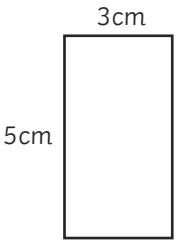
Area and Perimeter Murder Mystery

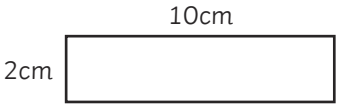
Calculate the perimeters of the shapes to find the weapon that was used.

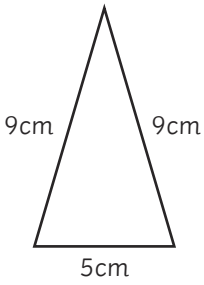
Add together all the perimeters.

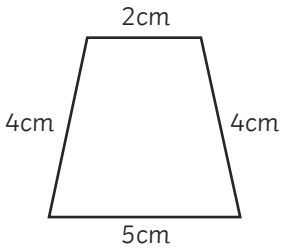
If your answer is:

- 66cm, then the murder weapon is a pencil;
- 78cm, then the murder weapon is a ruler;
- 90cm, then the murder weapon is a protractor;
- 102cm, then the murder weapon is a set square.





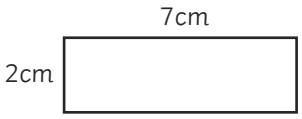


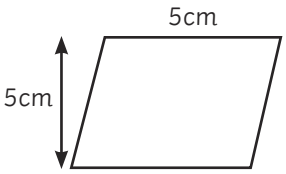


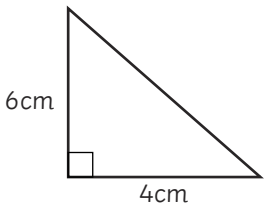
Calculate the areas of the shapes to find the name of the murderer.

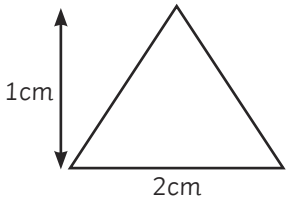
Calculate the area of each shape.

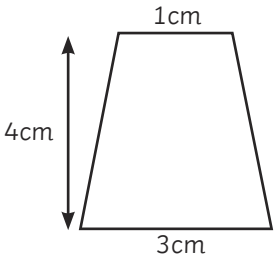
Then, using the alphabet so that A = 1, B = 2, C = 3 and so on, find the name of the person who committed the murder.









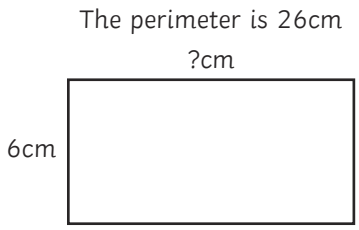


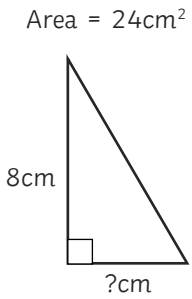
Find the missing numbers to find when the murder occurred.

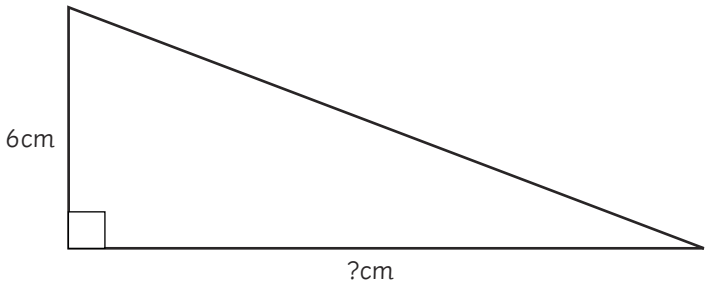
The **day** is given by the missing length of the rectangle.

The **month** is given by the missing length of the small triangle.

The **year** is given by the missing length of the large triangle.





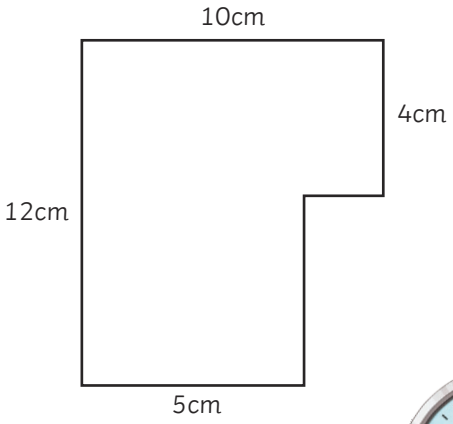


The area is 30cm²

Find the missing numbers to find where the murder occurred.

If the area is:

- 120cm², the murder occurred in Canary Wharf;
- 80cm², the murder occurred in Notting Hill;
- 100cm², the murder occurred in Leicester Square.



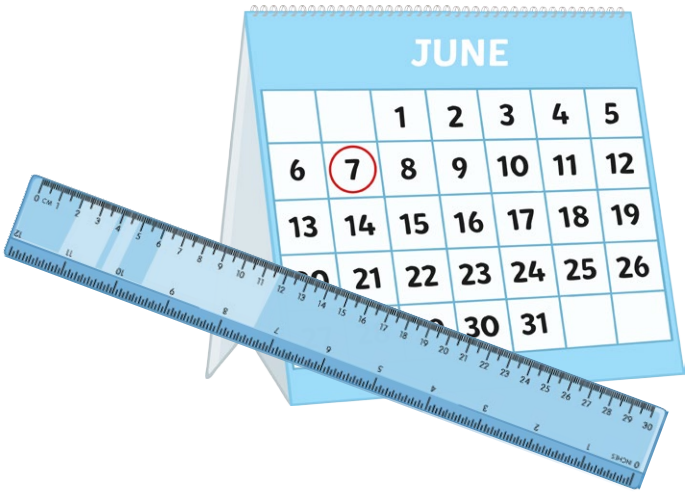
Area and Perimeter Murder Mystery Answers

The murder weapon was a ruler.

