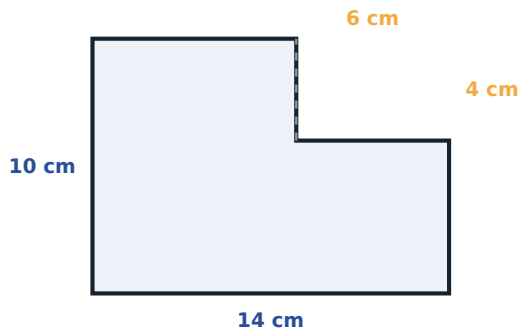
- 11 Find the **perimeter** of this L-shape, in centimetres.



Answer: 30

Walk round it: $9 + 4 + 3 + 2 + 6 + 6 = 30$ cm. It is the same as the perimeter of the whole 9 by 6 rectangle — the two cut edges replace exactly the two they removed.

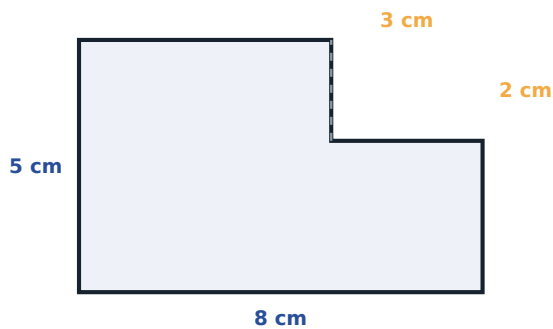
- 12 Find the **perimeter** of this L-shape, in centimetres.



Answer: 48

Walk round it: $14 + 6 + 6 + 4 + 8 + 10 = 48$ cm. It is the same as the perimeter of the whole 14 by 10 rectangle — the two cut edges replace exactly the two they removed.

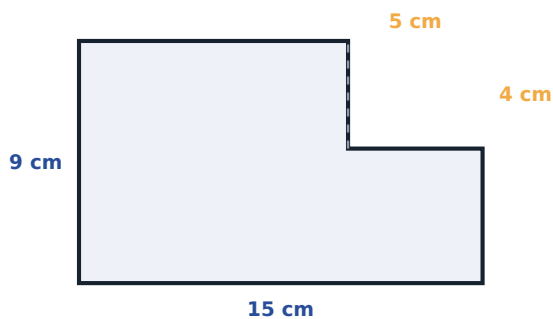
- 13 Find the **perimeter** of this L-shape, in centimetres.



Answer: 26

Walk round it: $8 + 3 + 3 + 2 + 5 + 5 = 26$ cm. It is the same as the perimeter of the whole 8 by 5 rectangle — the two cut edges replace exactly the two they removed.

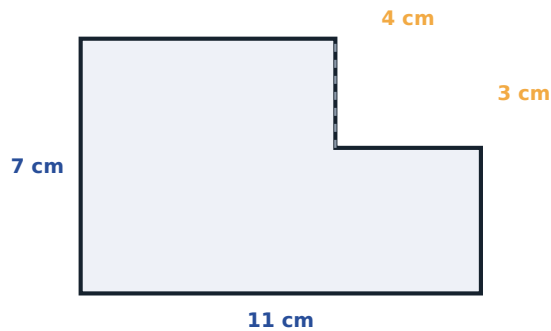
- 14 Find the **perimeter** of this L-shape, in centimetres.



Answer: 48

Walk round it: $15 + 5 + 5 + 4 + 10 + 9 = 48$ cm. It is the same as the perimeter of the whole 15 by 9 rectangle — the two cut edges replace exactly the two they removed.

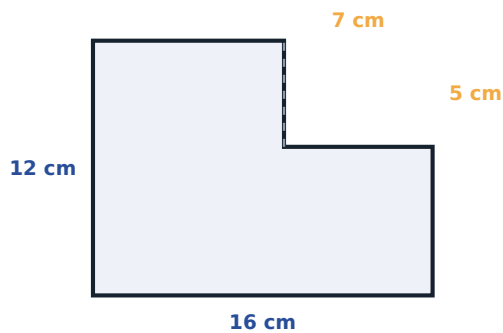
- 15** Find the **perimeter** of this L-shape, in centimetres.



Answer: 36

Walk round it: $11 + 4 + 4 + 3 + 7 + 7 = 36$ cm. It is the same as the perimeter of the whole 11 by 7 rectangle — the two cut edges replace exactly the two they removed.

