

Congruent Triangles

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Activity overview

Students will investigate what conditions are necessary to prove two triangles are congruent.

Concepts

- Two triangles are congruent by SSS, ASA, AAS, or SAS.
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Teacher preparation

Students need to understand how to match corresponding sides of a triangle.

The screenshots on pages 2-3 demonstrate expected student results. Refer to the screenshots on page 4-5 for a preview of the student .tns file.

Classroom management tips

This activity is designed to be student-centered with the teacher acting as a facilitator while students work cooperatively. The student worksheet is provided for students to record their answers to the questions asked in the activity.

You may have students share their methods to solve the problem on page 1.15 with the whole class to summarize and develop what was gained from the activity.

TI-Nspire Applications

Graphs & Geometry, Notes

Encourage students to grab each vertex of $\triangle ABC$ and drag to see the corresponding vertex for $\triangle GFE$ move.

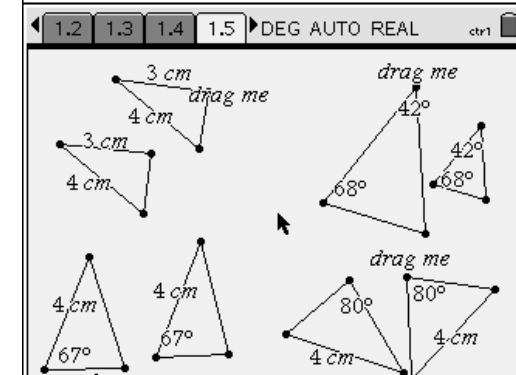
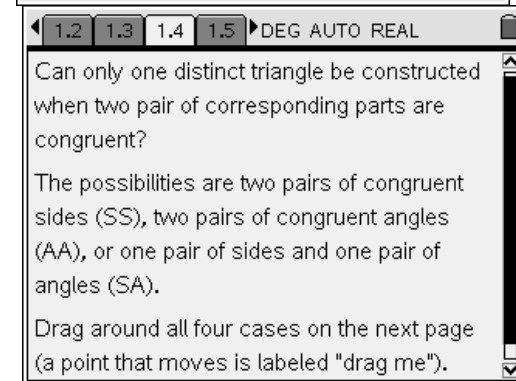
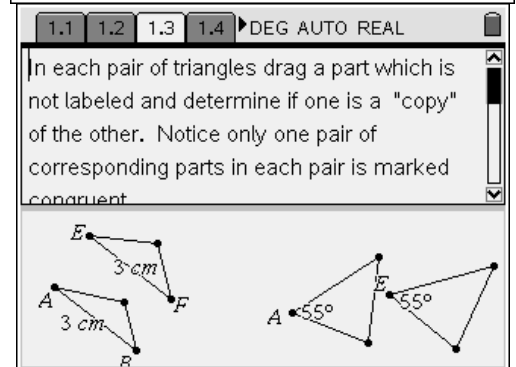
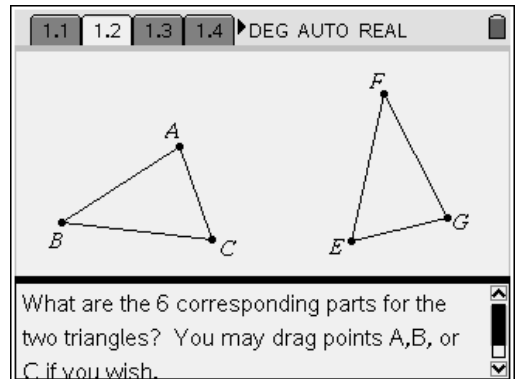
$$\begin{aligned} \overline{AB} &\cong \overline{GF} & \angle A &\cong \angle G \\ \overline{BC} &\cong \overline{FE} & \angle B &\cong \angle F \\ \overline{CA} &\cong \overline{EG} & \angle C &\cong \angle E \end{aligned}$$

No. If only one pair of corresponding parts is congruent one triangle will not always be a copy of the other.

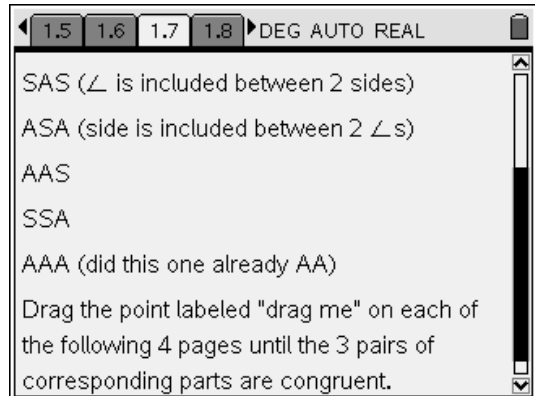
No. If only two pair of corresponding parts are congruent one triangle will not always be a copy of the other.

Check to see if congruent parts are labeled on student sketches.