The murderer's name was Nylah.

The date of the murder was 7th June 2010.

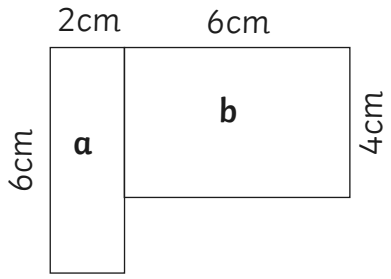
The murder occurred in Notting Hill.



Area of Composite Shapes

Calculate the area of each rectangle, then calculate the area of the whole compound shape.

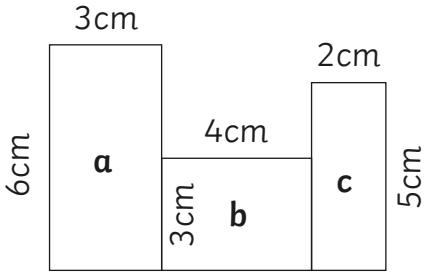
1.



Area a: _____ cm^2

Area b: _____ cm^2 **Total:** _____ cm^2

2.

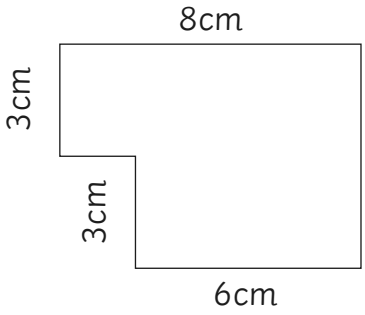


Area a: _____ cm^2 **Area c:** _____ cm^2

Area b: _____ cm^2 **Total:** _____ cm^2

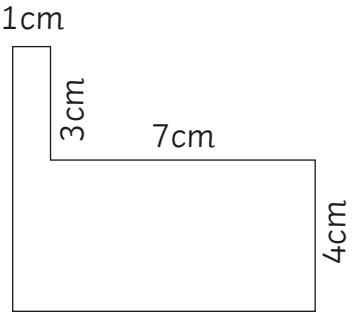
Identify the shapes where the area can be calculated. Calculate the area of each compound shape.

3.



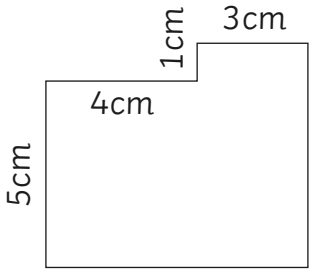
Total: _____

4.



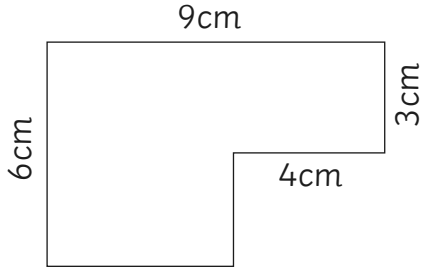
Total: _____

5.



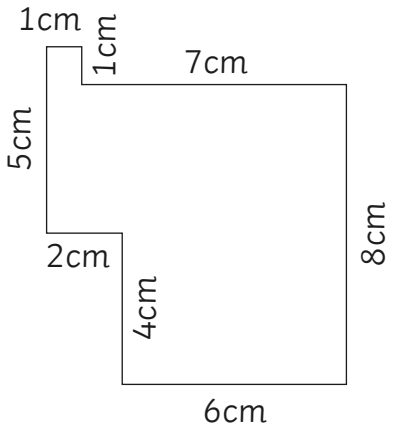
Total: _____

6.



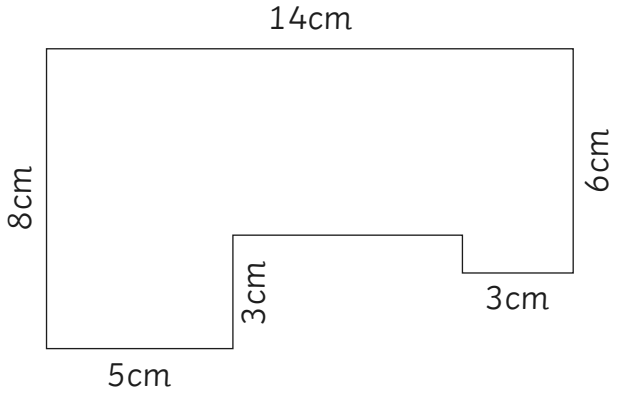
Total: _____

7.



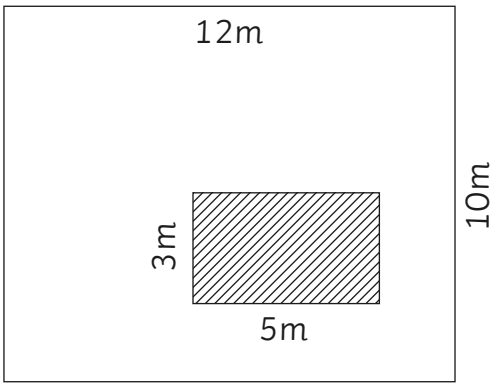
Total: _____

8.



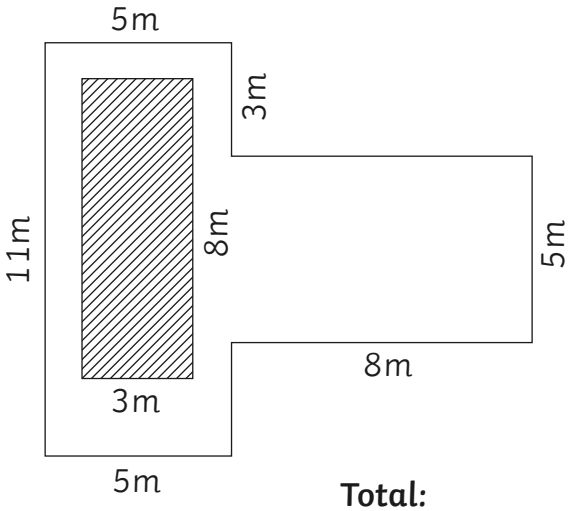
Total: _____

9.



