

5 5 proving overlapping triangles are congruent

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How to Prove Overlapping Triangles are Congruent**

Introduction

Overlapping triangles occur when two triangles share a common side or two. To prove that overlapping triangles are congruent, you can use several methods, including:

SSS (Side-Side-Side) Congruence

- If the three sides of one triangle are equal to the three sides of another triangle, then the triangles are congruent.

SAS (Side-Angle-Side) Congruence

- If two sides and the included angle of one triangle are equal to two sides and the included angle of another triangle, then the triangles are congruent.

ASA (Angle-Side-Angle) Congruence

- If two angles and the included side of one triangle are equal to two angles and the included side of another triangle, then the triangles are congruent.

AAS (Angle-Angle-Side) Congruence

- If two angles and a non-included side of one triangle are equal to two angles and a non-included side of another triangle, then the triangles are

congruent.

HL (Hypotenuse-Leg) Congruence

- If the hypotenuse and a leg of one right triangle are equal to the hypotenuse and a leg of another right triangle, then the triangles are congruent.

Properties of Overlapping Triangles

- Overlapping triangles have a common side or two.
- The angles that do not share a side are supplementary.
- The sum of the interior angles is 180 degrees.

4 Theorems That Prove Two Triangles are Congruent

- SSS Congruence Theorem
- SAS Congruence Theorem
- ASA Congruence Theorem
- AAS Congruence Theorem

SSA Congruence Rule

The SSA (Side-Side-Angle) Congruence Rule states that two triangles are congruent if they have two sides and the non-included angle equal. However, this rule is not valid in Euclidean geometry.

Why is SSA Congruence Not Possible?

In Euclidean geometry, SSA congruence is not possible because a side and an angle opposite to it do not uniquely determine a triangle. There can be multiple triangles with the same side and angle but different side lengths.

5 Rules for Congruent Triangles

- SSS (Side-Side-Side) Congruence
- SAS (Side-Angle-Side) Congruence
- ASA (Angle-Side-Angle) Congruence

- AAS (Angle-Angle-Side) Congruence
- HL (Hypotenuse-Leg) Congruence

45-45-90 Rule

The 45-45-90 Rule states that a triangle with angles measuring 45, 45, and 90 degrees is always congruent to another triangle with the same angles.

5 Proofs of Congruence

- SSS Congruence Proof
- SAS Congruence Proof
- ASA Congruence Proof
- AAS Congruence Proof
- HL Congruence Proof

Overlapping Angle Theorem

The Overlapping Angle Theorem states that if two angles and the segments that form them overlap perfectly, then the angles are congruent and the segments are equal.

RHS Rule for Congruence

The RHS (Right-Hypotenuse-Side) Rule for Congruence states that two right triangles are congruent if they have a right angle, the hypotenuse, and a leg in common.

Activities to Prove Two Triangles are Congruent

- Paper folding and cutting
- Using a protractor to measure angles
- Using a ruler to measure sides
- Using a compass to construct congruent triangles
- Graphing and plotting points to create congruent triangles

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