Pythagoras similarity proof

http://topdrawer.aamt.edu.au/Geometric-reasoning/Good-teaching/Writing-a-proof/Proving-Pythagoras-theorem/Dissected-proof

Aim: To prove $c^2 = a^2 + b^2$

Proof: In ΔABC and ΔADC

$\angle A$ is common

$\angle ACB = \angle ADC$ (both 90° given)

$\therefore \Delta ABC ||| \Delta ACD$ (AAA)

$\therefore \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ (matching sides of similar triangles)

$\frac{c}{b} = \frac{a}{CD} = \frac{b}{y}$

$\therefore \frac{c}{b} = \frac{b}{y}$

$\therefore b^2 = cy$

In ΔABC and ΔBDC

$\angle B$ is common

$\angle ACB = \angle BDC$ (both 90° given)

$\therefore \Delta ABC ||| \Delta CBD$ (AAA)

$\therefore \frac{AB}{CB} = \frac{BC}{BD} = \frac{AC}{CD}$ (matching sides of similar triangles)

$\frac{c}{a} = \frac{a}{x} = \frac{b}{CD}$

$\therefore a^2 = cx$

Now $a^2 + b^2 = cx + cy$

$= c(x + y)$

$= c(c)$

$= c^2$

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