Total: _____

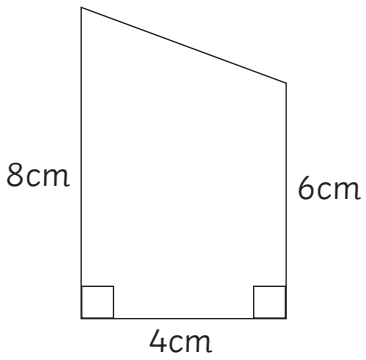
10.



Total: _____

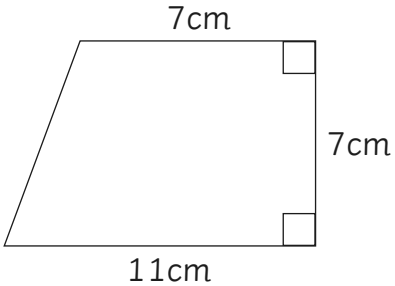
For each of the following questions, calculate the area of the shapes. Remember to write the units in your answer.

11.



Area: _____

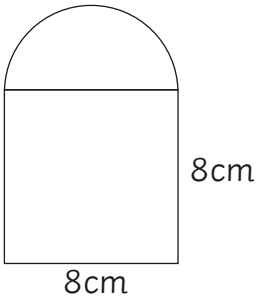
12.



Area: _____

13.

A semicircle is attached to a square. Leave your answer in terms of π.

