

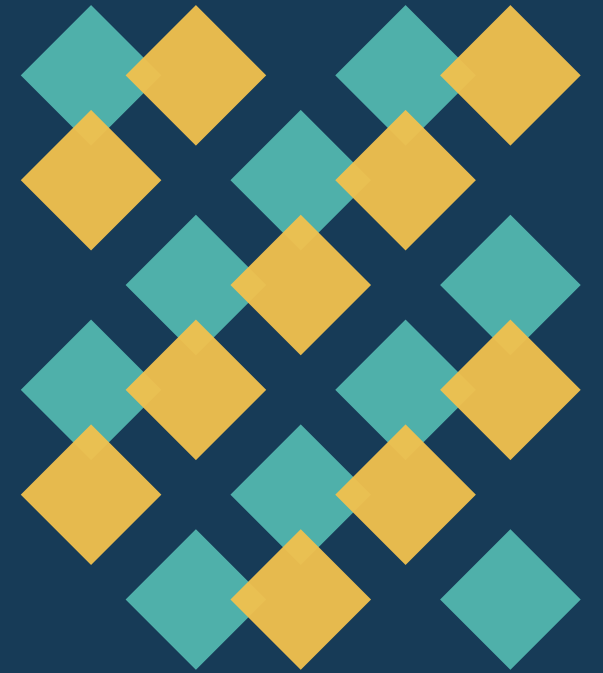
TRIANGLES

Bases, Heights & Area

Review for Math 6 • Unit 1 • Lessons 7–10

Goal: choose a base, match its perpendicular height, and explain why $A = \frac{1}{2} \times b \times h$.

Access IDEAS presents a customized session for OUSD Math 6.



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What are we trying to understand?

Three ideas connect the triangle lessons.

1

COMPOSE

Two identical triangles can form a parallelogram.

2

MATCH

Choose a base and its perpendicular height.

3

CALCULATE

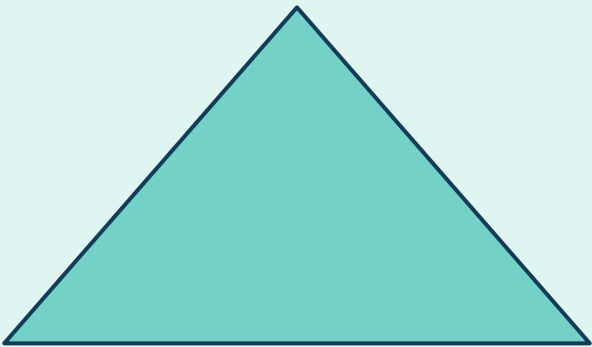
Multiply, then take half:
 $A = \frac{1}{2} \times b \times h.$

Big idea: A triangle is half of a parallelogram with the same base and perpendicular height.

What makes a triangle?

A triangle can look different and still use the same area strategy.

ONE TRIANGLE



A triangle

three sides and three vertices

THREE IDEAS TO CHECK

- 1 Any side can be chosen as the base.
- 2 The matching height is perpendicular to that base.
- 3 The height may be inside or outside the triangle.

TRIANGLES CAN LOOK DIFFERENT



acute



right



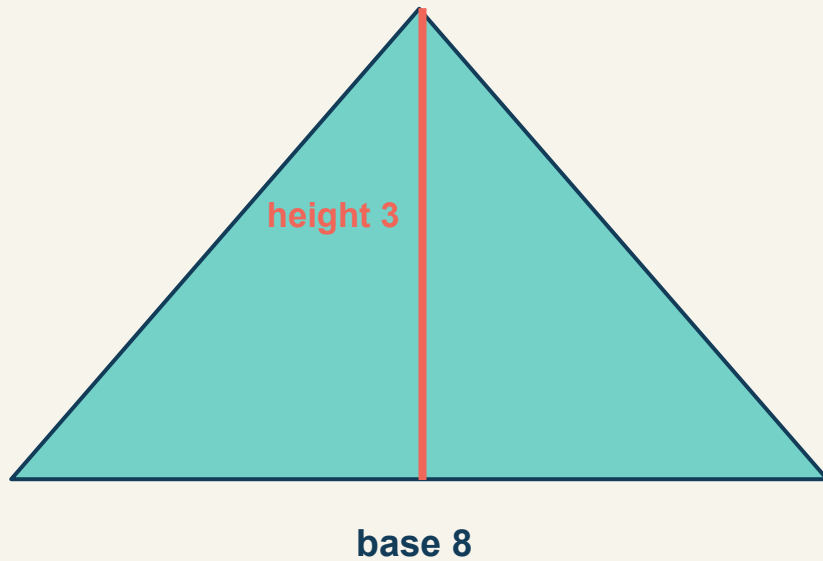
obtuse

The same base-height strategy works for every triangle.