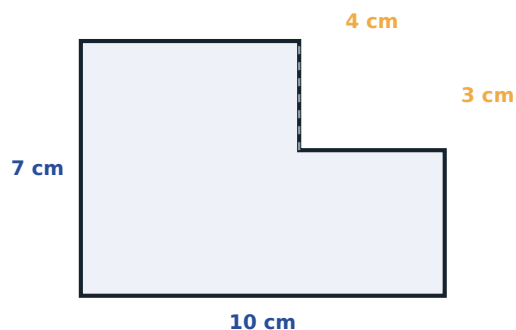
- 16** Find the **perimeter** of this L-shape, in centimetres.



Answer: 56

Walk round it: $16 + 7 + 7 + 5 + 9 + 12 = 56$ cm. It is the same as the perimeter of the whole 16 by 12 rectangle — the two cut edges replace exactly the two they removed.

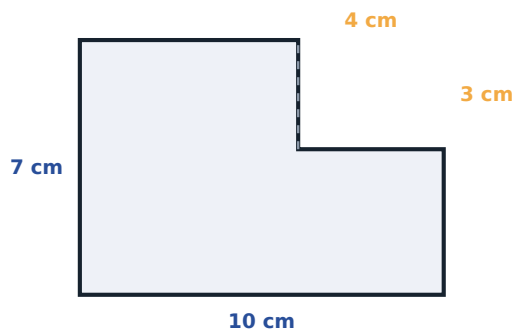
- 17** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 40

The lower rectangle is the full width 10 cm by $7 - 3 = 4$ cm tall: $10 \times 4 = 40$ cm².

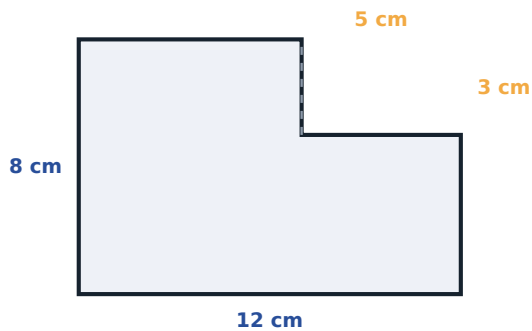
- 18** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 18

The upper rectangle is $10 - 4 = 6$ cm wide and 3 cm tall: $6 \times 3 = 18 \text{ cm}^2$. Adding the two gives $40 + 18 = 58 \text{ cm}^2$, the same as subtracting the corner.

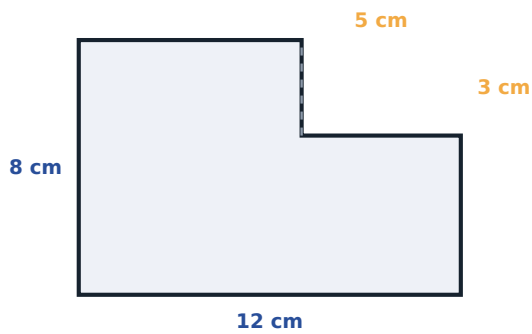
- 19** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 60

The lower rectangle is the full width 12 cm by $8 - 3 = 5$ cm tall: $12 \times 5 = 60 \text{ cm}^2$.

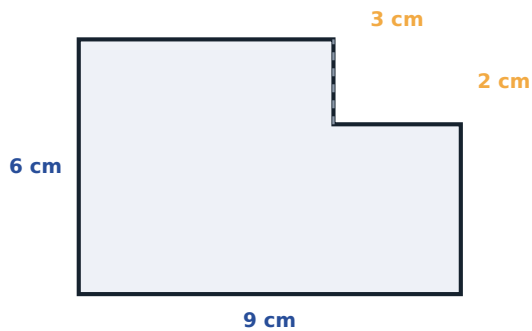
- 20** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 21

The upper rectangle is $12 - 5 = 7$ cm wide and 3 cm tall: $7 \times 3 = 21 \text{ cm}^2$. Adding the two gives $60 + 21 = 81 \text{ cm}^2$, the same as subtracting the corner.