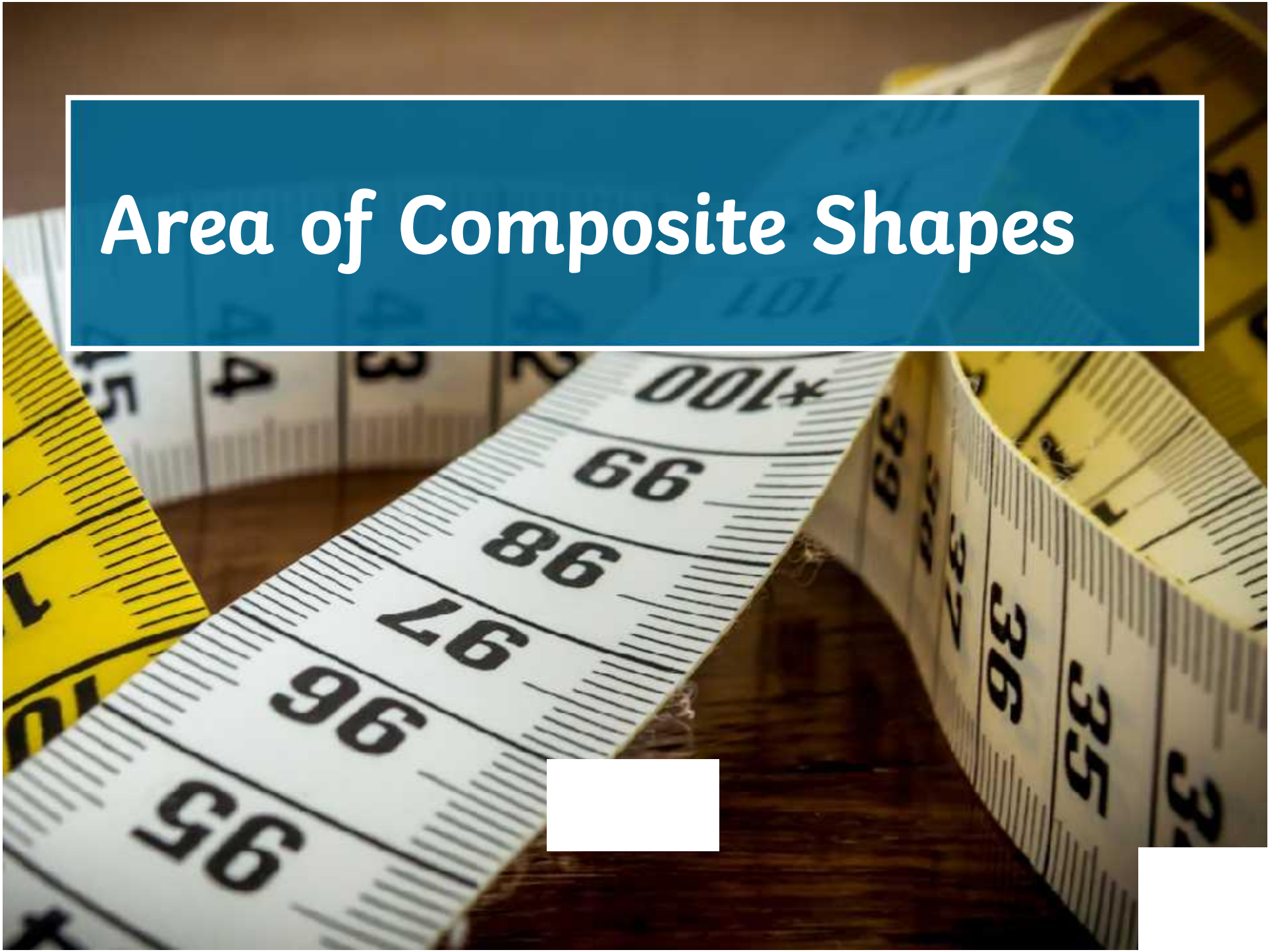


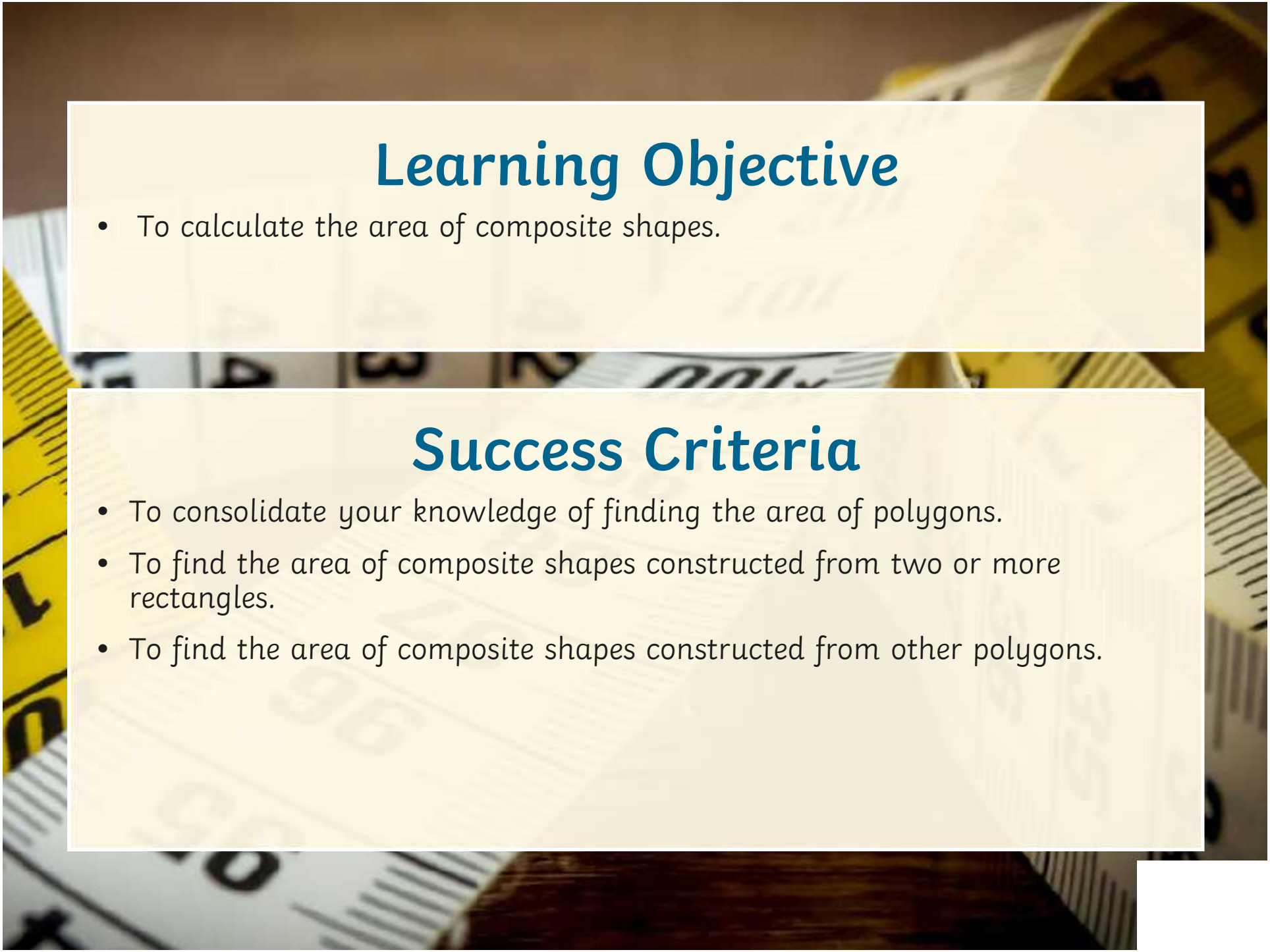
Area: _____

Area of Composite Shapes Answers

1. Area a: **12cm²** Area b: **24cm²** Total: **36cm²**
2. Area a: **18cm²** Area b: **12cm²** Area c: **10cm²** Total: **40cm²**
3. Total: **42cm²**
4. Total: **35cm²**
5. Total: **38cm²**
6. Total: **42cm²**
7. Total: **57cm²**
8. Total: **88cm²**
9. Total: **105cm²**
10. Total: **71cm²**
11. Total: **28cm²**
12. Total: **63cm²**
13. Total: **(64 + 8π)cm²**

Area of Composite Shapes





Learning Objective

- To calculate the area of composite shapes.

Success Criteria

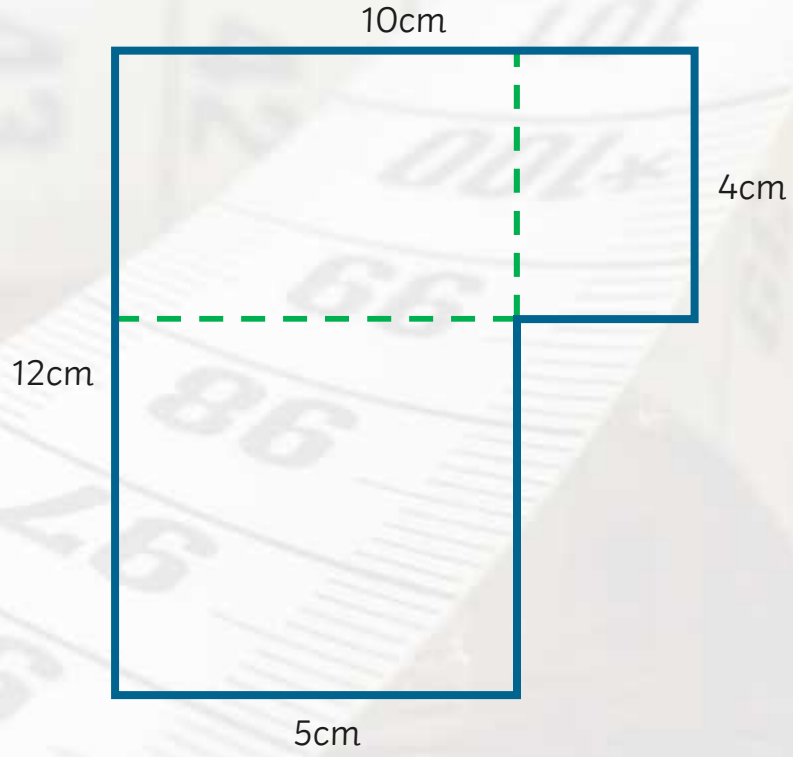
- To consolidate your knowledge of finding the area of polygons.
- To find the area of composite shapes constructed from two or more rectangles.
- To find the area of composite shapes constructed from other polygons.