Two triangles can make a parallelogram

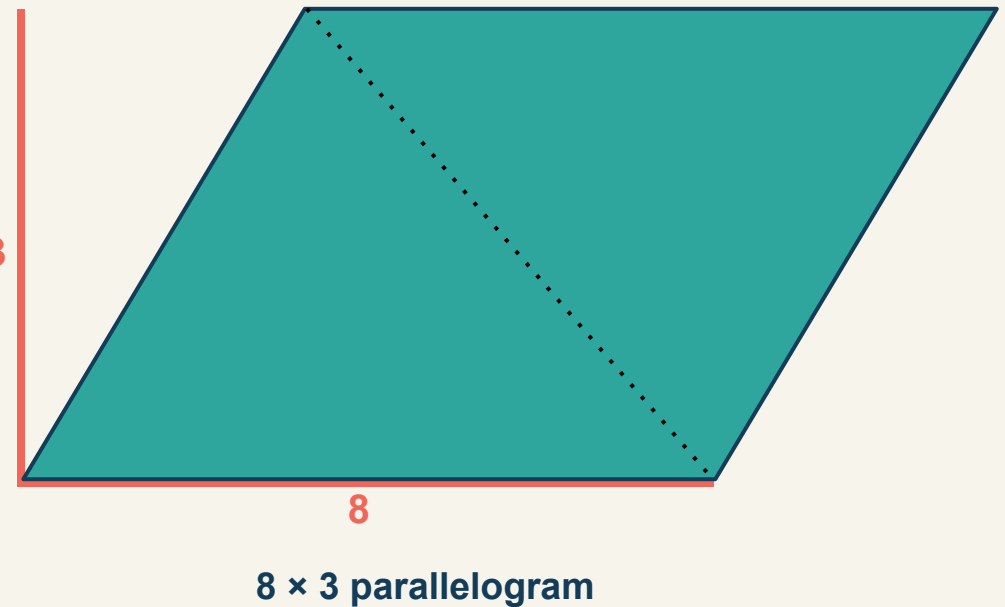
Join two identical copies. Together they form a parallelogram.

ONE TRIANGLE



copy + rotate → 3

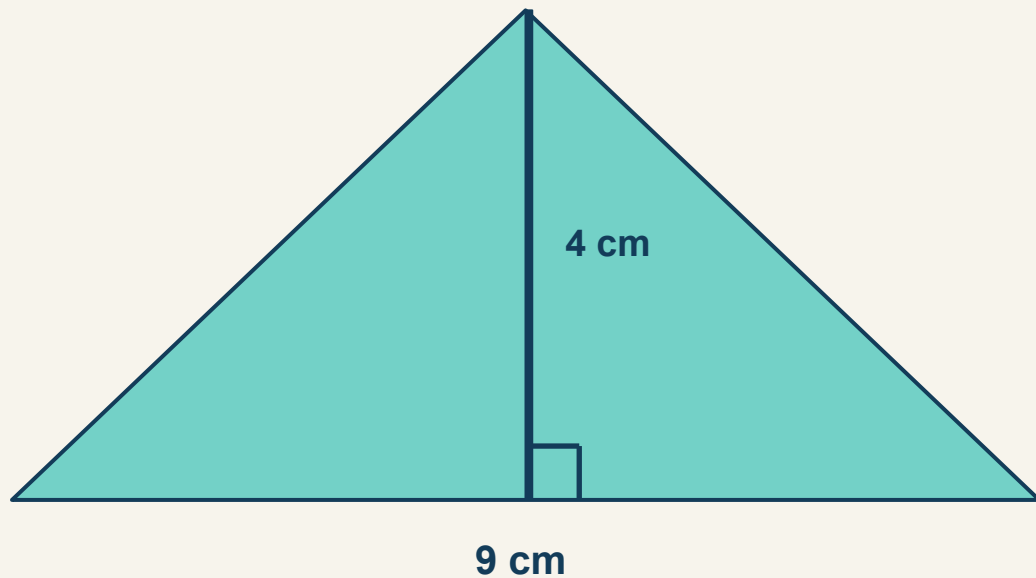
TWO TRIANGLES



The parallelogram has area $8 \times 3 = 24$ square units, so one triangle has half: 12 square units.

Example 1 — Try it first

A triangle has base 9 cm and corresponding height 4 cm.
What is its area? Explain why.



