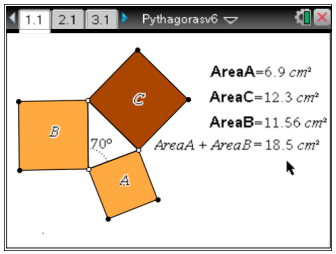
PYTHAGORAS' THEOREM
Student Notes

In this activity you will learn about Pythagoras' Theorem and use it to find the lengths of missing sides of right-angled triangles.

1) Three squares and a triangle

Transfer the document ***Pythagoras.tns*** to your handheld and open it.

Page 1.1 shows a triangle with a square on each side.



The three squares are labelled A, B and C.

Grab and move any of the corners of the triangle.

As you move the points, notice that the areas of some of the squares change.

The screen also shows the total when the area of square A is added to the area of square B.

Try to make

AreaA + AreaB = AreaC.

2) An ancient discovery

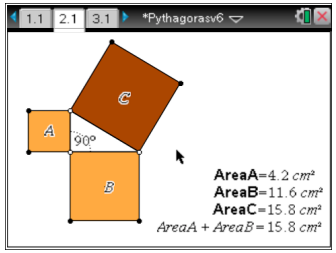
You have just met a mathematical rule that was discovered thousands of years ago.

It is known as Pythagoras' Theorem.

If a triangle is right-angled, the sum of the areas of the squares on the two shorter sides equals the area of the square on longest side.

Press ctrl ▶ to move to page 2.1, which shows this diagram.

This time the triangle is fixed so it always has a 90° angle.



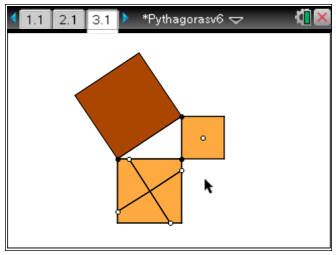
You will find that the area of C (the largest square) will always be equal to the sum of the areas of the smaller squares A and B.

3) It all fits together

Since the area of the largest square is the sum of the areas of the two smaller squares, it should be possible to 'fit' the two smaller squares inside the larger square.

Move to page 3.1.
Here you can grab and move the pieces of the smaller squares and fit them inside the larger square.

Try it!



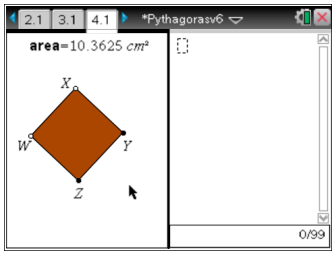
You can also change the shape of the right-angled triangle.

Is it always possible to fit the pieces together?

4) A square's side

Press ctrl ▸ to move to page 4.1

You will see a square and the measurement of its area.



Grab and move one of the vertices W or X.
As you move them the size of the square changes and so does its area.

Try to work out the length of the sides of the square.

Press ctrl tab to move to the right-hand part of the screen where you can do calculations.

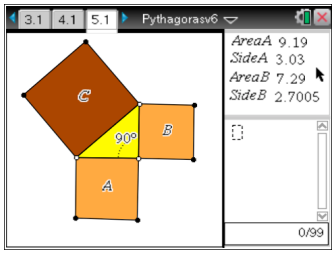
To check your answer, type the word *'side'* and press enter.
The current length of the side will appear.

Repeat for several different sized squares.

5) Something's missing!

Move to page 5.1.

You will see a right-angled triangle. Grab and move the corners of the triangle. You will see that although the triangle changes, it is always right-angled.



Using the rules that you learned in sections 2 and 4, calculate the area of square C and then the length of its sides.

It may help to look back to page 2.1.

On the right of the screen is a calculator area where you can do any calculations you need.

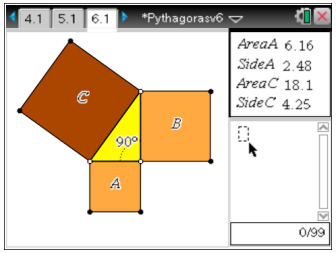
Press ctrl tab ctrl tab to move there.

To check your answers, type *AreaC* and *SideC*.

Change the triangle and try again.

6) Something's different!

Move to page 6.1. This page is like page 5.1 except that this time it is the area of square B and its side length that are missing.



Try to calculate the missing area and missing side length.

You can do any calculations you need on the right of the screen.

You may need to think carefully about Pythagoras' Theorem to solve this challenge.

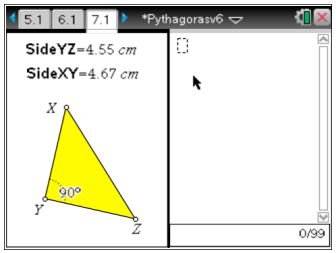
You can type *AreaB* and *SideB* to check your answers.

Repeat this for different triangles.

7) Find the long side

Page 7.1 has a right-angled triangle. You can grab and move the points if you wish.

There are no squares shown this time. Try to imagine them.



Side XY joins X to Y.

Side YZ joins Y to Z.

Side XZ is the longest side of the triangle.

Its length is not shown.

Try to work out. the length of the long side, XZ.
The right of the screen can be used for your calculations.

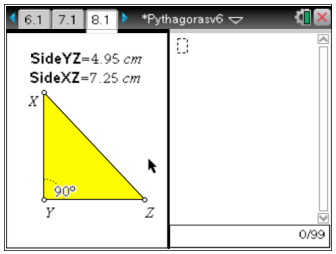
You can check your answer by typing *SideXZ*.

Try this again for different triangles.

8) A shorter side

Page 8.1 has another right-angled triangle.

This time the measurement for one of the shorter sides, XY, is missing.



Try to work out the length of XY.

You can do calculations and check your answer as usual.