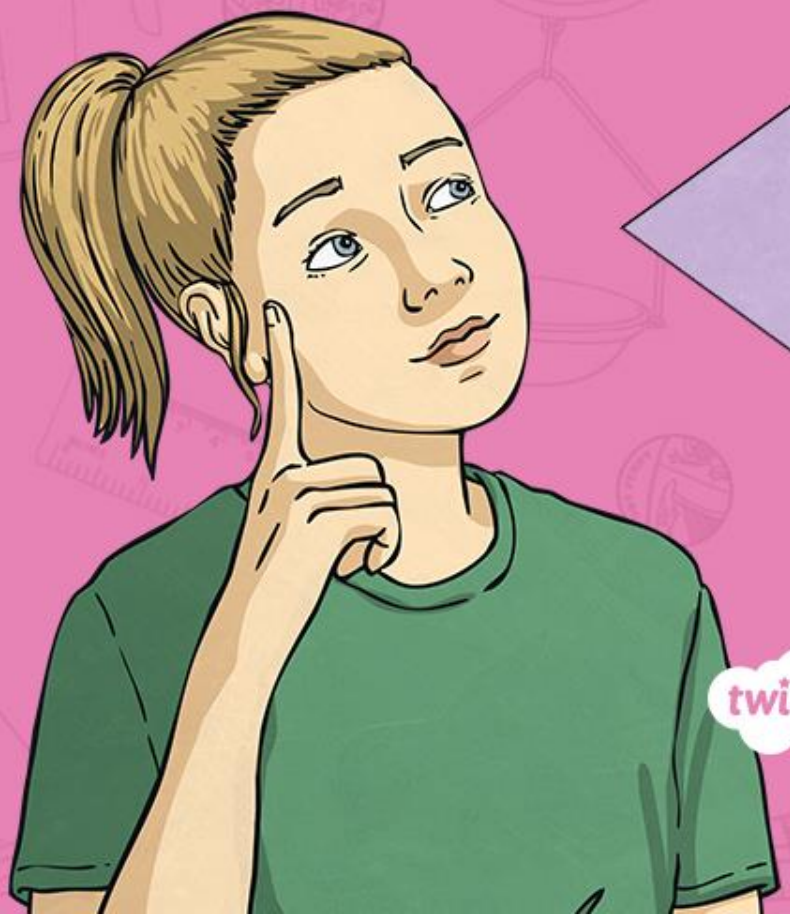
Maths

Measurement

Area of Triangles and Parallelograms Reasoning



Aim

I can solve reasoning questions involving calculating the area of triangles and parallelograms.

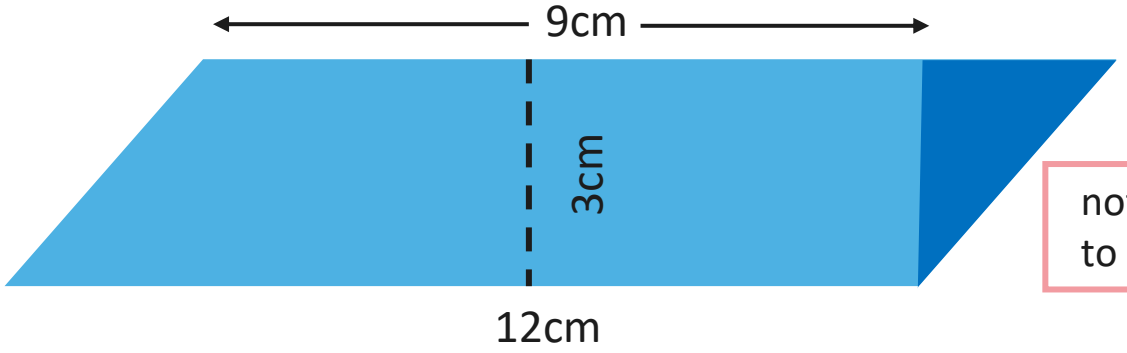
Success Criteria

- I can break down complex problems into smaller steps.
- I can use mathematical language to explain solutions to problems.

Guided Maths Question 1

Read this reasoning question carefully.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



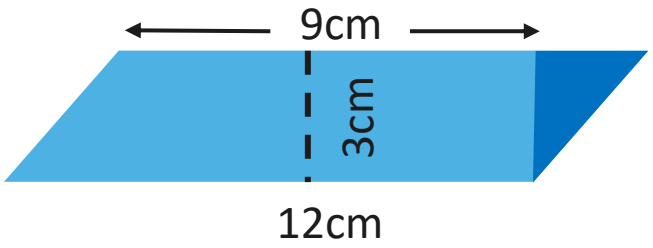
not drawn to scale

Let's highlight the important information and key vocabulary to show we **understand** the question.