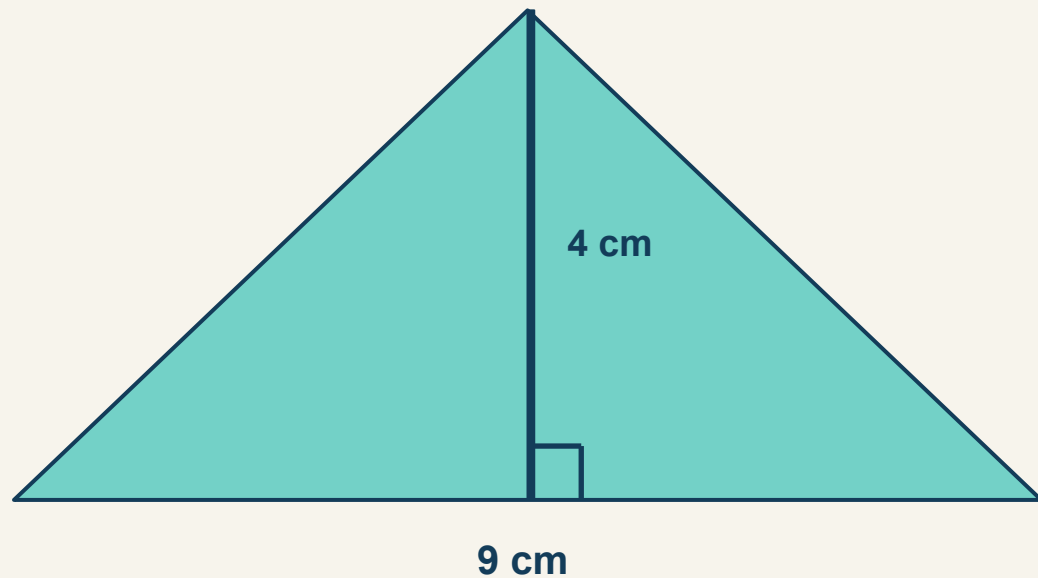
YOUR TURN

**Find the area.
Be ready to explain where the
 $\frac{1}{2}$ comes from.**

Start by naming b and h .

Example 1 — Step 1: Name the base

A triangle has base 9 cm and corresponding height 4 cm.
What is its area? Explain why.



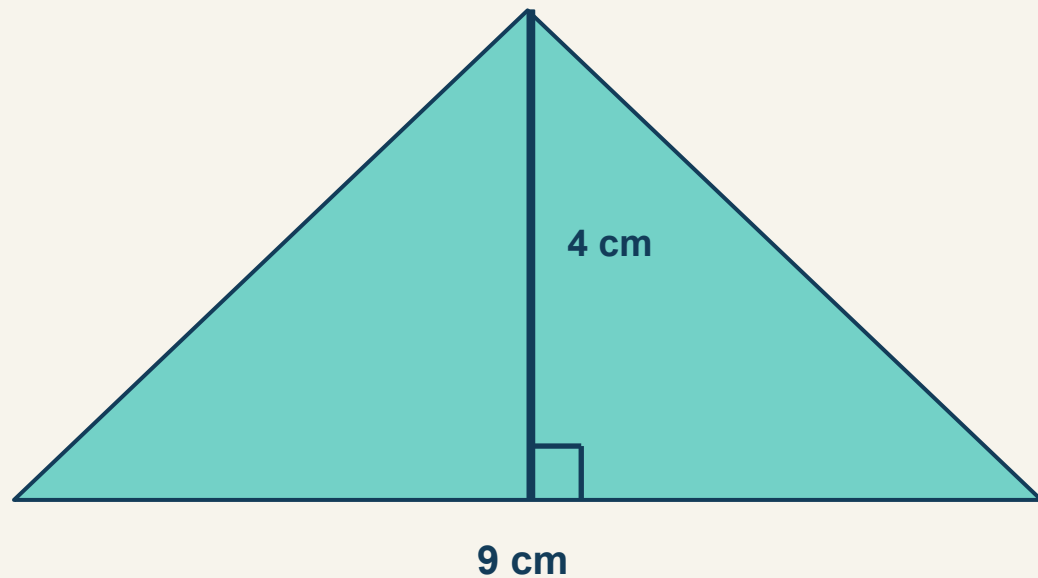
STEP 1: NAME THE BASE

Choose $b = 9$ cm.
Use the bottom side
as the base.

Next: match the height.

Example 1 — Step 2: Match the height

A triangle has base 9 cm and corresponding height 4 cm.
What is its area? Explain why.