Starter – Murder Mystery

Complete the murder mystery to recap how to calculate the area and perimeter of polygons.

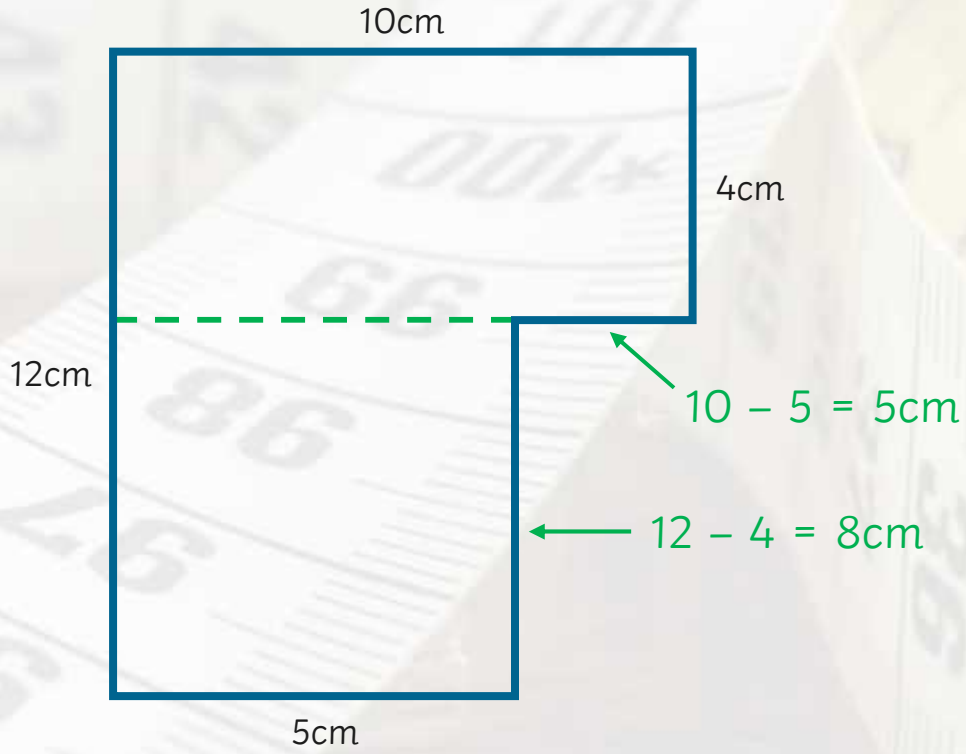
Think, Pair, Share

This is called a **composite** or **compound** shape, because it is made up of two (or more) different shapes. What are they?



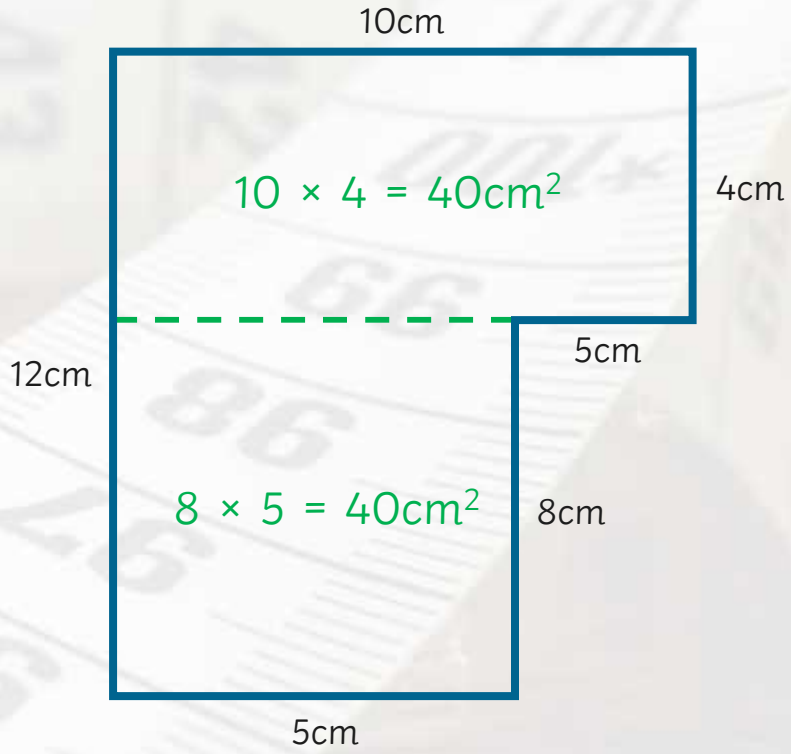
Think, Pair, Share

Can you find the missing lengths?