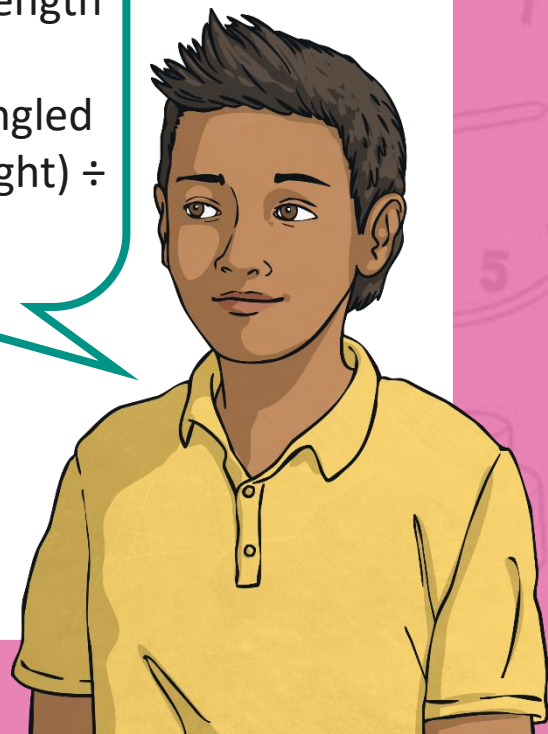
Guided Maths Question 1

Next, let's think about what we **already know** in order to help us answer the question correctly.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



I know the area of a parallelogram is the length × height.
The area of a right-angled triangle is (base × height) ÷ 2.

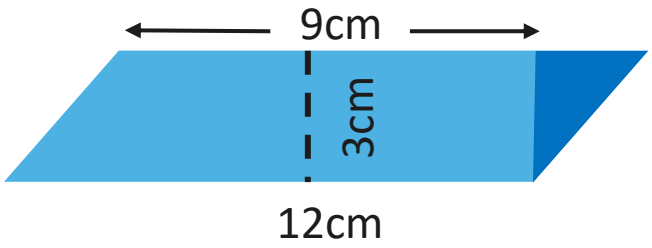


Guided Maths Question 1

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



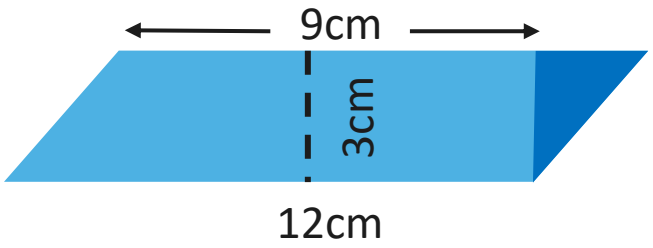
The area of the parallelogram
= 12cm × 3cm = **36cm²**

Guided Maths Question 1

Whole Class

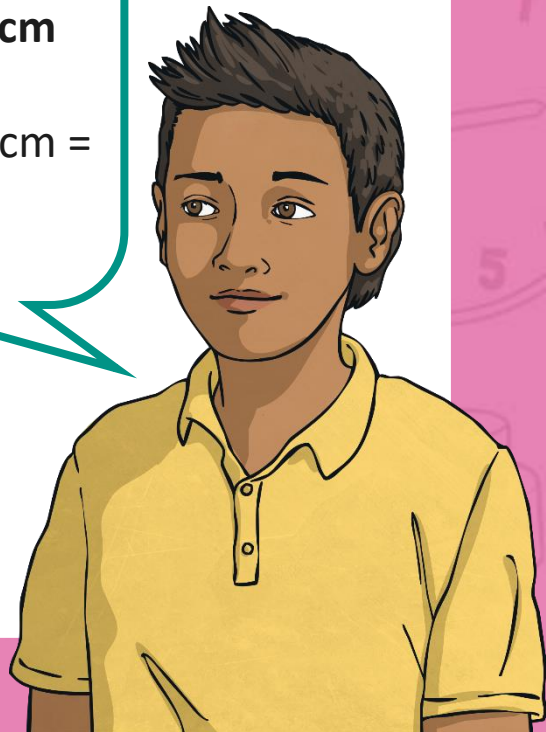
Now we are ready to **apply our learning** to solve the question.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



The height of the right-angled triangle = **3cm**

The base = 12cm – 9cm = **3cm**.

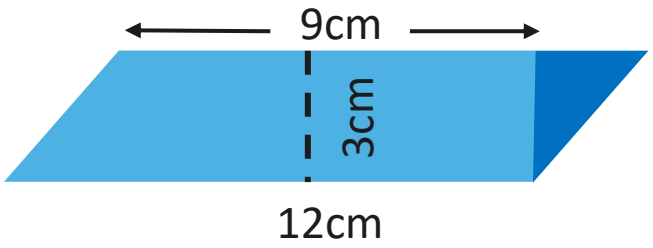


Guided Maths Question 1

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



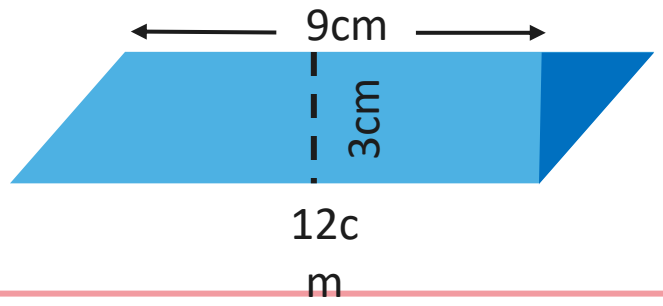
The area of the right-angled triangle =
(3cm × 3cm) ÷ 2 =
4.5cm²

Guided Maths Question 1

Whole Class

Let's double check our calculations to ensure the answers are correct.