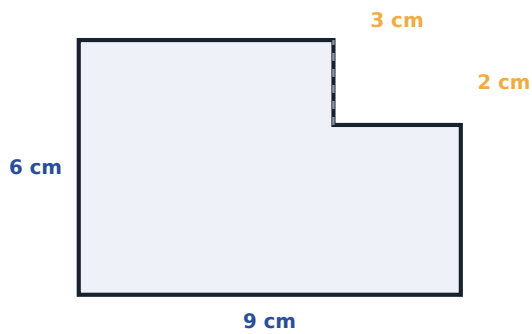
- 21** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 36

The lower rectangle is the full width 9 cm by $6 - 2 = 4$ cm tall: $9 \times 4 = 36 \text{ cm}^2$.

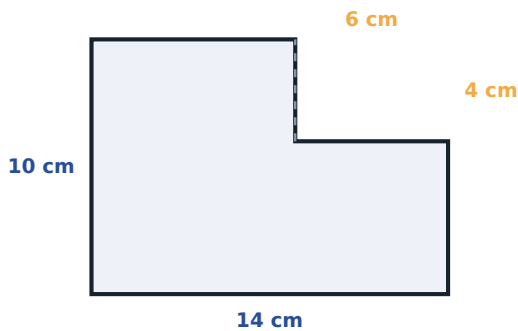
- 22 Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 12

The upper rectangle is $9 - 3 = 6$ cm wide and 2 cm tall: $6 \times 2 = 12 \text{ cm}^2$. Adding the two gives $36 + 12 = 48 \text{ cm}^2$, the same as subtracting the corner.

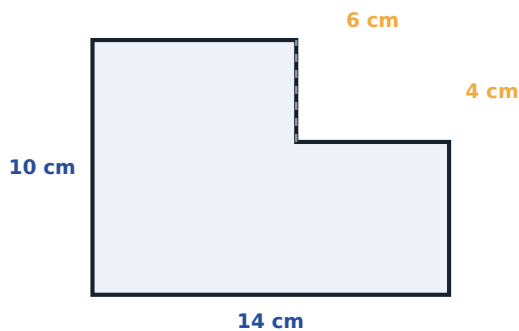
- 23 Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 84

The lower rectangle is the full width 14 cm by $10 - 4 = 6$ cm tall: $14 \times 6 = 84 \text{ cm}^2$.

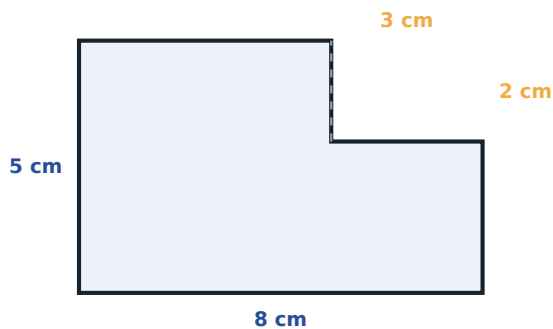
- 24 Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 32

The upper rectangle is $14 - 6 = 8$ cm wide and 4 cm tall: $8 \times 4 = 32 \text{ cm}^2$. Adding the two gives $84 + 32 = 116 \text{ cm}^2$, the same as subtracting the corner.

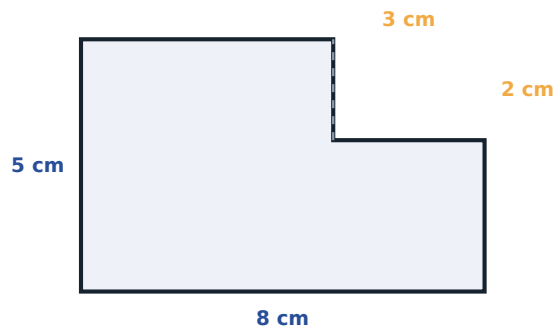
- 25 Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 24

The lower rectangle is the full width 8 cm by $5 - 2 = 3$ cm tall: $8 \times 3 = 24 \text{ cm}^2$.

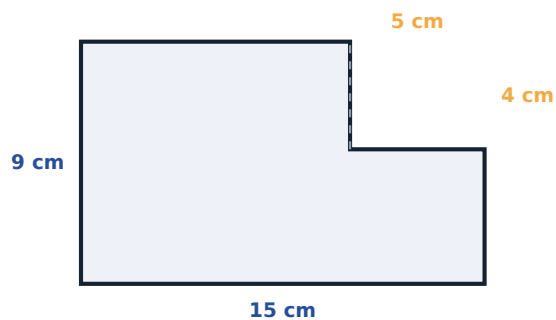
- 26** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 10

The upper rectangle is $8 - 3 = 5$ cm wide and 2 cm tall: $5 \times 2 = 10 \text{ cm}^2$. Adding the two gives $24 + 10 = 34 \text{ cm}^2$, the same as subtracting the corner.

