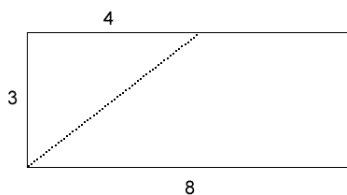
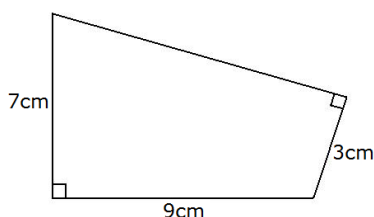


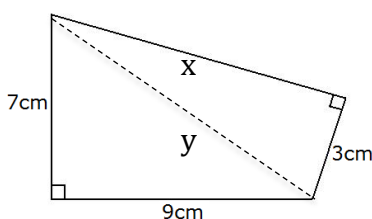
Riding on Pythagoras 1



1. Find the area of the quadrilateral.

2. The rectangle is cut into two pieces along the dotted line and rearranged to make a triangle. Find the perimeter of the triangle.

SOLUTION



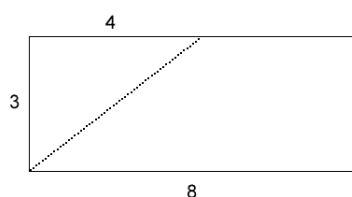
We need to find the length x . First draw the diagonal and find its length y cm. By Pythagoras Theorem

$$y^2 = 7^2 + 9^2 = 130 \quad \text{and}$$

$$x^2 = 130 - 3^2 = 121.$$

$$\text{So } x = 11 \text{ cm.}$$

$$\text{Area} = \frac{1}{2}(7 \times 9) + \frac{1}{2}(3 \times 11) = 48 \text{ cm}^2.$$

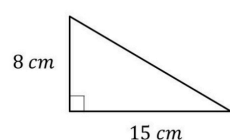


2. By Pythagoras Theorem the length of the cut line is 5 cm (3-4-5 triangle) so the triangle has edges 8, 6 and 10 and the perimeter of the triangle is 24 cm.

Notes for teachers

Diagnostic Assessment This should take about 5–10 minutes.

- Write the question on the board, say to the class:
“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D”.
- Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
- Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
- Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
- If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.



Here is a right-angled triangle.

Work out the length of the hypotenuse.

A. is the correct answer.

Common Misconceptions

B. This is the square of the length and learners have not found the square root.

C. The learner has doubled each side instead of squaring.

D. The student has added the two sides, without squaring.



17 cm



289 cm



$\sqrt{46}$ cm



23 cm

<https://diagnosticquestions.com>

Why do this activity?

This activity provides two quite simple riders that both use Pythagoras Theorem but are not just routine so that learners are involved in mathematical thinking.

Intended learning outcomes

Practice in using Pythagoras Theorem in geometric problems.

Possible approach

Start with the diagnostic question. Without calculators learners should try to find 8^2 and 15^2 and add them to get 289 and then check the first answer given by finding 17^2 .

Draw the diagrams on the board or give copies to the learners. Tell the learners to read the questions and to work individually to solve the problems. As learners need lots of practice in reading questions teachers should avoid doing this for them in class. There should be no need for the use of calculators in doing this question.

After allowing time for most of the learners to finish both questions, then ask the learners to check their working and their answers with the learner next to them.

Then for the whole class, ask learners to explain how they worked out the answers. Remind learners that they should spot the 3-4-5 triangle and save time spent doing calculations.

Key questions

What could you add to the diagram to help you?

What do you need to know to find the area?

What do you know about right angled triangles?

Possible extension

See <https://aiminghigh.aimssec.ac.za/grades-8-to-10-riding-on-pythagoras-2/>

Possible support

For the second question it may help learners to draw the 3 by 8 rectangle and cut it out, then to cut off the triangular piece and make up the triangle as described in the question.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and up to Secondary 5 in East Africa.

Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is **not included in the school curriculum for Grade 12 SA.**

	Lower Primary or Foundation Phase Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 14	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6