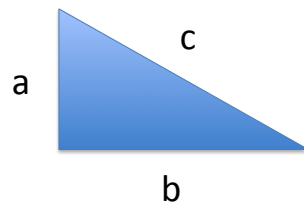


Pythagoras was a Greek mathematician who spotted an interesting relationship between triangles and squares.

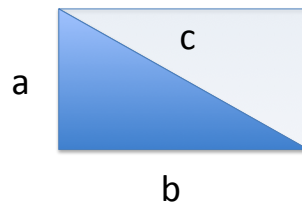
We start with a triangle of a particular type.



Why is this a right angled triangle?

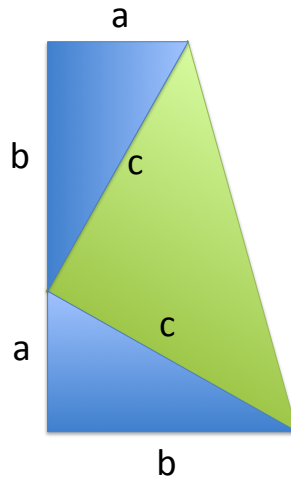
If a was 3 cm long and b was 4 cm long, how long would c be?

What is the area of this rectangle?



Area of rectangle = $a * b$
Area of triangle = $(a * b)/2$

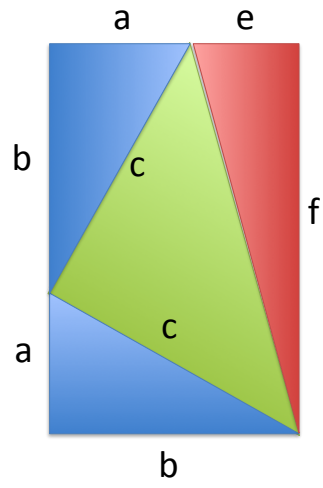
Split that rectangle so that we can have two of the original triangles and a new right angled triangle



What is this shape?

It's a trapezium, a type of quadrilateral.

Fill in the gap
with another
right angled
triangle to make
another
rectangle.



There are games that people play arranging shapes like this into other shapes or geometric patterns.

Does anyone know the name?

It's called a **tangram**.

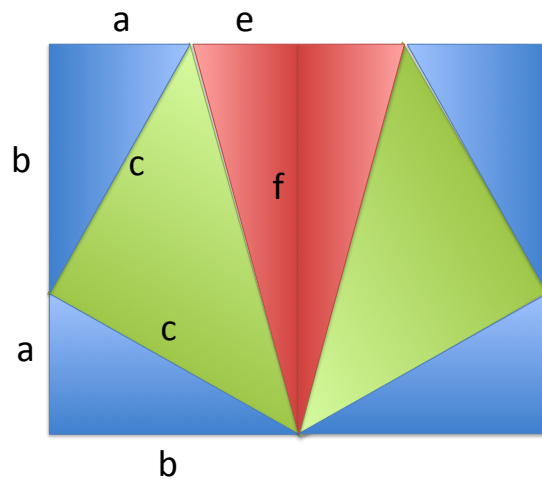
Can you define e in terms of the other lengths?

$$e = b - a$$

Can you define f in terms of the other lengths?

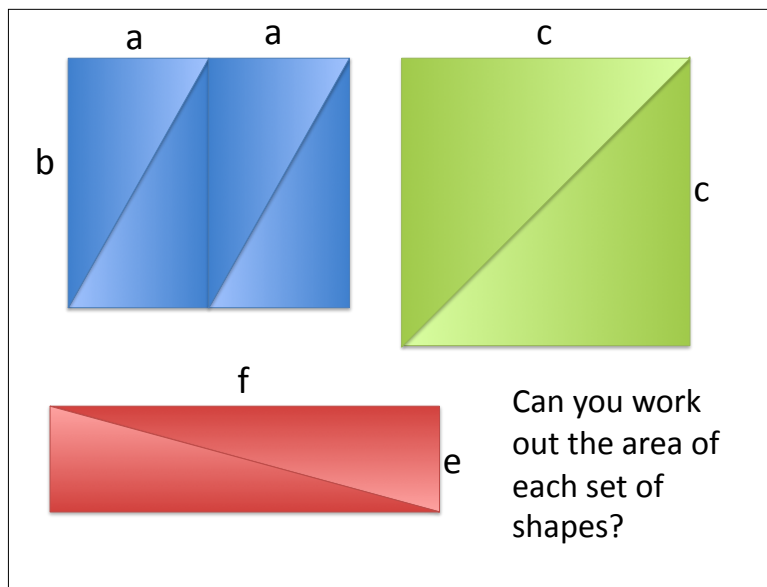
$$f = b + a$$

Mirror one rectangle to make a larger one



What would the total area of this rectangle be?

Total area = $2b(a+b)$



$$\text{Total area} = 2b(a+b) = 2ab + 2b^2$$

$$\text{Blue area} = 2ab$$

$$\text{Green area} = c^2$$

$$\text{Red area} = ef = (b-a)(b+a) = b^2 - a^2$$

Now can you use these and the total area you worked out previously to work out c in terms of a & b?

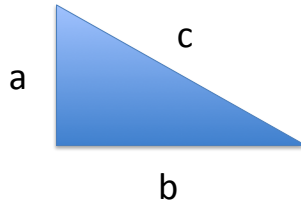
$$\text{Therefore } 2ab + c^2 + b^2 - a^2 = 2ab + 2b^2$$

$$c^2 + b^2 - a^2 = 2b^2$$

$$c^2 - a^2 = b^2$$

$$c^2 = a^2 + b^2$$

Pythagoras' Theorem



$$a^2 + b^2 = c^2$$

What sorts of things might we use Pythagoras' theorem to help us with?

Engineering & building

Mapping & navigation

Etc.