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



Parallelogram area =
3cm × 12cm = **36cm²**

Triangle area =
(3 × 3cm) ÷ 2 = **4.5cm²**

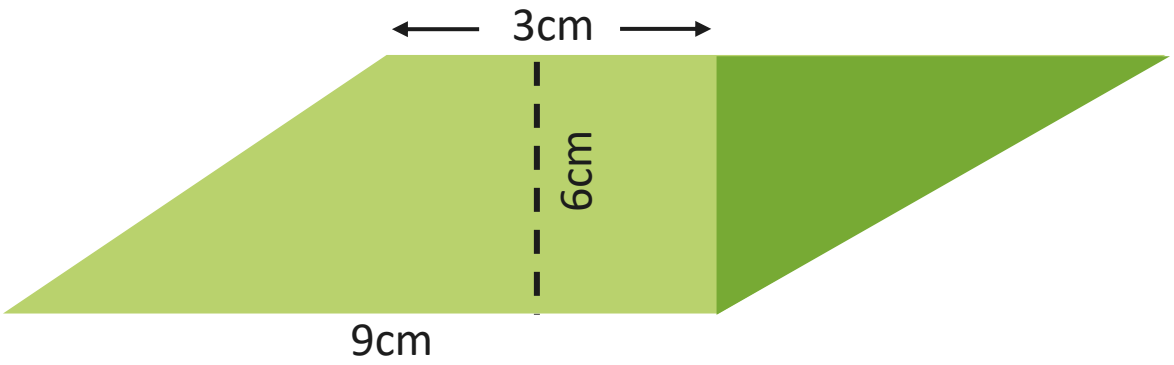
Answer:

The area of the parallelogram = 36cm²
The area of the right-angled triangle = 4.5cm²

Partner Maths Question 1

Working with a partner, use your reasoning skills to answer this question

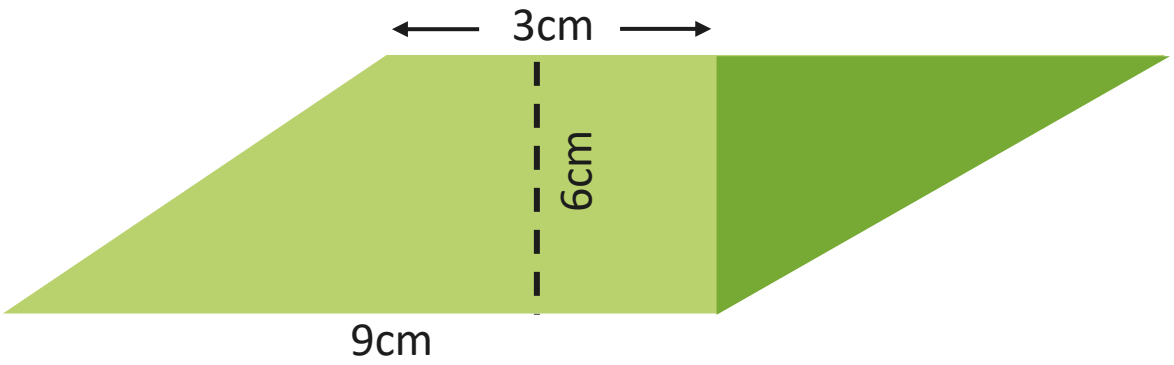
Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



Partner Maths Question 1

Working with a partner, use your reasoning skills to answer this question

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.

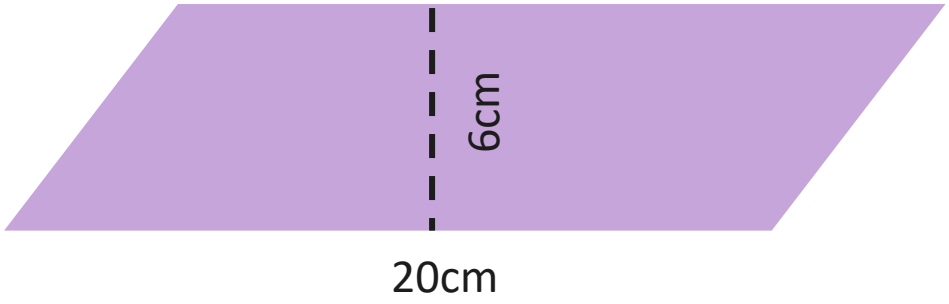


Area of parallelogram = 54cm²
Area of right-angled triangle = 18cm²

Guided Maths Question 2

Read this reasoning question carefully.

Give the dimensions of a triangle which would have the same area as this parallelogram.



Let's highlight the important information and key vocabulary to show we **understand** the question.

Guided Maths Question 2

Whole Class

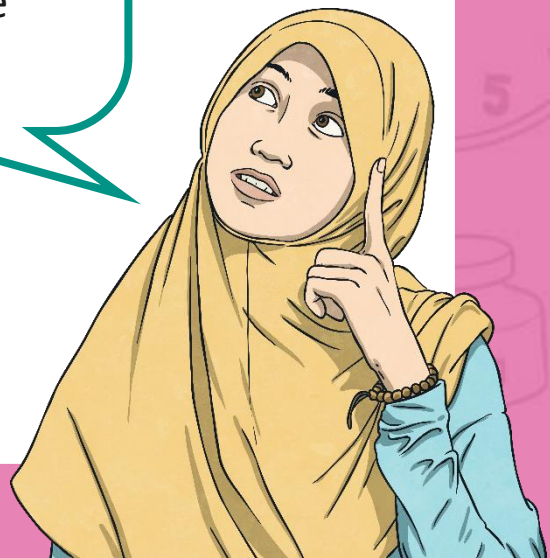
Next, let's think about what we **already know** in order to help us answer the question correctly.