Think, Pair, Share

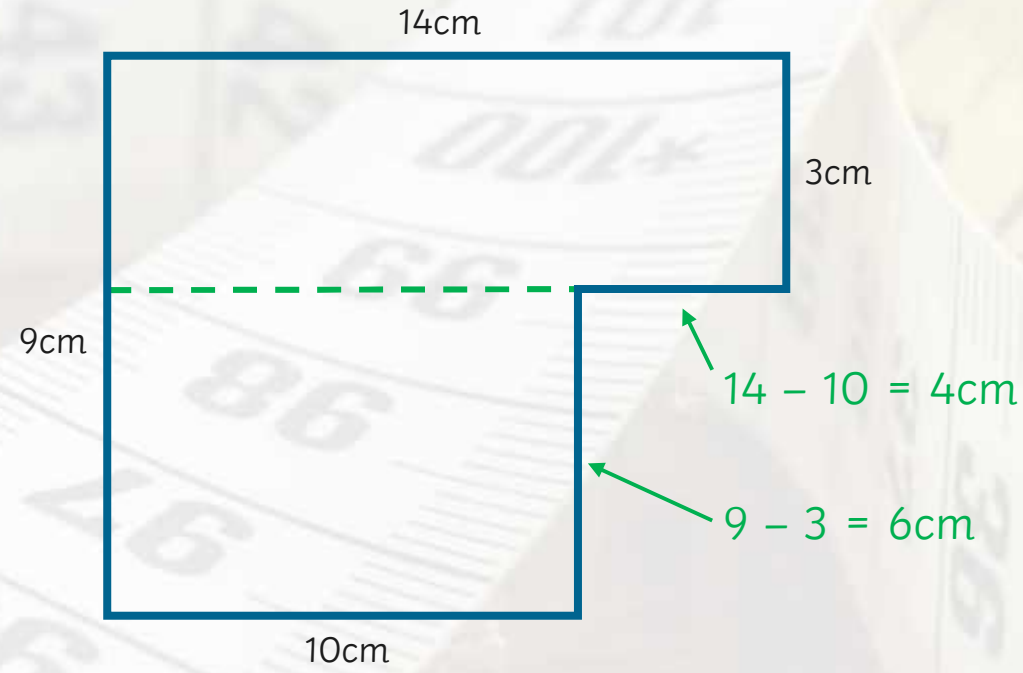
Now find the area of the composite shape.



Total area = **40cm² + 40cm² = 80cm²**

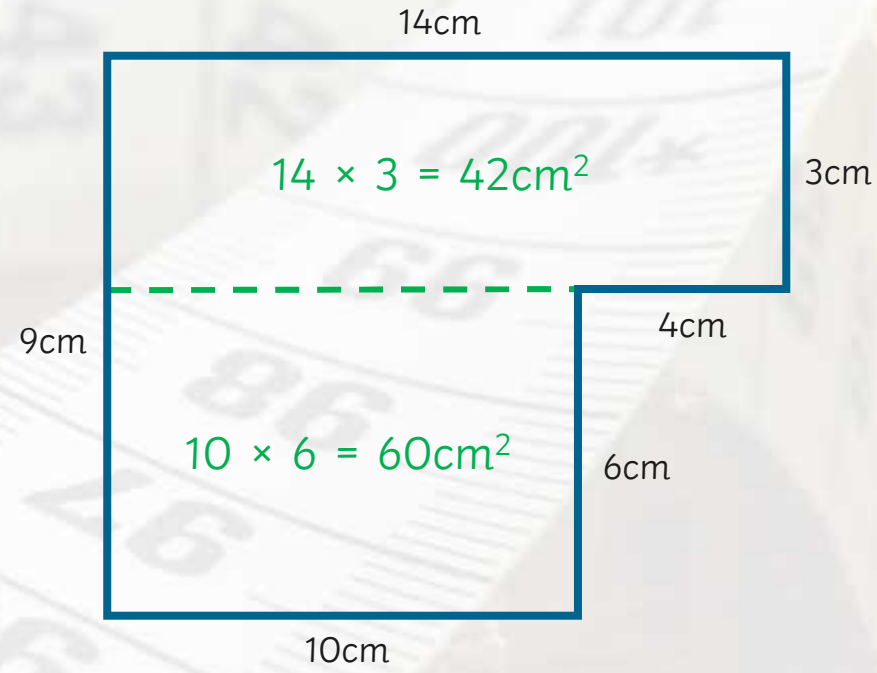
Think, Pair, Share

Find the area of this shape. Be ready to share your ideas with the class!



Think, Pair, Share

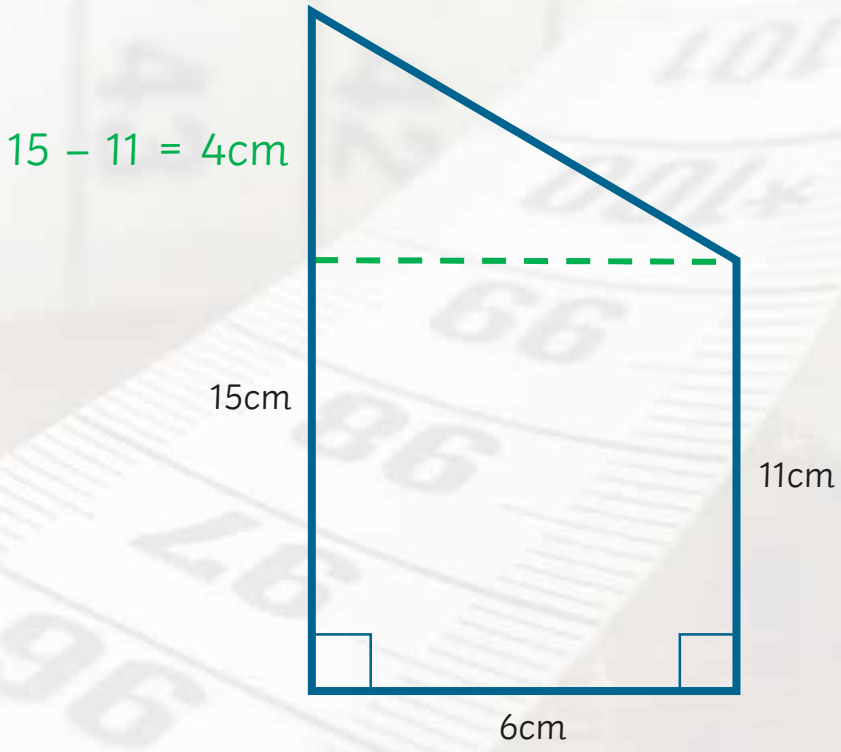
Find the area of this shape. Be ready to share your ideas with the class!