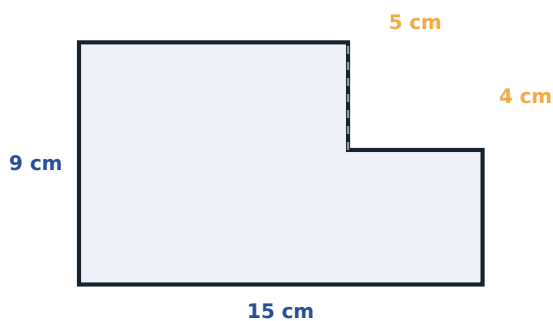
- 27** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **lower** rectangle, in square centimetres?



Answer: 75

The lower rectangle is the full width 15 cm by $9 - 4 = 5$ cm tall: $15 \times 5 = 75 \text{ cm}^2$.

- 28** Split this L-shape into two rectangles with a horizontal cut. What is the area of the **upper** rectangle, in square centimetres?



Answer: 40

The upper rectangle is $15 - 5 = 10$ cm wide and 4 cm tall: $10 \times 4 = 40 \text{ cm}^2$. Adding the two gives $75 + 40 = 115 \text{ cm}^2$, the same as subtracting the corner.

B · Reasoning — Why the two methods agree, and how area and perimeter differ.

- 29** What is a compound shape?
- ☐ A shape with curves
 - ☐ A shape made from simpler shapes joined together
 - ☐ A 3D shape
 - ☐ A shape with equal sides

Answer: A shape made from simpler shapes joined together

Split it into rectangles you can already handle.

- 30** Which two methods both find the area of an L-shape?
- ☐ Split it in two, or subtract the missing corner
 - ☐ Add the sides, or multiply them
 - ☐ Measure it, or guess
 - ☐ Only splitting works

Answer: Split it in two, or subtract the missing corner

They must agree. Doing both is a free check on your answer.

- 31** Does cutting a rectangular corner out of a rectangle change its perimeter?
- ☐ Yes
 - ☐ No

Answer: No

The two new edges are exactly as long as the two they replaced, so the total is unchanged. It surprises most learners.

- 32** Does cutting a corner out of a rectangle change its area?
- ☐ Yes
 - ☐ No

Answer: Yes

The area falls by the area of the piece removed. Area and perimeter behave quite differently here.

33 When you split a compound shape, the areas of the parts ...

- ☐ are multiplied
- ☐ are added
- ☐ are subtracted
- ☐ are averaged

Answer: are added

The pieces do not overlap, so their areas simply total.

34 Why write down every side length before you start?

- ☐ It looks tidy
- ☐ Because the missing ones are found by subtracting, and that is where marks are lost
- ☐ It is not necessary
- ☐ To fill the page

Answer: Because the missing ones are found by subtracting, and that is where marks are lost

An unlabelled side is the commonest cause of a wrong answer here.

35 An L-shape is 10 cm by 7 cm overall with a 4 cm by 3 cm corner removed. Its area is ...

- ☐ 70 cm²
- ☐ 58 cm²
- ☐ 82 cm²
- ☐ 12 cm²

Answer: 58 cm²

$10 \times 7 = 70$ and $4 \times 3 = 12$, so $70 - 12 = 58$ cm².

36 Can a compound shape be split in more than one way?

- ☐ Yes
- ☐ No

Answer: Yes

Horizontally or vertically — both give the same total, which is another way to check.

37 Two learners split the same L-shape differently and get different answers. What follows?

- ☐ Both can be right
- ☐ At least one has made a mistake
- ☐ The shape is wrong
- ☐ It depends on the split

Answer: At least one has made a mistake

The area of a shape does not depend on how you choose to cut it up.

38 The area of a compound shape is measured in ...

- ☐ cm
- ☐ cm²
- ☐ cm³
- ☐ no units

Answer: cm²

It is still an area, however complicated the outline.

C · Challenge — Squares in rows, crosses and borders.