Give the dimensions of a triangle which would have the same area as this parallelogram.

20cm

The parallelogram has an area of 120cm².

The area of the triangle would need to be the same.



Guided Maths Question 2

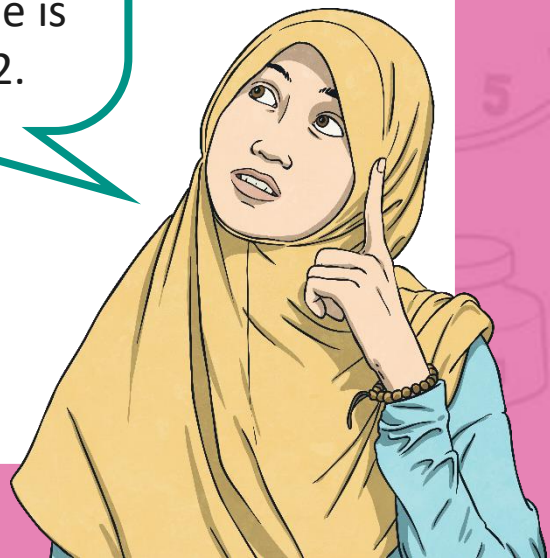
Whole Class

Next, let's think about what we **already know** in order to help us answer the question correctly.

Give the dimensions of a triangle which would have the same area as this parallelogram.

One example of two numbers which have a product of 120 is 10 × 12.

The area of a triangle is (base × height) ÷ 2.



Guided Maths Question 2

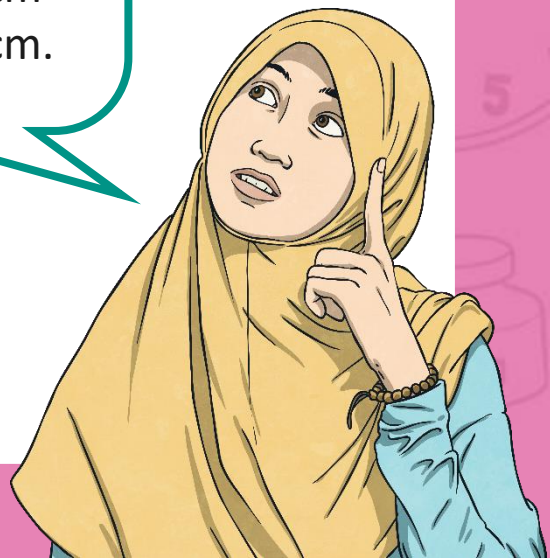
Whole Class

Next, let's think about what we **already know** in order to help us answer the question correctly.

Give the dimensions of a triangle which would have the same area as this parallelogram.

20cm

Therefore, one of the dimensions would need to be doubled.
So the dimensions could be 20cm × 12cm or 40cm × 6cm or 10cm × 24cm.



Guided Maths Question 2

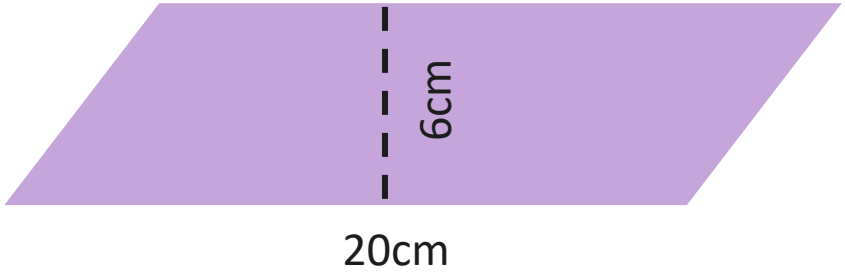
Let's check our answers by checking that the dimensions give an area of 120cm².

Give the dimensions of a triangle which would have the same area as this parallelogram.

Triangle 1:

20cm and 12cm

(20cm × 12cm) ÷ 2 =
120cm²



Guided Maths Question 2

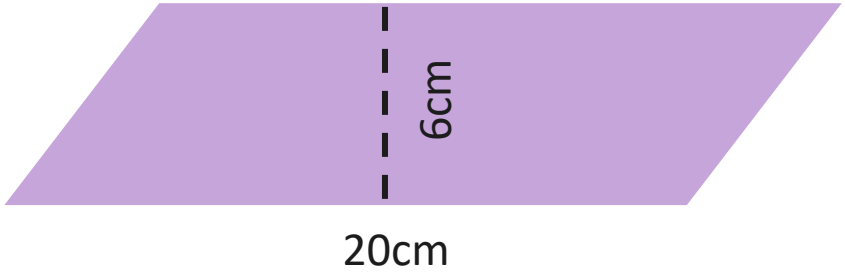
Let's check our answers by checking that the dimensions give an area of 120cm².