Total area = **42cm² + 60cm² = 102cm²**

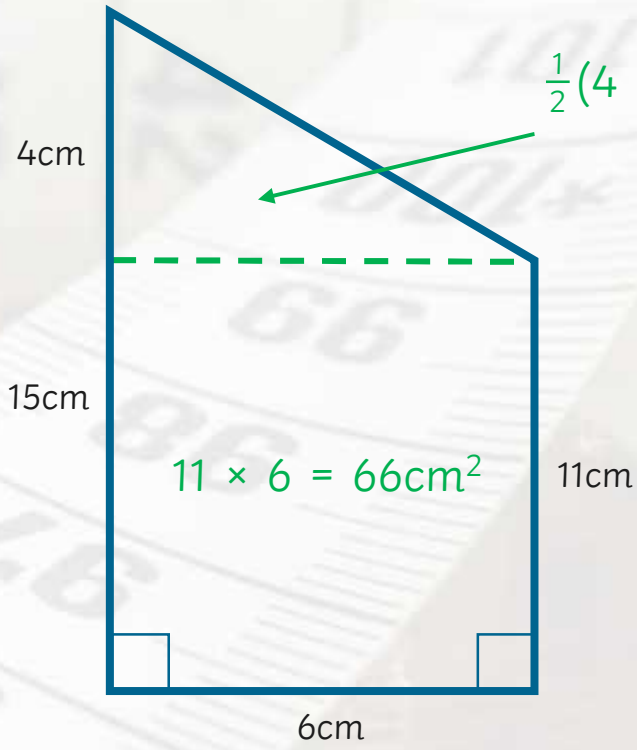
Think, Pair, Share

Find the area of this shape. Be ready to share your ideas with the class!



Think, Pair, Share

Find the area of this shape. Be ready to share your ideas with the class!

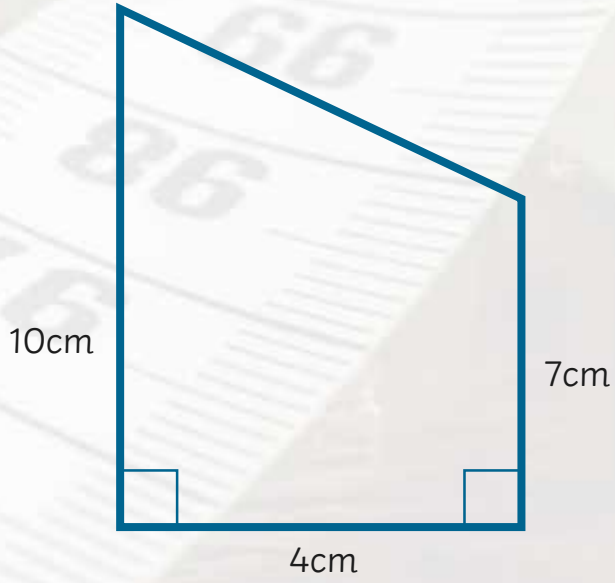


Total area = **$12cm^2$ + $66cm^2$ = $78cm^2$**

Your Turn

Calculate the area of the composite shape, showing all stages of your working and giving the correct units.

Extension:
Find the perimeter of this shape. What other skill will you need to use?



Answers

Area

$7 \times 4 = 28cm^2$

$1/2(3 \times 4) = 6cm^2$

$28cm^2 + 6cm^2 = 34cm^2$

Extension:

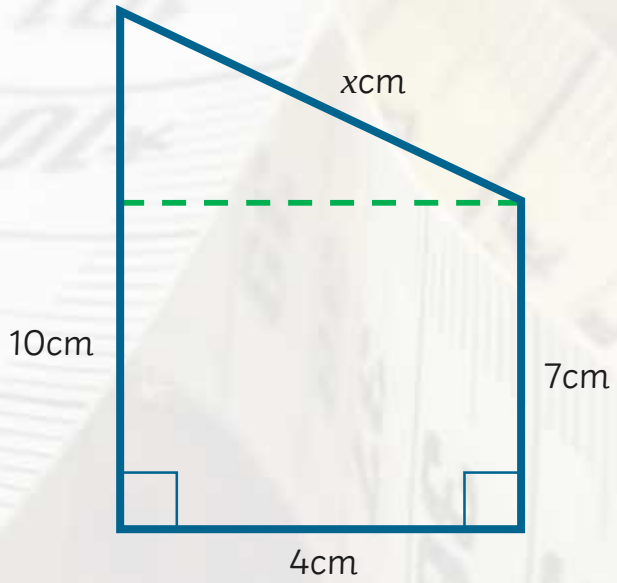
You need to use Pythagoras' Theorem to find the missing length.

$3^2 + 4^2 = x^2$

$25 = x^2$

$5 = x$

So the perimeter is 26cm.

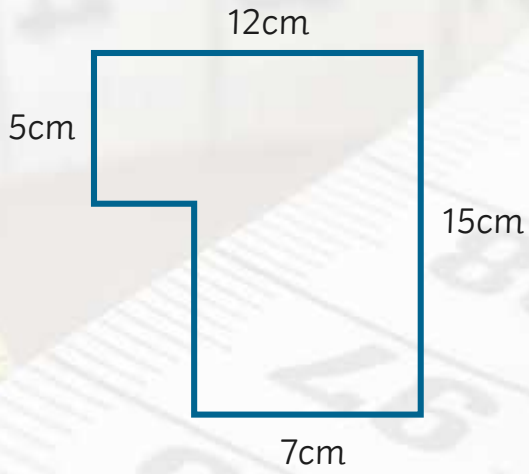


Spot the Mistakes

Below are some common mistakes. How many mistakes can you and your partner spot?