- 39** A rectangle 20 cm by 12 cm has a 6 cm square cut from one corner. What is the remaining area, in square centimetres?
Answer: 204
 $20 \times 12 = 240 \text{ cm}^2$ for the whole and $6 \times 6 = 36 \text{ cm}^2$ for the square, so $240 - 36 = 204 \text{ cm}^2$.
- 40** A rectangular lawn 15 m by 10 m has a rectangular pond 4 m by 3 m in it. What area of grass is left, in square metres?
Answer: 138
 $15 \times 10 = 150 \text{ m}^2$ and $4 \times 3 = 12 \text{ m}^2$, so $150 - 12 = 138 \text{ m}^2$.
- 41** An L-shape is made of a 9 cm by 4 cm rectangle and a 5 cm by 6 cm rectangle joined edge to edge. What is its total area, in square centimetres?
Answer: 66
 $9 \times 4 = 36 \text{ cm}^2$ and $5 \times 6 = 30 \text{ cm}^2$, so $36 + 30 = 66 \text{ cm}^2$.
- 42** A shape is made from three squares of side 5 cm joined in a row. What is its area, in square centimetres?
Answer: 75
Each square is $5 \times 5 = 25 \text{ cm}^2$, and $3 \times 25 = 75 \text{ cm}^2$.
- 43** A shape is made from three squares of side 5 cm joined in a row. What is its perimeter, in centimetres?
Answer: 40
The shape is a 15 cm by 5 cm rectangle, so the perimeter is $2 \times (15 + 5) = 40 \text{ cm}$ — not 3×20 , because the joins are inside.
- 44** A cross is made from five 3 cm squares. What is its area, in square centimetres?
Answer: 45
Each square is $3 \times 3 = 9 \text{ cm}^2$, and $5 \times 9 = 45 \text{ cm}^2$.
- 45** A room is an L-shape: 8 m by 5 m with a 3 m by 2 m corner taken out. What area of flooring is needed, in square metres?
Answer: 34
 $8 \times 5 = 40 \text{ m}^2$ and $3 \times 2 = 6 \text{ m}^2$, so $40 - 6 = 34 \text{ m}^2$.

D · Word problems — Patios, walls, car parks and mounts.

- 46** A patio is 12 m by 8 m with a 3 m by 3 m flower bed cut out of one corner. What area is paved, in square metres?
Answer: 87
 $12 \times 8 = 96 \text{ m}^2$ and $3 \times 3 = 9 \text{ m}^2$, so $96 - 9 = 87 \text{ m}^2$.
- 47** A rectangular sheet of card 30 cm by 20 cm has a 10 cm by 8 cm rectangle cut from it. What area of card remains, in square centimetres?
Answer: 520
 $30 \times 20 = 600 \text{ cm}^2$ and $10 \times 8 = 80 \text{ cm}^2$, so $600 - 80 = 520 \text{ cm}^2$.
- 48** A wall 5 m by 3 m has a window 2 m by 1 m. What area is painted, in square metres?
Answer: 13
 $5 \times 3 = 15 \text{ m}^2$ and $2 \times 1 = 2 \text{ m}^2$, so $15 - 2 = 13 \text{ m}^2$.

- 49** A car park is 40 m by 25 m with a 10 m by 10 m building on it. What area is left for cars, in square metres?

Answer: 900

$40 \times 25 = 1000 \text{ m}^2$ and $10 \times 10 = 100 \text{ m}^2$, so $1000 - 100 = 900 \text{ m}^2$.

- 50** A picture 20 cm by 15 cm is mounted with a 3 cm border all round. What is the area of the mount and picture together, in square centimetres?

Answer: 546

The outside is $20 + 6 = 26 \text{ cm}$ by $15 + 6 = 21 \text{ cm}$, so the area is $26 \times 21 = 546 \text{ cm}^2$.

- 51** A picture 20 cm by 15 cm is mounted with a 3 cm border all round. What is the area of the border alone, in square centimetres?

Answer: 246

The whole is $26 \times 21 = 546 \text{ cm}^2$ and the picture is $20 \times 15 = 300 \text{ cm}^2$, so the border is $546 - 300 = 246 \text{ cm}^2$.

- 52** A garden path 2 m wide runs along one 12 m side of a rectangular garden. What is the area of the path, in square metres?

Answer: 24

$12 \times 2 = 24 \text{ m}^2$.

- 53** A kitchen floor is an L-shape: 6 m by 4 m with a 2 m by 2 m corner taken out. Tiles cost \$12 per square metre. What is the total cost, in dollars?

Answer: 240

The floor is $6 \times 4 = 24 \text{ m}^2$ less $2 \times 2 = 4 \text{ m}^2$, so 20 m^2 . $20 \times 12 = 240$ dollars.