Give the dimensions of a triangle which would have the same area as this parallelogram.

Triangle 2:

10cm and 24cm

(10cm × 24cm) ÷ 2 =
120cm²



Answer:

The triangle could have the dimensions 20cm and 12cm or 10cm and 24cm. These are not the only triangles with an area of 120cm²!

Partner Maths Question 2

Working with a partner, use your reasoning skills to answer this question.

Give the dimensions of a triangle which would have the same area as this parallelogram.

Partner Maths Question 2

Working with a partner, use your reasoning skills to answer this question.

Give the dimensions of a triangle which would have the same area as this parallelogram.

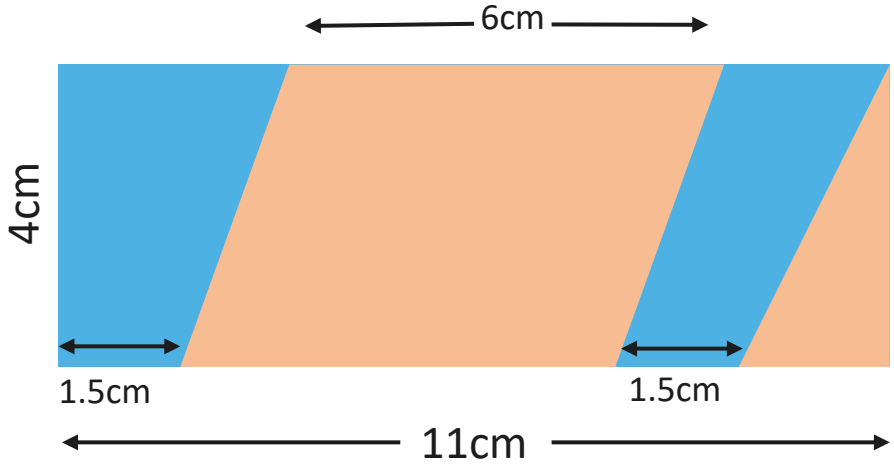
12cm

There are multiple possible answers, including:
10cm and 12cm 20cm and 6cm
60cm and 2cm 30cm and 4cm
15cm and 8cm

Guided Maths Question 3

Read this reasoning question carefully.

Calculate the total area of this shape which is shaded blue.



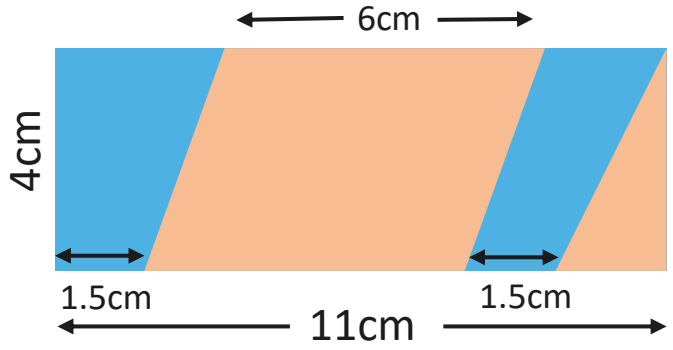
Let's highlight the important information and key vocabulary to show we **understand** the question.

Guided Maths Question 3

Whole Class

Next, let's think about what we **already know** in order to help us answer the question correctly.

Calculate the total area of this shape which is shaded blue.



Area of a rectangle = length × width

Area of parallelogram = length × height

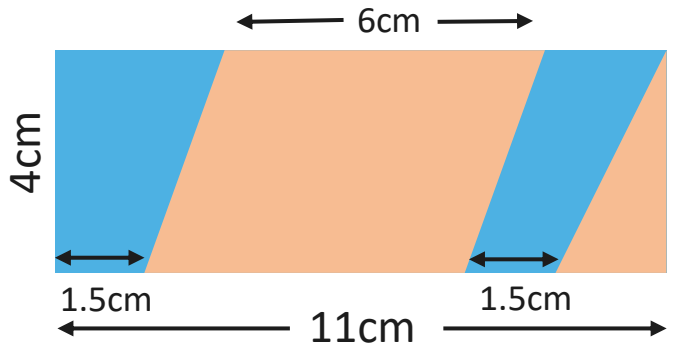
Area of triangle = (base × height) ÷ 2

Guided Maths Question 3

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the total area of this shape which is shaded blue.



First, let's calculate the area of the rectangle.

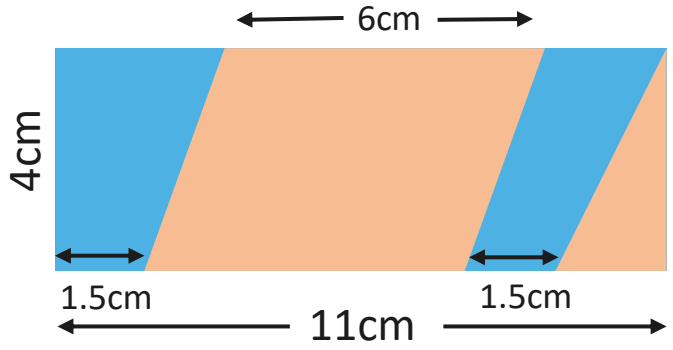
$11\text{cm} \times 4\text{cm} = 44\text{cm}^2$

Guided Maths Question 3

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the total area of this shape which is shaded blue.