Find the areas of the composite shapes.

1.



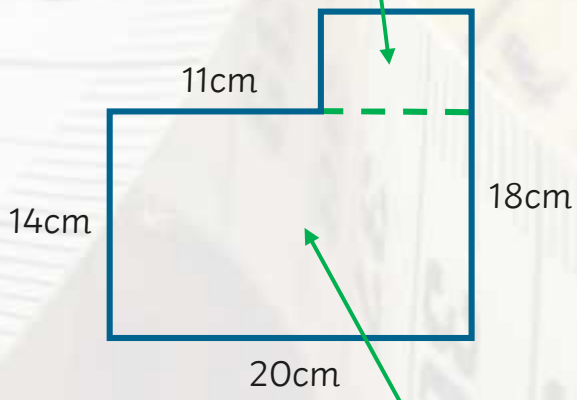
$12 \times 5 = 60$

$15 \times 7 = 105$

$105 + 60 = 165cm^2$

2.

20 ÷ 2 = 10 then 10 × 9 = 90

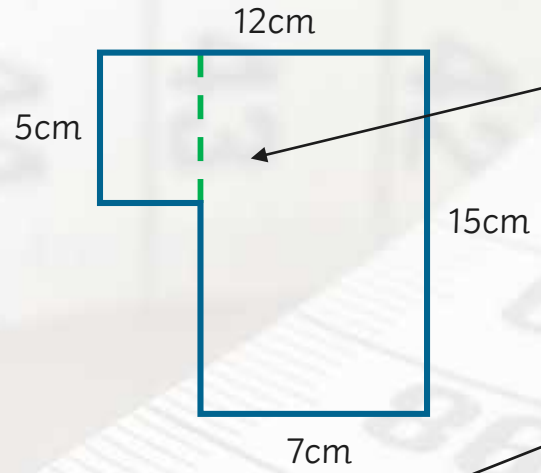


18 ÷ 2 = 9 then 20 × 9 = 180

$180 + 90 = 270cm^2$

Answers

1.



They have not split the shape up.

They have not worked out the differences between the two parallel sides.

$12 \times 5 = 60$
$15 \times 7 = 105$
$105 + 60 = 165cm^2$

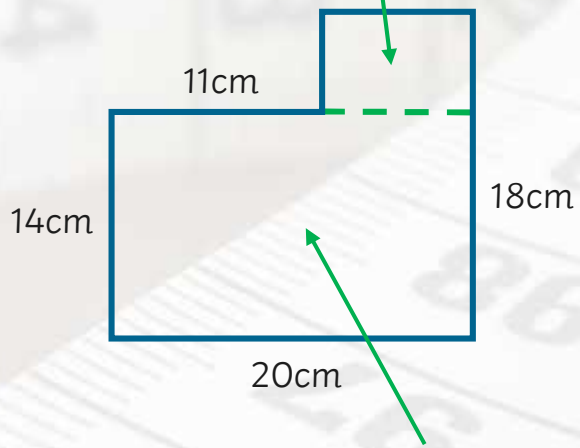
The correct answer is:

$12 - 7 = 5cm$
$5 \times 5 = 25cm^2$
$7 \times 15 = 105cm^2$
Total area $= 25 + 105 = 130cm^2$

Answers

20 ÷ 2 = 10 then 10 × 9 = 90

2.



18 ÷ 2 = 9 then 20 × 9 = 180

180 + 90 = 270cm^2

They have incorrectly worked out the missing lengths by halving the long sides.

The correct answer is:

18 – 14 = 4
20 – 11 = 9
20 × 14 = 280cm^2
4 × 9 = 36cm^2
Total Area = 280 + 36 = 316cm^2

Finding Areas of Composite Shapes
Teaching Ideas

Learning Objective:	To calculate the area of composite shapes.
Success Criteria:	• To consolidate your knowledge of finding the area of polygons. • To find the area of composite shapes constructed from two or more rectangles. • To find the area of composite shapes constructed from other polygons.
Context:	This lesson looks at breaking down composite shapes into recognisable polygons. Your KS3 students should already have a good understanding of how to find the area of simple polygons – rectangles, triangles, parallelograms and trapeziums.

Starter

Murder Mystery

Students can work in pairs or independently to complete the **Area and Perimeter Murder Mystery Activity Sheet**. Answers included. This task should take approximately 15 minutes and is designed to recap how to calculate simple areas and perimeters.

Main Activities

Think, Pair, Share

Display the final example from the murder mystery on the board. Students should discuss with their partner what they think they might need to do to find the area of the shape. Show students how the shape can be split into two rectangles, either vertically or horizontally (remember to emphasise that it doesn't matter which option you choose, as you'll get the correct answer either way). Emphasise the fact that rectangles have parallel lines, which will help figure out the missing lengths.

Think, Pair, Share

Discuss the remaining examples as a class. You could encourage the students to find the area of the largest, simplest shape within the composite shape and work from there. For higher ability students, you could ask them to find the area of the composite shapes by subtracting the missing areas from larger shapes.

For the third and fourth examples, encourage the students to find a way of splitting the trapezium into simpler shapes. If they can recall the formula for a trapezium, they could use this to check their answer.

Your Turn

Students complete each question on the **Area of Composite Shapes Activity Sheet** (you might want to display the sheet or print just enough for one between two to save on photocopying costs). Extension included to find the perimeter of a composite shape with Pythagoras' Theorem.

Plenary

Spot the Mistakes

Designed to be completed in pairs and draw out common misconceptions. The most common ones include: finding the missing length by halving, rather than subtracting; and forgetting to split the shape up. You should ask the class to explain, in their own words, what mistakes have been made, and write the correct answers.