TWGHs Lo Kon Ting Memorial College

S2 Mathematics 2020 – 2021

STEM Worksheet --- Creating a Model of Pythagoras' Theorem

Worksheet 1

Name: ______________________ Class: _____ ( ) Group: ___ Date: _______________

Pythagoras' Theorem

In ΔABC, if $\angle C = 90^\circ$, then $a^2 + b^2 = c^2$.

Proof of Pythagoras' Theorem by Areas

Figure 1.1 shows a big square of side c. It consists of:

- 4 identical *right-angled* triangles;
- and 1 small square of side $(b - a)$.

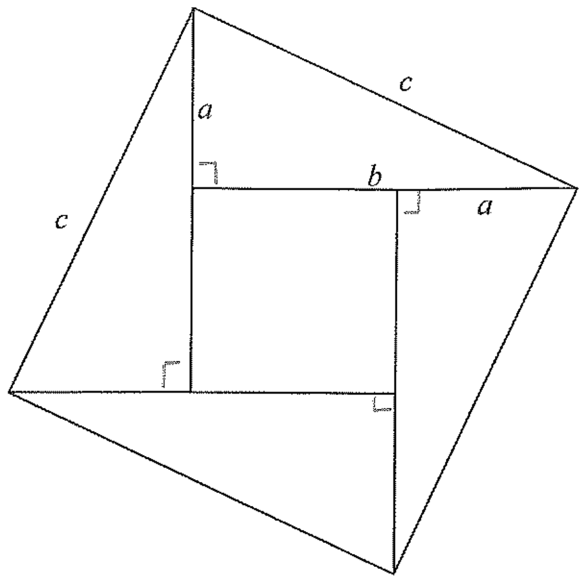

Figure 1.1

Based on the figure above, how can we prove that $a^2 + b^2 = c^2$?

(Hint: Consider the area of the big square, 4 triangles and the small square.)

Area of the big square $= c^2$

Area of the 4 triangles $= 4 \times \frac{ab}{2} = 2ab$

Area of the small square $= (b-a)^2 = b^2 - 2ab + a^2$

$\because$ Area of the big square = Area of the 4 triangles + Area of the small square

$\therefore \quad c^2 = 2ab + b^2 - 2ab + a^2$

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

Proof of Pythagoras' Theorem by Rearrangement (重排) and Areas

- Figure 1.2(a) is the same as Figure 1.1 on the previous page.
- After rearrangement, we have Figure 1.2(b).

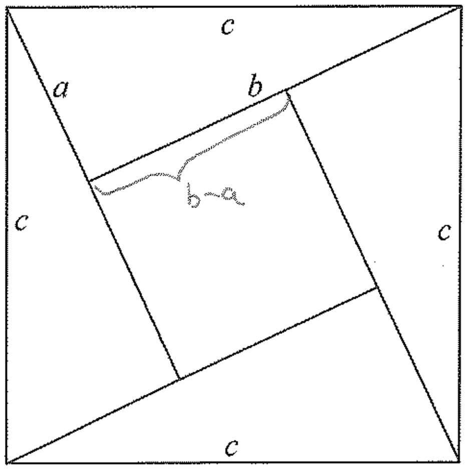

Figure 1.2(a)

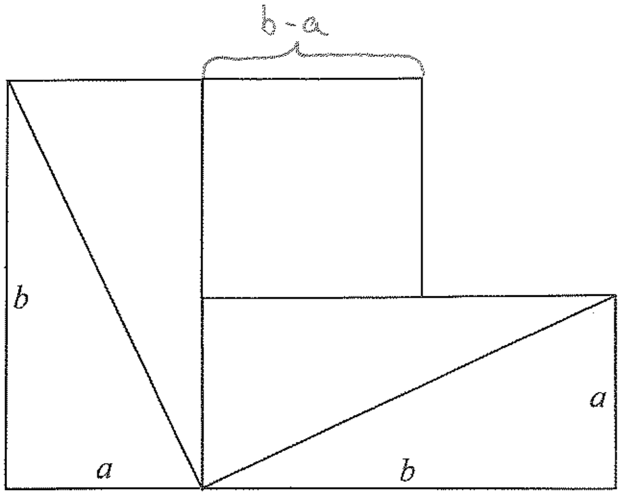

Figure 1.2(b)

Based on the figures above, how can we prove that $a^2 + b^2 = c^2$?

After rearrangement, the areas of Figure 1.2(a) and Figure 1.2(b) are the same.

$\therefore \quad c^2 = a \cdot b + a \cdot b + (b-a)^2$

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

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