Next, let's calculate the area of the parallelogram. The length is 6cm, the height is 4cm.

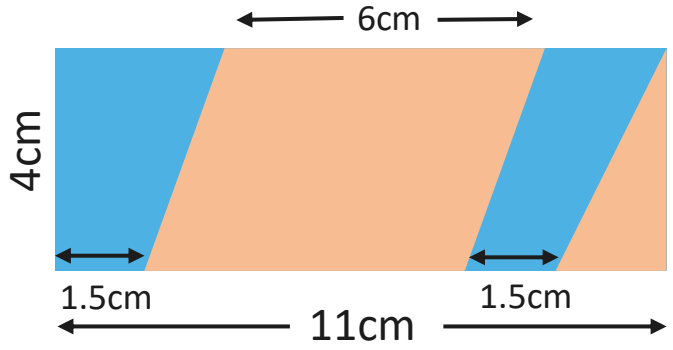
$6cm \times 4cm = 24cm^2$

Guided Maths Question 3

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the total area of this shape which is shaded blue.



Now, let's calculate the area of the triangle.
The base =
11cm – 1.5cm – 6cm – 1.5cm = 2cm

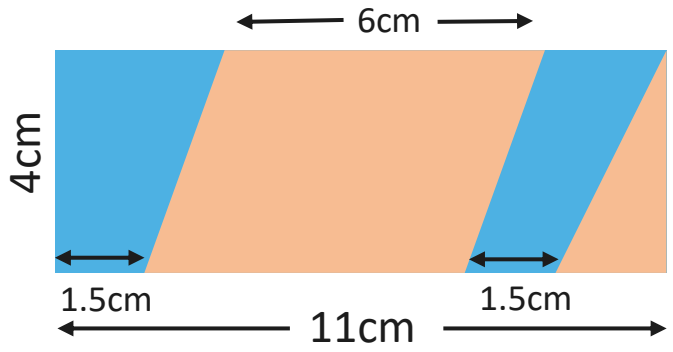
Area = (2cm × 4cm) ÷ 2
= 4cm²

Guided Maths Question 3

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the total area of this shape which is shaded blue.



Let's add together the area of the parallelogram and the triangle:

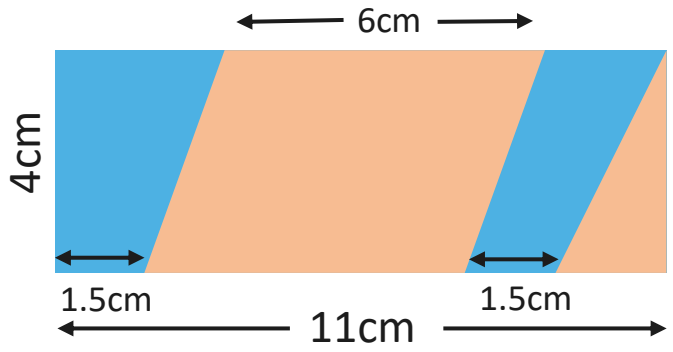
$24cm^2 + 4cm^2 = 28cm^2$

Guided Maths Question 3

Whole Class

Now we are ready to **apply our learning** to solve the question.

Calculate the total area of this shape which is shaded blue.



Finally, subtract the area of the parallelogram and the area of the triangle from the area of the rectangle:

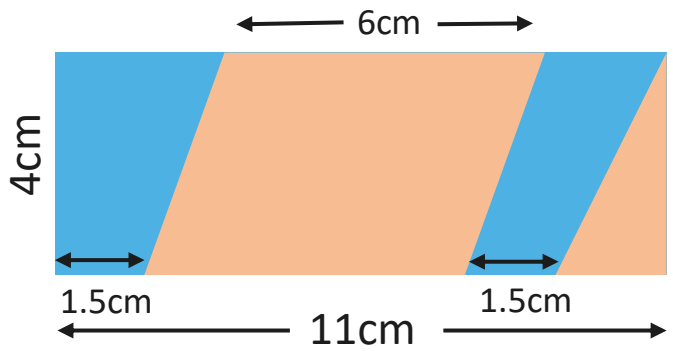
$44cm^2 - 28cm^2 = 16cm^2$

Guided Maths Question 3

Whole Class

Let's check our answers, by summarising our working out.

Calculate the total area of this shape which is shaded blue.



The area of the blue part of the shape is 16cm².

