IM 9–12 MATH v.1

Unit 2
Congruence

GEOMETRY

Lesson 11

Side-Side-Angle (Sometimes) Congruence

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Learning Goal

Let's explore triangle congruence criteria that are ambiguous.

Geometry

Congruence Fail

Warm-up: Notice and Wonder

What do you notice? What do you wonder?

In triangles *GBD* and *KHI*:

- Angle *GBD* is congruent to angle *KHI*.
- Segment *BD* is congruent to segment *HI*.
- Segment *DG* is congruent to segment *IK*.

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Congruence Fail

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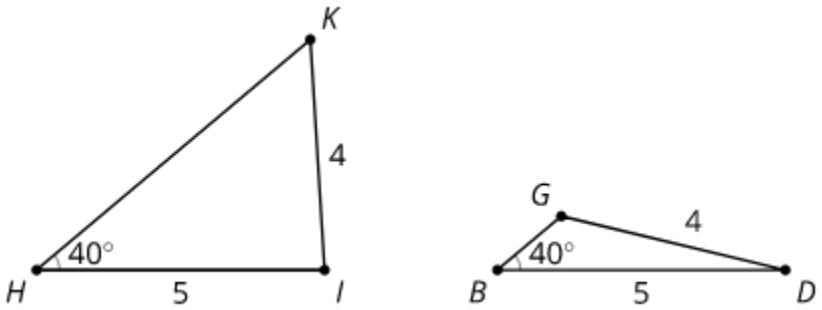

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Dare to Be (Even More) Different

Use technology to make a triangle using the given angle and side lengths so that the given angle is not between the 2 given sides. Try to make your triangle different from the triangles created by the other people in your group.

- Angle: 40^o
- Side length: 6 cm
- Side length: 8 cm

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Ambiguously Ambiguous?

Your teacher will give you some sets of information.

- For each set of information, make a triangle using that information.
- If you think you can make more than one triangle, make more than one triangle.
- If you think you can't make any triangle, note that.

When you are confident they are accurate, create a visual display.

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Side-Side-Angle (Sometimes) Congruence

Lesson Synthesis

When you are given that two pairs of corresponding sides are congruent, and a pair of corresponding angles that are not between the sides are congruent, that is enough to guarantee triangle congruence if the longer side is opposite the given angle, but not enough information if the shorter side is opposite the given angle.

Sketch a picture of the ambiguous case, and the non-ambiguous case, and label them in ways that help you understand.

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- I know Side-Side-Angle does not guarantee triangles are congruent.

Learning Targets

Geometry

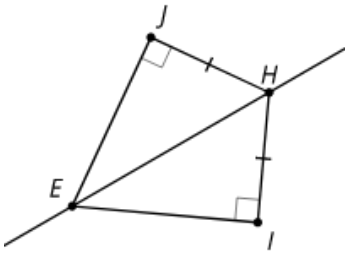
Are They Ambiguous?

Cool-down

Label each example with one of the statements:

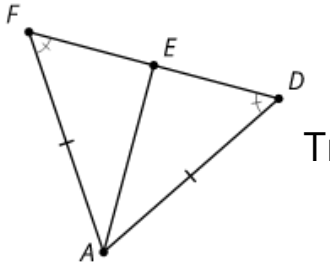
- The triangles must be congruent.
- The triangles might not be congruent.

$\overline{HJ} \perp \overline{JE}, \overline{HI} \perp \overline{IE}, \overline{HJ} \cong \overline{HI}$



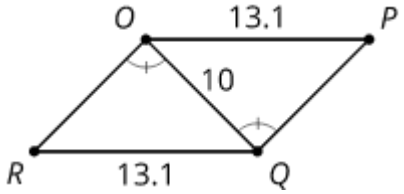
Triangle *EJH* and triangle *EIH*

1. $\overline{AF} \cong \overline{AD}, \angle F \cong \angle D$



Triangle *AFE* and triangle *ADE*

3. $\angle ROQ \cong \angle PQO$



Triangle *EJH* and triangle *EIH*

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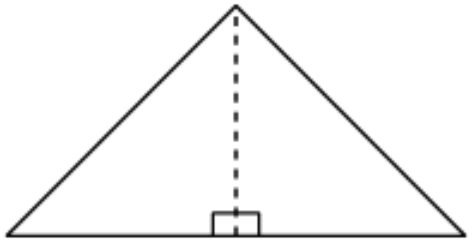
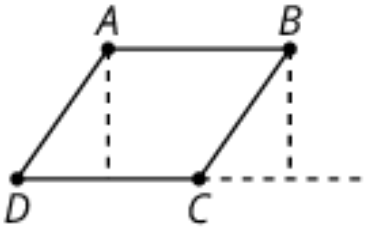
auxiliary line

An extra line drawn in a figure to reveal hidden structure.



For example, the line shown in the isosceles triangle is a line of symmetry, and the lines shown in the parallelogram suggest a way of rearranging it into a rectangle.



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converse

The converse of an if-then statement is the statement that interchanges the hypothesis and the conclusion. For example, the converse of "if it's Tuesday, then this must be Belgium" is "if this is Belgium, then it must be Tuesday."

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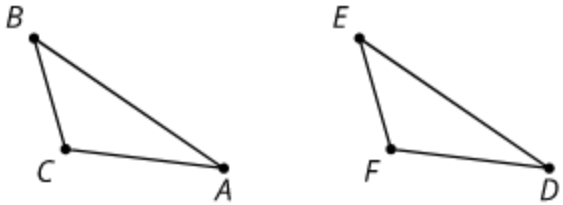
corresponding

For a rigid transformation that takes one figure onto another, a part of the first figure and its image in the second figure are called corresponding parts. We also talk about corresponding parts when we are trying to prove two figures are congruent and set up a correspondence between the parts to see if the parts are congruent.



In the figure, segment *AB* corresponds to segment *DE*, and angle *BCA* corresponds to angle *EFD*.

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parallelogram

A quadrilateral in which pairs of opposite sides are parallel.

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