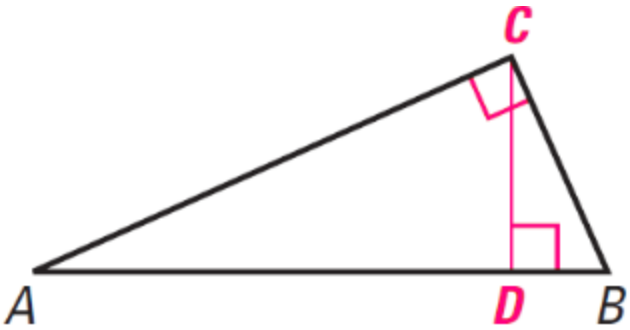
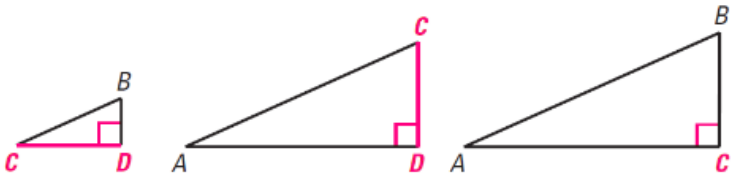
3.06 Toolbox

Review of Similarity in Right Triangles





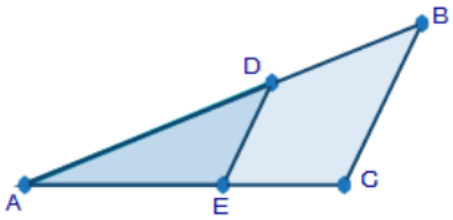
$\Delta ABC \sim \Delta$_____ $\sim \Delta$_____

Video: [V22_306-video2]

Triangle Proportionality Theorem

What it says:

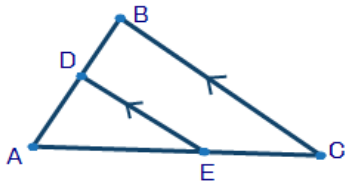
If a segment is _____ to one side of a triangle and intersects the other two sides of the triangle, the segment divides the sides of the triangle _____.



Video: [Geo306-video1]

Converse of the Triangle Proportionality Theorem: If a line divides two sides of a triangle _____, then it is parallel to the third side.	

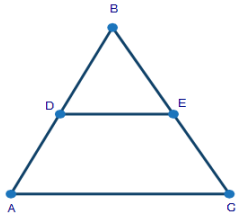
The Triangle Proportionality Theorem Proof

Video: Geo306-video2 **(Extra Enrichment: Geo306-video2b)**
Given: ΔABC, DE intersects AB and AC, and DE||BC      **Prove:** $\frac{AD}{AB} = \frac{AE}{AC}$

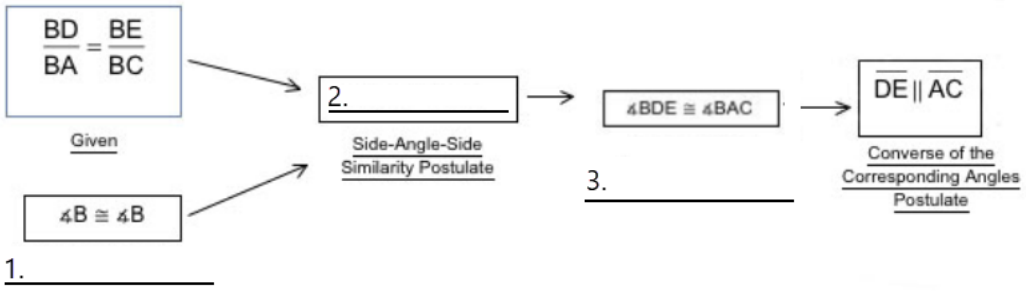
Two-column proof:

Statements	Reasons
ΔABC is intersected by line DE	_____
DE || BC	Given
∡ABC ≅ ∡_____	Corresponding Angles Postulate
∡A ≅ ∡A	_____ _____
ΔABC ~ ΔADE	_____ - _____ Similarity Postulate
AD / AB = AE / AC	Definition of Similar Triangles

The Converse of the Triangle Proportionality Theorem Proof

Video: Geo306-video3
In ΔABC shown, BD / BA equals BE / BC: Prove: DE||AC   

Flow-chart Proof:



Blanks:

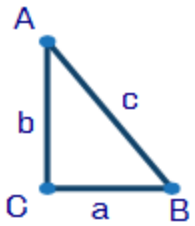
1. _____
2. _____
3. _____

Pythagorean Theorem

Video: Geo306-video5

What it says:

If a right triangle has sides a and b and hypotenuse c then _____.



Converse of the Pythagorean Theorem:

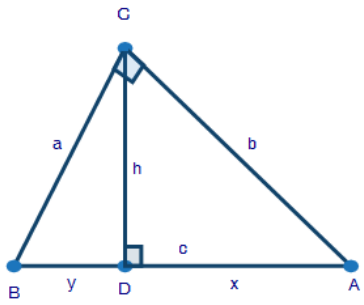
In a triangle with sides a, b, and c, if $a^2 + b^2 = c^2$, then the triangle is a _____ triangle.