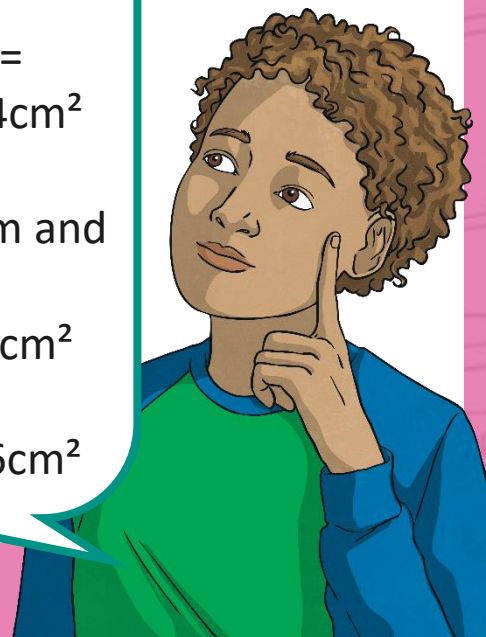
Area of rectangle =
$11cm \times 4cm = 44cm^2$

Area of parallelogram =
$6cm \times 4cm = 24cm^2$

Area of triangle =
$(2cm \times 4cm) \div 2 = 4cm^2$

Area of parallelogram and triangle =
$24cm^2 + 4cm^2 = 28cm^2$

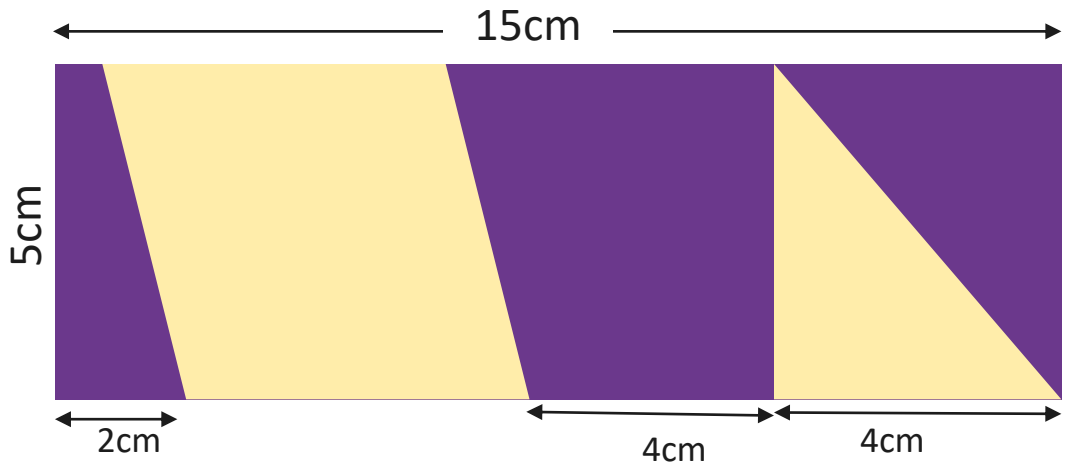
$44cm^2 - 28cm^2 = 16cm^2$



Partner Maths Question 3

Working with a partner, use your reasoning skills to answer this question.

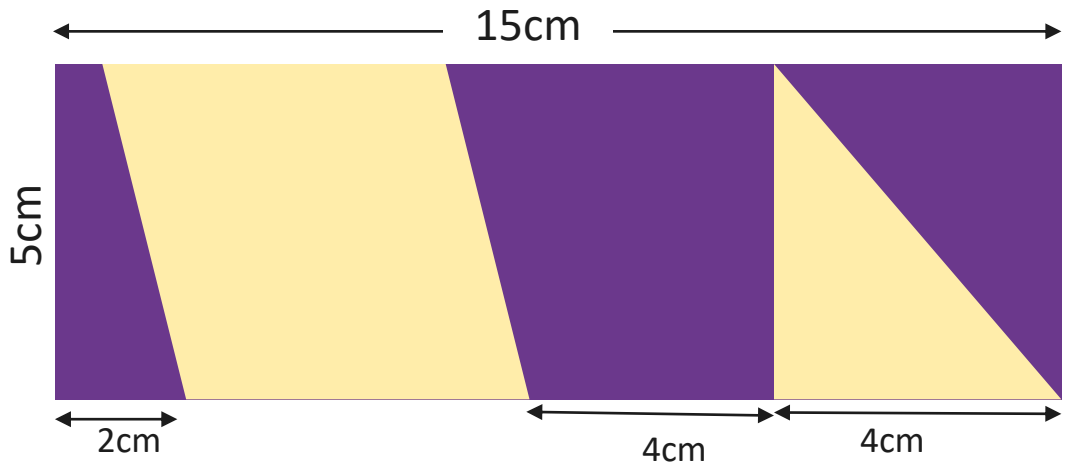
Calculate the total area of this shape which is shaded purple.



Partner Maths Question 3

Working with a partner, use your reasoning skills to answer this question.

Calculate the total area of this shape which is shaded purple.



= 40cm²

Activities

Red – 1 Star

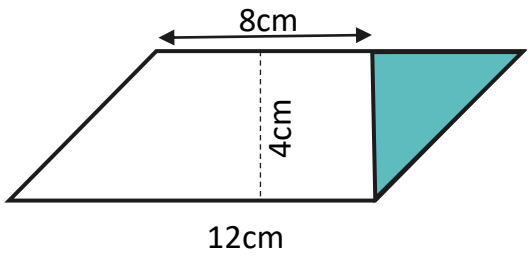
Yellow – 2 Star

Green – 3 Star

Reasoning Practice Answers

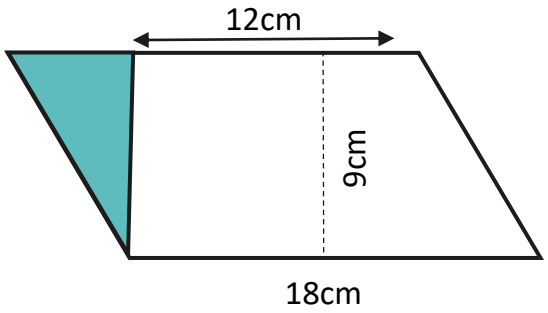
Did you correctly answer the **first** reasoning question?

