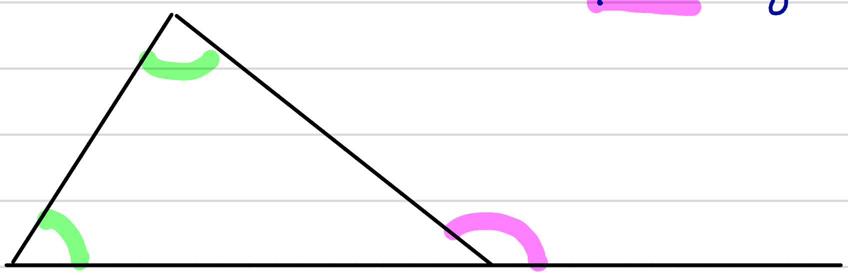
Props 11 + 12 (P is on ℓ / P is not on ℓ) Given a line, ℓ, and a point, P, it is possible to construct a second line through P perpendicular to ℓ.

↳ Def 10

Uses props 8 + 10
SSS   bisection

Prop 16 The exterior angle of a triangle is greater than either interior opposite angles
(The pink angle is larger than the green)

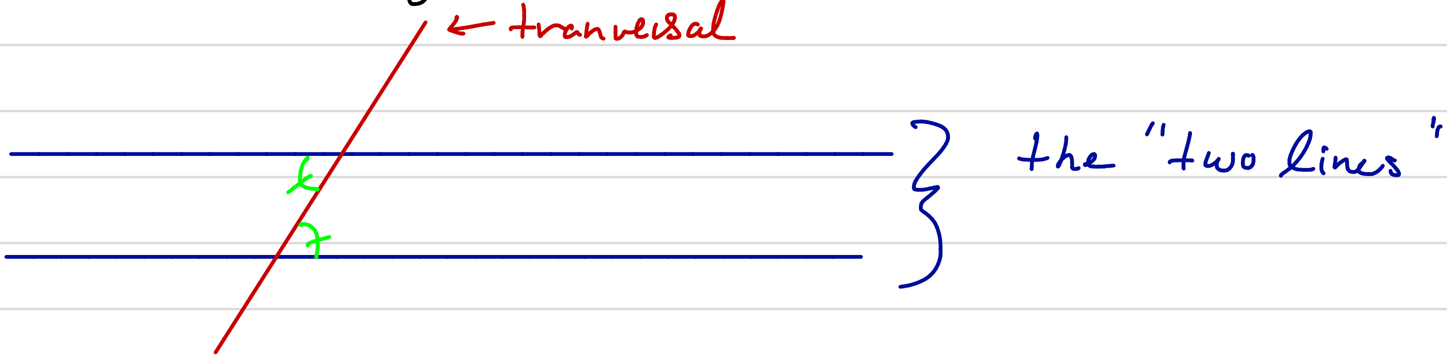


• Note: Didn't need to measure the angles.

Proof used: Prop 3 (construct equal line segments)
Prop 4 (SAS)
Prop 10 (bisect line segment)
Prop 15 (Vertical angles are equal)
CN5 (whole > part)

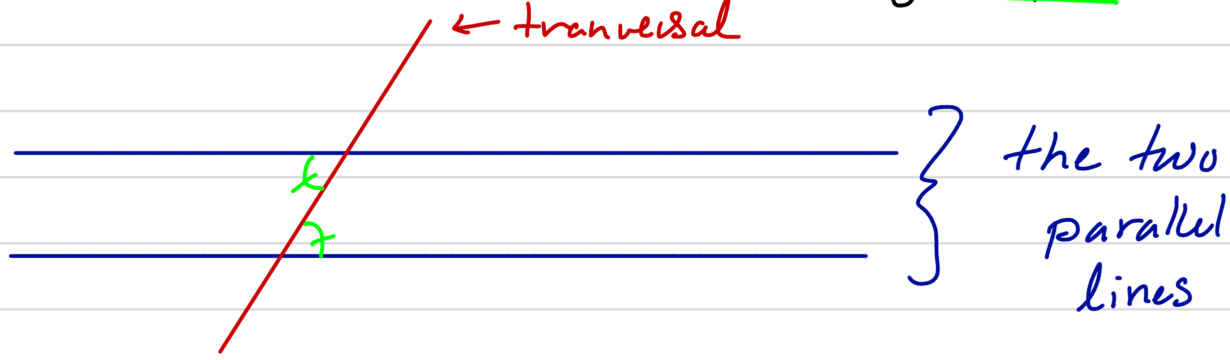
Prop 27 If a straight line falling on two straight lines makes alternate angles equal, then the straight lines are parallel.