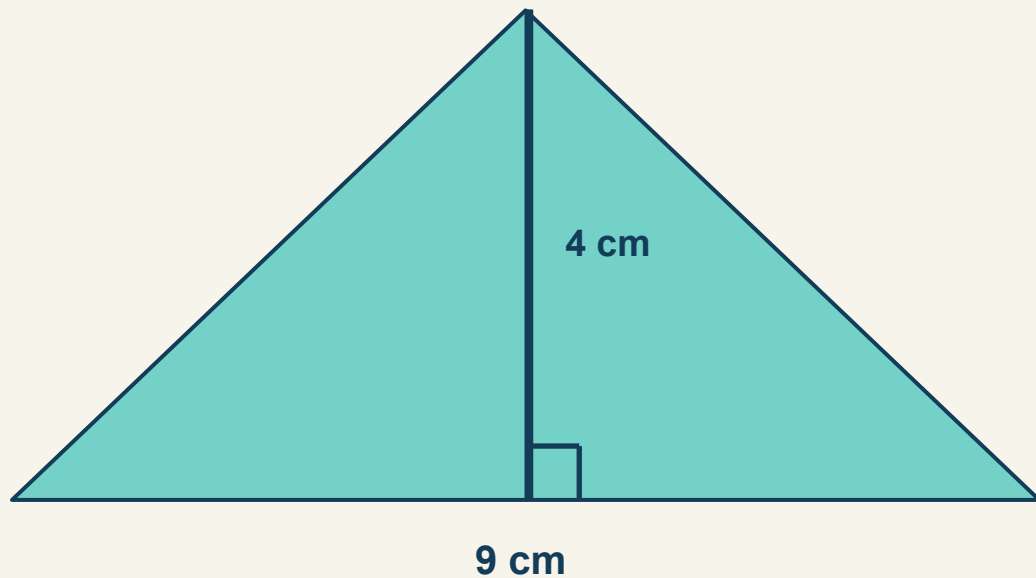
STEP 2: MATCH THE HEIGHT

**The perpendicular
height is $h = 4$ cm.
It meets the 9 cm base
at 90° .**

Next: multiply, then take half.

Example 1 — Step 3: Calculate the area

A triangle has base 9 cm and corresponding height 4 cm.
What is its area? Explain why.



STEP 3: CALCULATE THE AREA

$$A = \frac{1}{2} \times b \times h$$

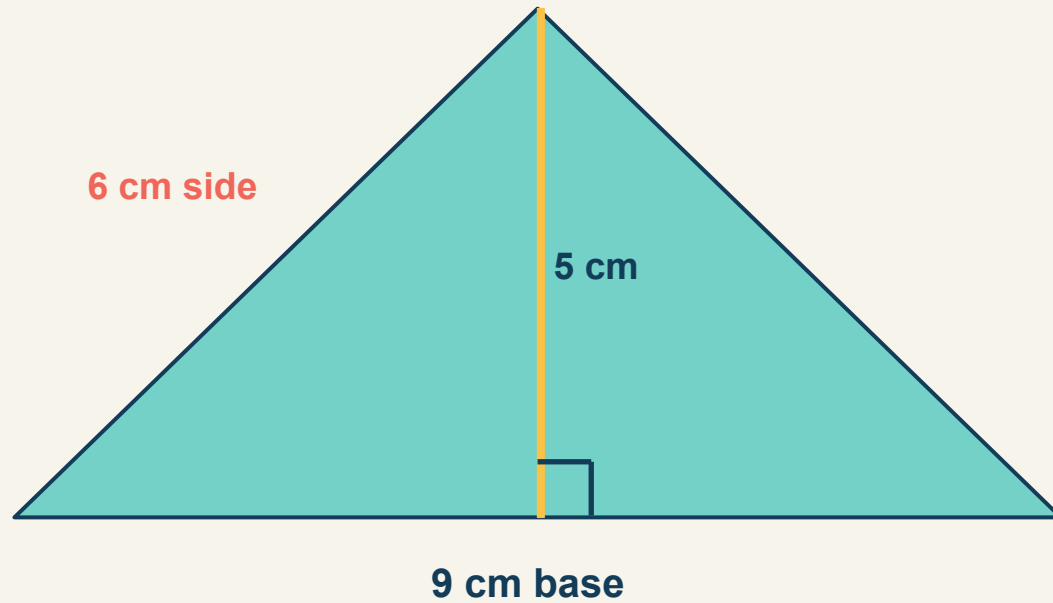
$$A = \frac{1}{2} \times 9 \times 4$$

$$A = 18 \text{ cm}^2$$

The triangle's area is 18 cm².

Example 2 — Try it first

For the 9 cm base, which labeled length is the corresponding height: 5 cm or 6 cm?

