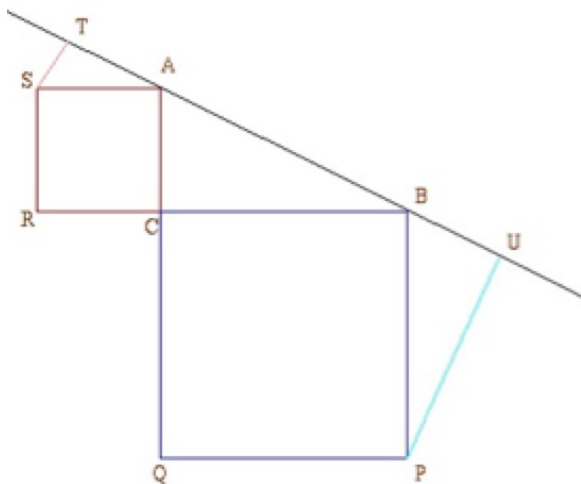# WHY THE SAME?

In the diagram ASRC and BCQP are squares and PU and ST are perpendicular to the straight line TABU.

Prove that PU + ST = AB.

SOLUTION

Construct CD perpendicular to AB with D on AB.

ΔAST is congruent to ΔCAD because
AS = AC
∠ATS = ∠ACD = 90°
∠SAT + ∠CAD = 90° and ∠SAT + ∠TSA = 90°
So ∠SAT = ∠TSA
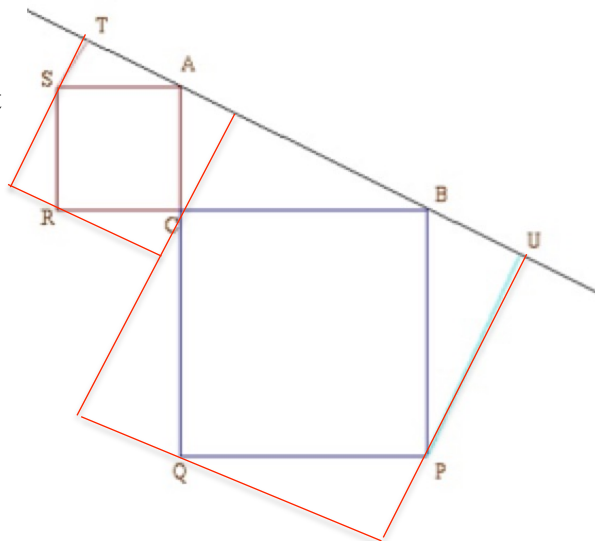
It follows that ST = AD

By a similar argument ΔCBD is congruent to ΔBPU so PU = DB

Adding we get ST + PU = AD + DB = AB
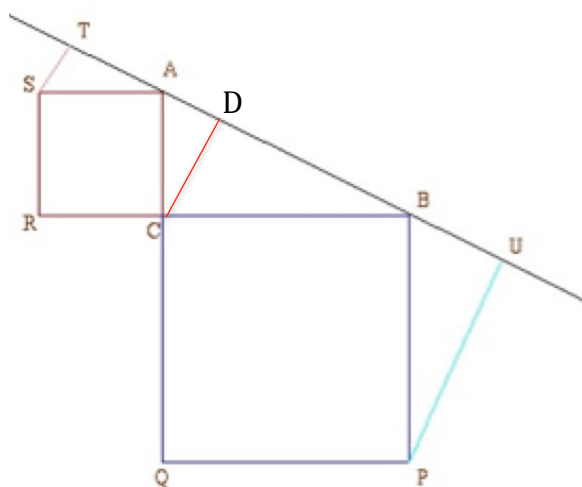
By boxing in the two squares with lines parallel to ST and PU each square is enclosed by 4 congruent triangles. This shows that PU + ST = AB

NOTES FOR TEACHERS

Why do this activity?
This is a simple exercise based on congruent triangles.

Intended learning outcomes
Practice in geometrical reasoning.

Possible approach
Put the question on the board or copy the top part of page 1 to make worksheets.

Depending on your class you may have to ask the learners to suggest a construction that they could do to make triangles that they could work with. Accept all suggestions and draw several diagrams if necessary.

Give the learners time to do the question working in pairs then have a class discussion in which learners show their solutions and give explanations for each step in the argument.

Key questions
Can you put in another line to make some triangles that you could work with?
You have said those two lengths are the same, why?
What can you say about those two triangles, why?
Which angles are equal, try marking them in the diagram with the same colour.
Which lengths are equal, try marking them in the diagram with the same colour.

Possible extension
See Pythagoras Jig-saw https://aiminghigh.aimssec.ac.za/grades-8-to-12-pythagoras-jig-saw/

Possible support
 It will help to make equal angles in the same colour and equal lengths in the same colour.