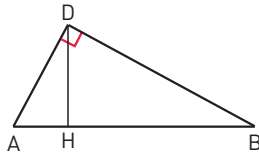


YOU & MATHS **A non-Pythagorean case** Draw a triangle ABC in which AB is the longest side and the sum of the areas of the squares built on AC and BC is less than the area of the square built on AB .

Let us draw a right triangle ABD in which \widehat{D} is the right angle, and let DH be the altitude to the hypotenuse.

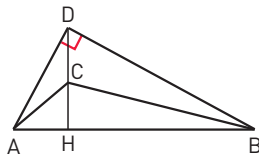


According to the Pythagorean theorem we know that:

$$\overline{AB}^2 = \overline{AD}^2 + \overline{BD}^2.$$

Let us choose a point C on the line segment DH , excluding the endpoints. In this case we get:

$$CH < DH.$$



Then, comparing the right triangles ADH and ACH we notice that:

$$AC < AD.$$

Comparing the right triangles BDH and BCH we notice that:

$$BC < BD.$$

We can then deduce:

$$\overline{AB}^2 = \overline{AD}^2 + \overline{BD}^2 > \overline{AC}^2 + \overline{BC}^2.$$

In a similar way we can prove that $\overline{AB}^2 < \overline{AC}^2 + \overline{BC}^2$ if and only if $\widehat{ACB} < 90^\circ$.