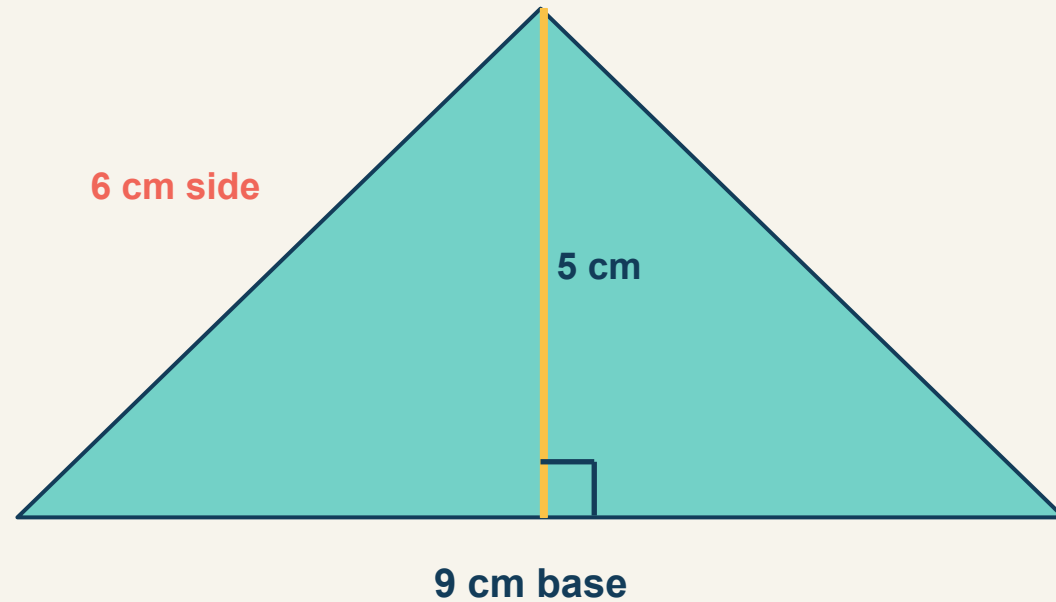


YOUR TURN

Which labeled length is the height?
Explain using the 90° relationship.

Example 2 — Reveal: Check for 90°

For the 9 cm base, which labeled length is the corresponding height: 5 cm or 6 cm?



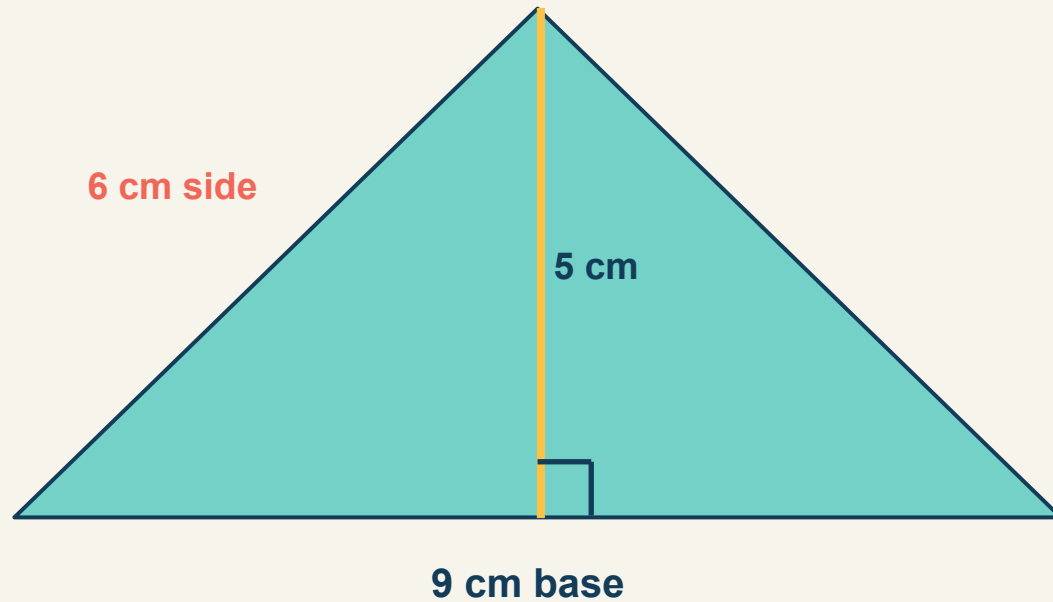
STEP 2: CHECK FOR 90°

The 5 cm segment meets the 9 cm base at 90°.

The 6 cm side is slanted, so it is not the height.

Example 2 — Solution

For the 9 cm base, which labeled length is the corresponding height: 5 cm or 6 cm?