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



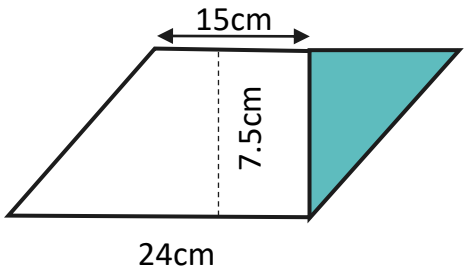
Parallelogram = 48cm^2
Triangle = 8cm^2

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.



Parallelogram = 162cm2
Triangle = 27cm2

Calculate the area of the parallelogram and the area of the right-angled triangle inside the parallelogram.

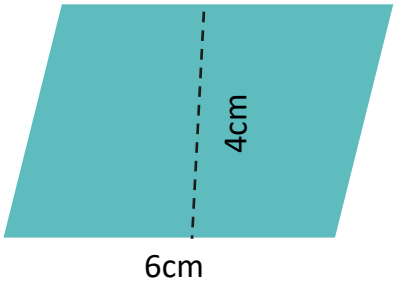


Parallelogram = 180cm2
Triangle = 33.75cm2

Reasoning Practice Answers

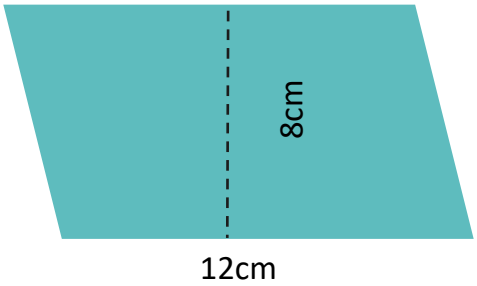
Did you correctly answer the **second** reasoning question?

Give the dimensions of a triangle which would have the same area as this parallelogram.



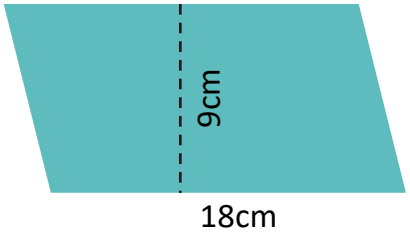
The triangle's dimensions need to have the product of 48cm², for example 1cm × 48cm, 2cm × 24cm, 3cm × 16cm, 4cm × 12cm, 6cm × 8cm.

Give the dimensions of a triangle which would have the same area as this parallelogram.



The triangle's dimensions need to have a product of 192cm2, for example, 1cm × 192cm, 2cm × 96cm, 3cm × 64cm, 4cm × 48cm, 6cm × 32cm, 8cm × 24cm, 12cm × 16cm.

Give the dimensions of a triangle which would have the same area as this parallelogram.

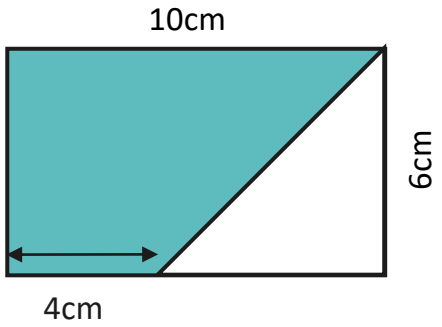


The triangle's dimensions need to have a product of 324cm2, for example, 1cm × 324cm, 2cm × 162cm, 3cm × 108cm, 4cm × 81cm, 6cm × 54cm, 9cm × 36cm, 12cm × 27cm, 18cm × 18cm.

Reasoning Practice Answers

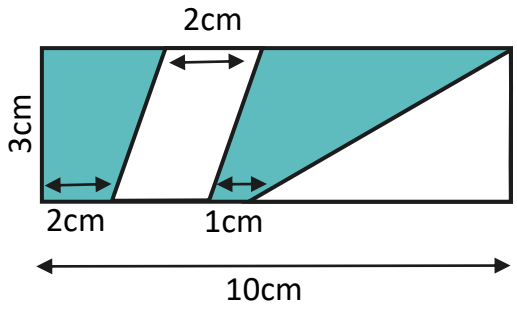
Did you correctly answer the **third** reasoning question?

Calculate the total area of this shape which is shaded.



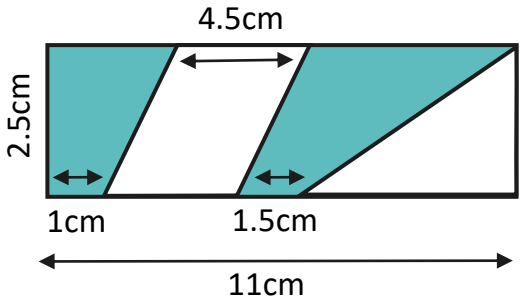
Area of shaded part = 42cm2

Calculate the total area of this shape which is shaded.



Area of shaded part = 16.5cm2

Calculate the total area of this shape which is shaded.



Area of shaded part = 11.25cm2