The Pythagorean Theorem, using Similar Triangles Proof

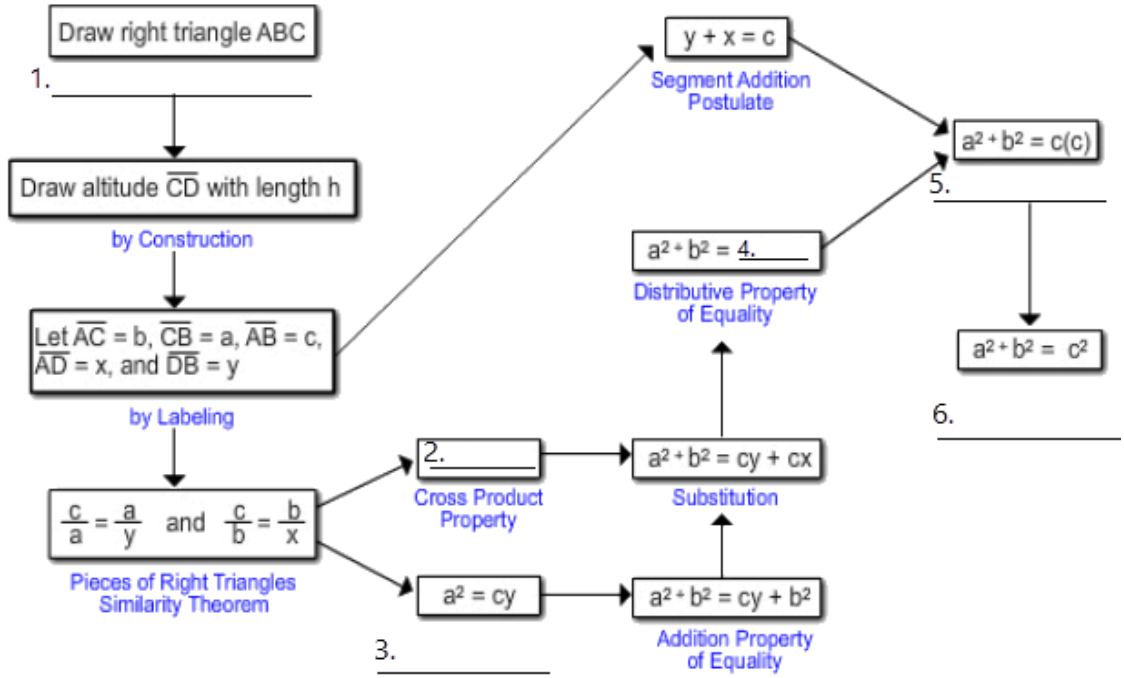
Video: [Geo306-video6]

Given: ΔABC is a right triangle.

Prove: $a^2 + b^2 = c^2$



Flow-Chart Proof:



Blanks:

1. _____ 2. _____

3. _____ 4. _____

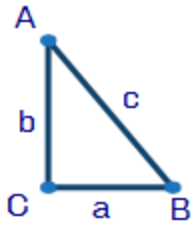
5. _____ 6. _____

The Converse of the Pythagorean Theorem Proof

Video: [Geo306-video7]

Given: ΔABC, where $a^2 + b^2 = c^2$

Prove: $\angle ACB$ is a right angle



Two-column proof:

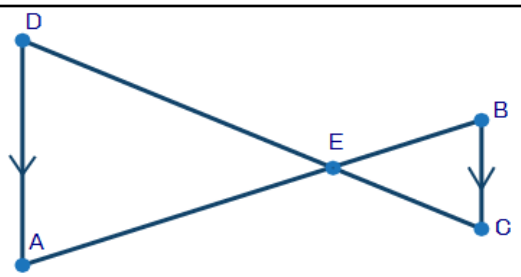
Statements	Reasons
The length of BC is a, the length of AC is b, and the length of AB is c	_____
Construct right triangle SIT where legs ST and TI are congruent to legs AC and CB of triangle ABC, respectively.	By construction
TI ≅ CB ST ≅ AC	by _____
ST has length i, TI has length s, and IS has length t	By Labeling
$t^2 = s^2 + i^2$	_____ Theorem
$t^2 = a^2 + b^2$	Substitution Property of Equality
_____	Given
$t^2 = c^2$	Substitution Property of Equality
_____ = _____	Square Root Property of Equality
$\Delta ABC \cong \Delta SIT$	Side-Side-Side (SSS) Postulate
$\angle ACB$ is a right angle	_____

Proving Similarity

Video: [Geo306-video8]

Given: $\overline{AB}$ intersects $\overline{DC}$ at point E and AD||CB

Prove: ΔAED ~ ΔBEC



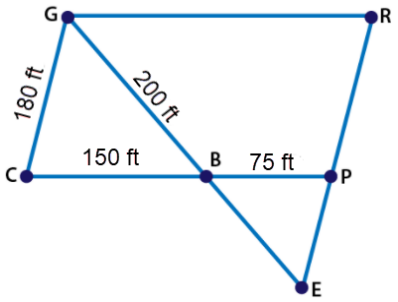
Two-column proof:

Statements	**Reasons**
$\overline{AB}$ intersects $\overline{DC}$ at point E	Given
AD||CB	Given
∡AED ≅ ∡BEC	_____ _____ Theorem
∡DAE ≅ ∡CBE	_____ _____ Angles Theorem
ΔAED ~ ΔBEC	_____ - _____ Similarity Postulate

Practice

GRPC is a parallelogram.

Part 1: Determine if triangles GBC and EBP are similar? Explain how you know.



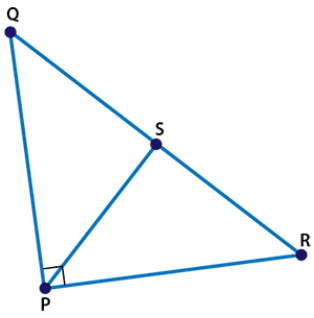
Part 2: Find the distance from B to E and from P to E.

Video: [Geo306-video9]

Carla is using triangle similarity to prove the Pythagorean Theorem. In the triangle PQR, angle P is 90° and segment PS is perpendicular to segment QR.

Part 1: Find a pair of similar triangles and explain why they are similar.

Video:[Geo306-video10]



Part 2: If RS = 2 and RQ = 18, find the length of segment RP.