SOLUTION

Base: $b = 9$ cm

Height: $h = 5$ cm

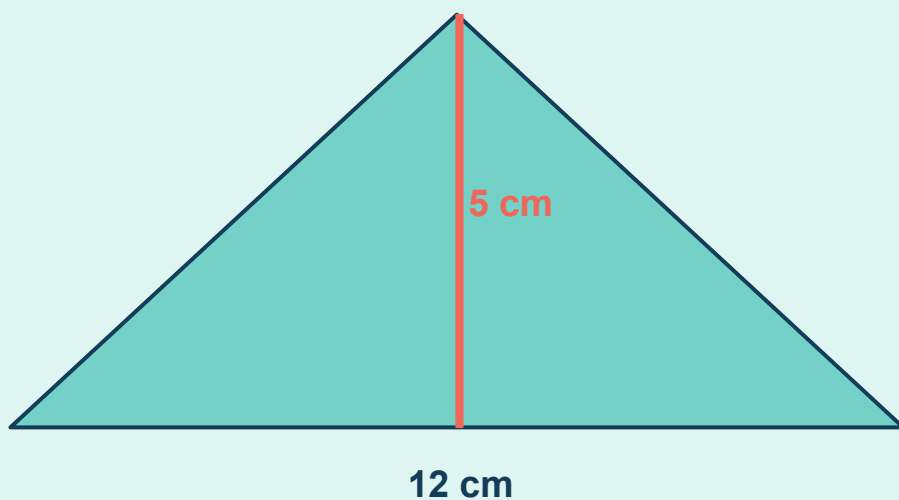
Area:

$$A = \frac{1}{2} \times 9 \times 5 = 22.5 \text{ cm}^2$$

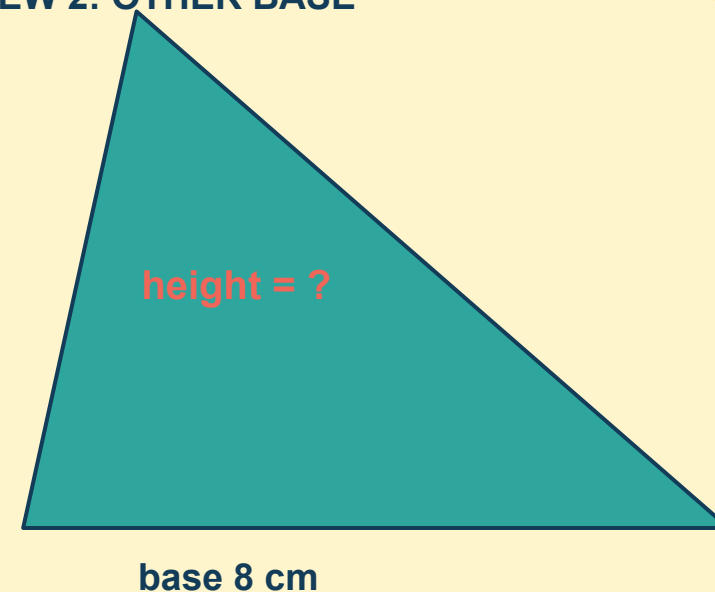
Example 3 — Try it first

Both triangles have same area. A triangle has one base-height pair 12 cm and 5 cm. If the other triangle has base of 8 cm, find its corresponding height.

VIEW 1: KNOWN PAIR



VIEW 2: OTHER BASE

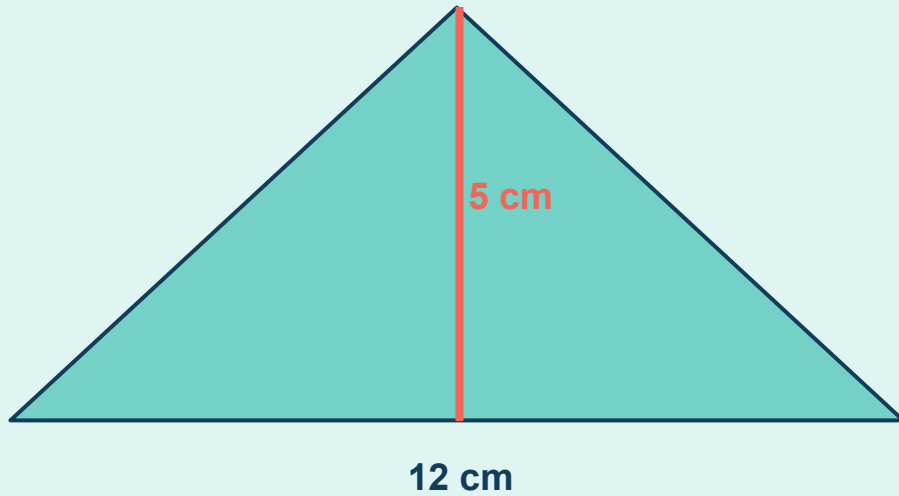


How can the first base-height pair help?

