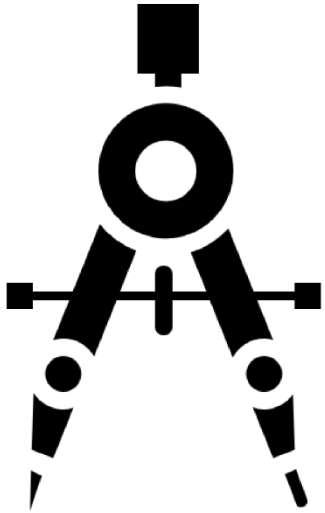


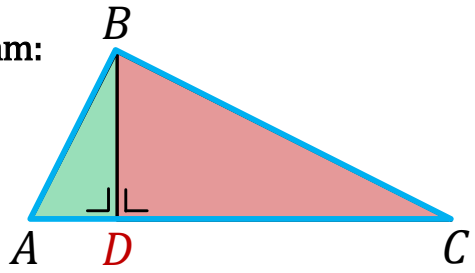
MATHSPOINTS.IE

JUNIOR & LEAVING CERT

PROOFS

JUNIOR CERT HIGHER LEVEL

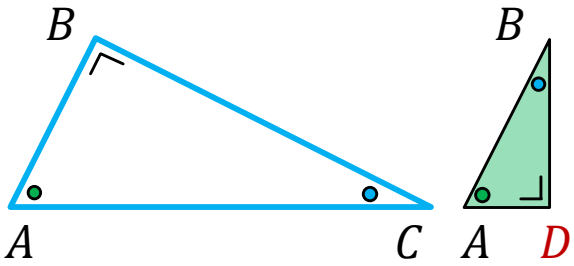
Diagram:

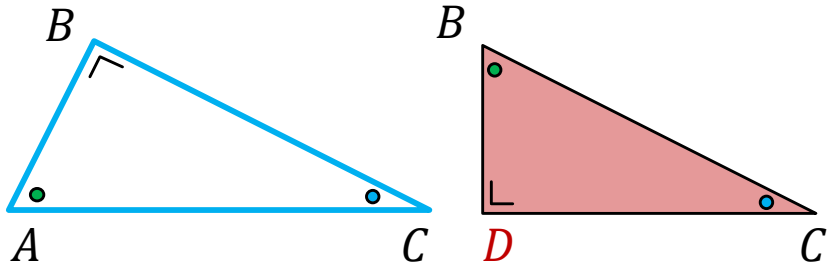


Given: A right angled triangle ABC with $|\angle ABC| = 90°$

To Prove: $|AC|^2 = |AB|^2 + |BC|^2$

Construction: Draw $BD \perp AC$





Proof: Step 1

Consider the triangles ΔABC and ΔBAD

$|\angle ABC| = |\angle ADB|$ 90°

$|\angle BAC| = |\angle BAD|$ Common

$\therefore$ ΔABC and ΔBAD are similar

$$\frac{|AC|}{|AB|} = \left|\frac{AB}{AD}\right|$$

$$|AB|.|AB| = |AC|.|AD|$$

$$|AB|^2 = |AC|.|AD|$$

Proof: Step 2

Consider the triangles ΔABC and ΔBDC

$|\angle ABC| = |\angle BDC|$ 90°

$|\angle ACB| = |\angle DCB|$ Common

$\therefore$ ΔABC and ΔBDC are similar

$$\frac{|AC|}{|BC|} = \left|\frac{BC}{DC}\right|$$

$$|BC|.|BC| = |AC|.|DC|$$

$$|BC|^2 = |AC|.|DC|$$

Proof: Step 3

$$|AB|^2 + |BC|^2 = |AC|.|AD| + |AC|.|DC|$$

$$|AB|^2 + |BC|^2 = |AC|(|AD| + |DC|)$$

$$|AB|^2 + |BC|^2 = |AC|.|AC|$$

$$|AB|^2 + |BC|^2 = |AC|^2$$