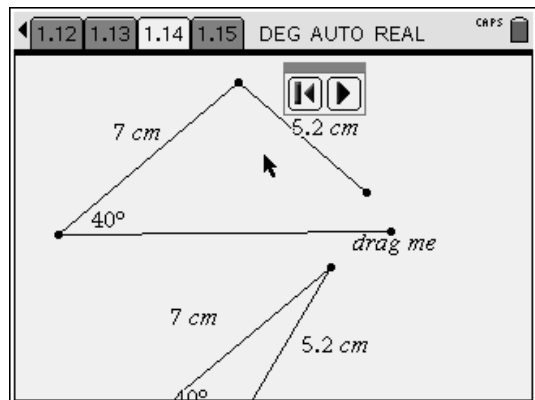
1st case (upper left corner) is SS. 2nd case (upper right corner) is AA. 3rd case (lower left corner) is AS. 4th case (lower right corner) is AS.



Make sure students read directions carefully at the bottom of this page as the goal is slightly different – make all three labeled parts congruent, then decide if the triangles are congruent.

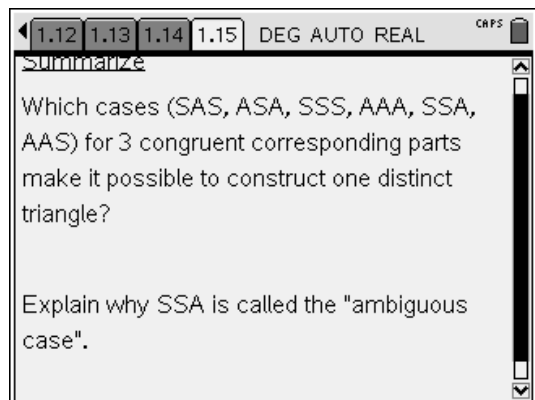


No. Two triangles can be made with the given measures. One matches the obtuse triangle shown below and the other is an acute triangle.



The cases SAS, ASA, SSS, and AAS will make it possible to construct one distinct triangle.

SSA allows for the construction of two triangles, one triangle, or no triangle at all depending on the values of the angle and sides.



Student TI-Nspire Document
congruent_triangles.tns

1.1 1.2 1.3 1.4 DEG AUTO REAL CAPS

CONGRUENT TRIANGLES

When two figures are congruent, **all** of the corresponding sides and corresponding angles are congruent.

Specifically, for triangles we say **corresponding parts of congruent triangles are congruent.**

1.1 1.2 1.3 1.4 DEG AUTO REAL CAPS ctr1

What are the 6 corresponding parts for the two triangles? You may drag points A, B, or C, if you wish.

1.1 1.2 1.3 1.4 DEG AUTO REAL CAPS

corresponding parts in each pair is marked congruent.

"Copy" means that we can construct only **one** distinct triangle congruent to the original triangle.

1.1 1.2 1.3 1.4 DEG AUTO REAL CAPS

Can only one distinct triangle be constructed when two pair of corresponding parts are congruent?

The possibilities are two pairs of congruent sides (SS), two pairs of congruent angles (AA), or one pair of sides and one pair of angles (SA).

Drag around all four cases on the next page (a point that moves is labeled "drag me").

1.2 1.3 1.4 1.5 DEG AUTO REAL CAPS ctr1

1.3 1.4 1.5 1.6 DEG AUTO REAL CAPS

Identify which case (SS, SA, AA) goes with each pair of triangles on the previous page.

Change each case to two non-congruent triangles and sketch your results.

1.4 1.5 1.6 1.7 DEG AUTO REAL CAPS

The 6 possibilities are:

- SSS
- SAS (\angle is included between 2 sides)
- ASA (side is included between 2 \angle s)
- AAS
- SSA
- AAA (did this one already AA)

Drag the point labeled "drag me" on each of

1.5 1.6 1.7 1.8 DEG AUTO REAL CAPS ctr1

1.6 1.7 1.8 1.9 DEG AUTO REAL CAPS ctr1

1.7 1.8 1.9 1.10 DEG AUTO REAL CRPS ctr1

1.8 1.9 1.10 1.11 DEG AUTO REAL CRPS ctr1

1.9 1.10 1.11 1.12 DEG AUTO REAL CRPS

Leave each of the 4 previous pages showing congruent triangles (if possible). Identify which case goes with each page.

1.10 1.11 1.12 1.13 DEG AUTO REAL CRPS

We still have one more case to explore (SSA).

On the following page, press play (**let it play all the way through**). You can pause or reset when needed. Use the "drag me" point to make a triangle.

Can only one distinct triangle be constructed with the given measures?

1.11 1.12 1.13 1.14 DEG AUTO REAL CRPS ctr1

1.12 1.13 1.14 1.15 DEG AUTO REAL CRPS

Summarize

Which cases (SAS, ASA, SSS, AAA, SSA, AAS) for 3 congruent corresponding parts make it possible to construct one distinct triangle?

I

Explain why SSA is called the "ambiguous case".