Example 3 — Step 1: Find the area

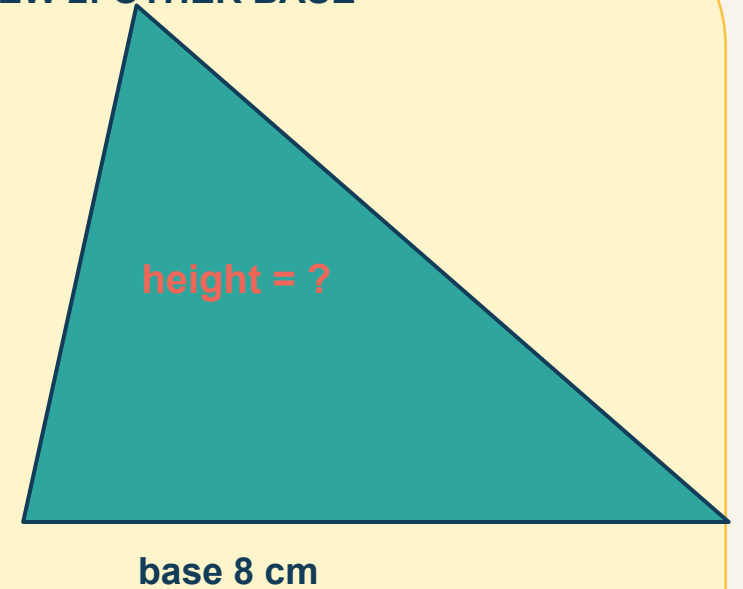
Use the known base-height pair first.

VIEW 1: KNOWN PAIR



$$A = \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$$

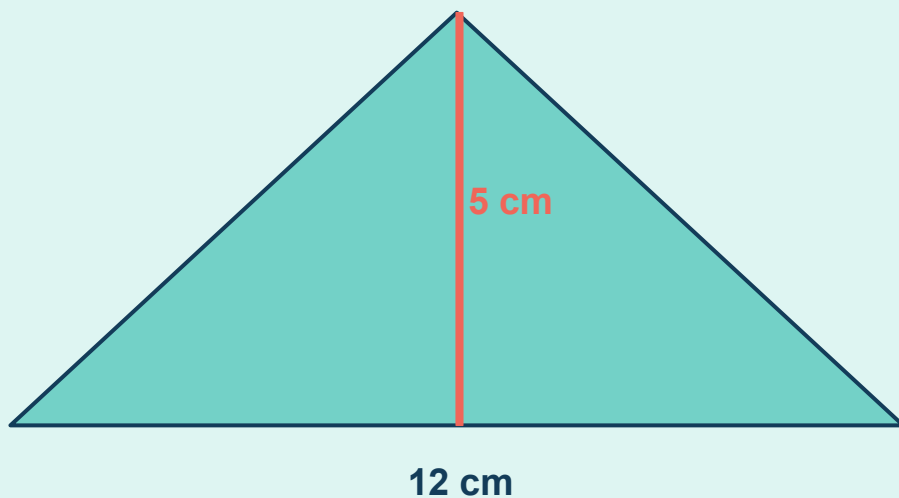
VIEW 2: OTHER BASE



Example 3 — Step 2: Use the other base

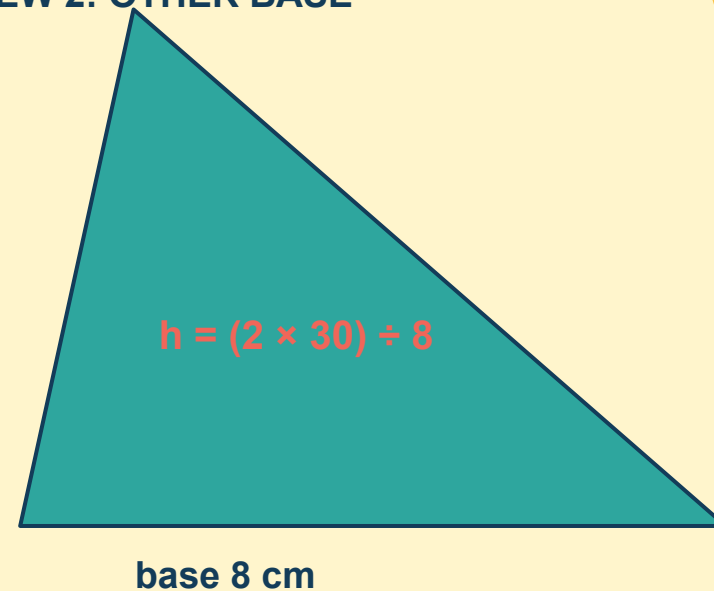
The same triangle has the same area, no matter which side is chosen as the base.