← tranversal



Pf: (by contradiction)   Uses Prop 16

Prop 29: A straight line falling on two parallel lines makes alternate angles equal.



Pf: (by contradiction)

Uses Prop 13, 15 + 5^{th} axiom

Prop 32: The sum of the angles of a triangle equals two right angles.

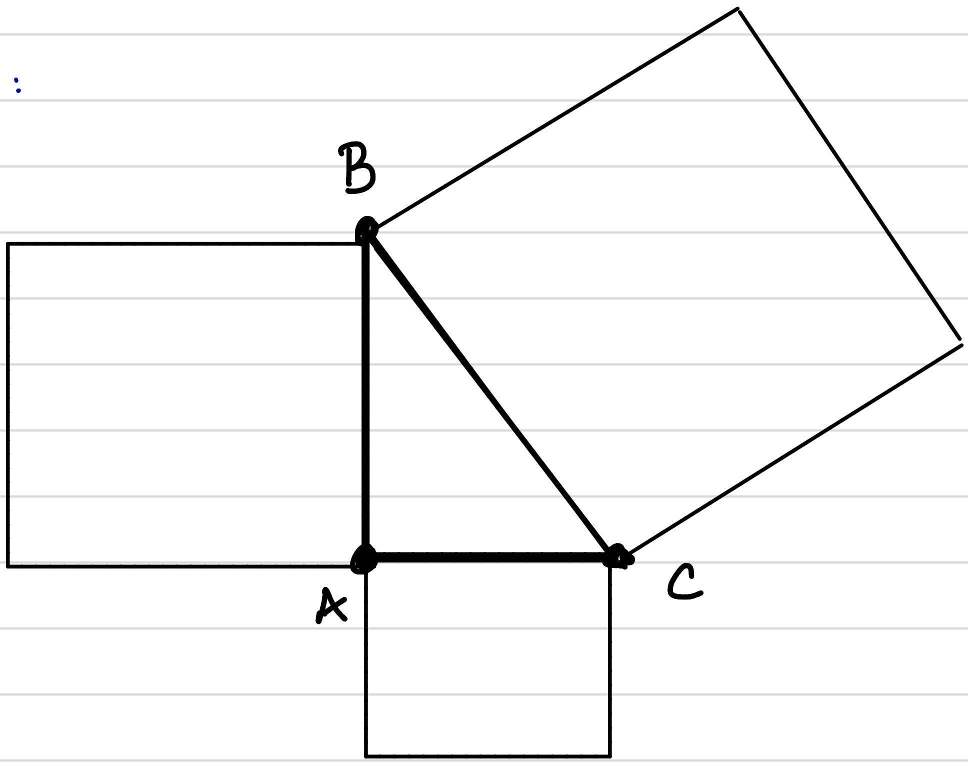
Pf: (Constructive)

Uses Props 13, 29, 31

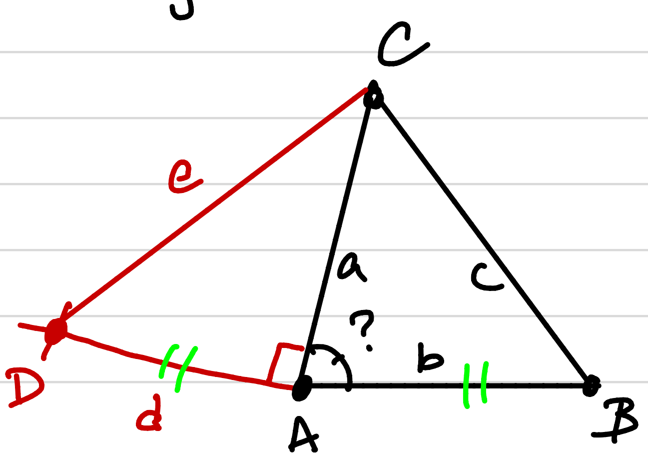
Prop 47: (the Pythagorean Thm)
In a right triangle, the square on the hypontkneuse equals the sum of the squares on the other two sides.

Pf:

Uses Prop 46 (which uses prop 29)



Prop 48: If in a triangle, the square on one side equals the sum of the squares on the other two sides, then the triangle is right.



$e^2 = a^2 + d^2$ b/c $\angle CAD = 90°$
$= a^2 + b^2$ b/c $DA = AB$
$= c^2$ b/c hypoth.
So Δ's are congruent by SSS.
So $90 = \angle CAD = \angle CAB$.

Picture of Dependencies