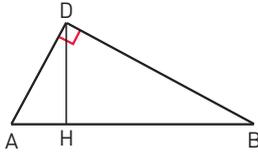


**YOU & MATHS** **A non-Pythagorean case** Draw a triangle  $ABC$  in which  $AB$  is the longest side and the sum of the areas of the squares built on  $AC$  and  $BC$  is less than the area of the square built on  $AB$ .

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

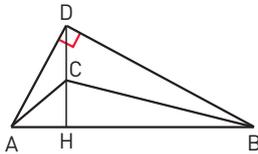


According to the Pythagorean theorem we know that:

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

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  $\widehat{ACB} < 90^\circ$ .