VIEW 1: KNOWN PAIR



$$A = \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$$

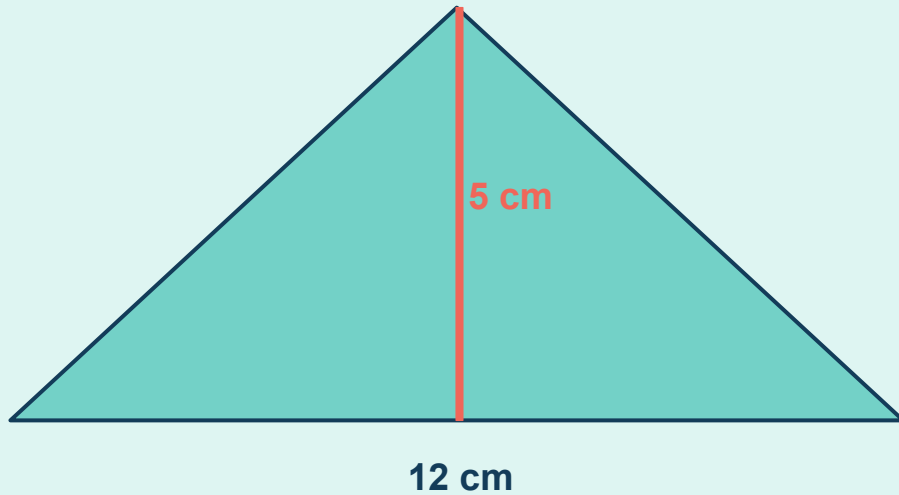
VIEW 2: OTHER BASE



Example 3 — Solution

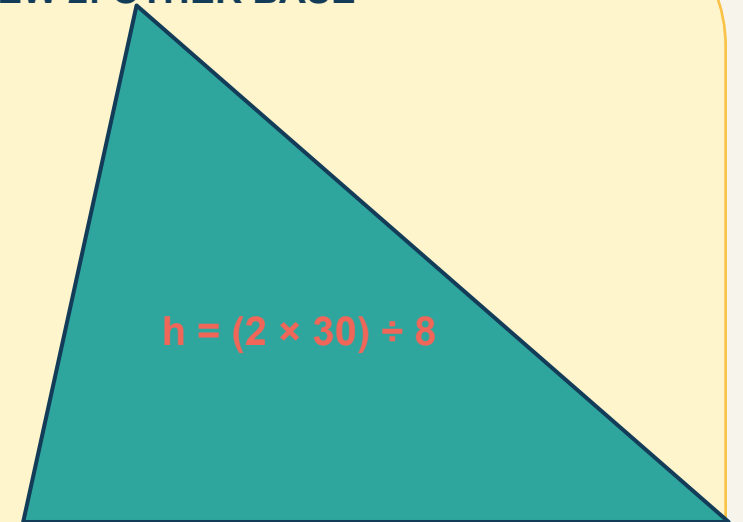
Check that both base-height pairs give the same area.

VIEW 1: KNOWN PAIR



$$A = \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$$

VIEW 2: OTHER BASE



base 8 cm
 $h = 7.5$
 $\frac{1}{2} \times 8 \times 7.5 = 30 \text{ cm}^2$

Both base-height pairs give an area of 30 cm².

Pause & think

Decide what counts as a matching base-height pair before calculating.

A

A triangle is turned so no side is horizontal.

Can any side still be chosen as the base? What must the height do?

choose a side

look for 90°

ignore the tilt

B

Two triangles have the same base length and the same perpendicular height, but different shapes.

How do their areas compare? Explain using the formula.

Use the words
base, corresponding height, and
perpendicular.

No need to solve yet—first explain how you know which measurements belong together.

Takeaway + exit ticket

A correct triangle-area calculation begins by matching a base with a perpendicular height.

1 Any side can be a base

Choose one side and name its length b .

2 Height means perpendicular distance

It may be drawn inside or outside the shape.

3 Triangle area is half base $\times$ height

Use the matching pair and write square units.

EXIT TICKET

A triangle has base 11 m, height 3 m, and slanted side 5 m. Find its area and explain why 5 m is not used.

Bonus: sketch a different triangle with the same base, height, and area.



THANK YOU

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