

CUT & GLUE SORT

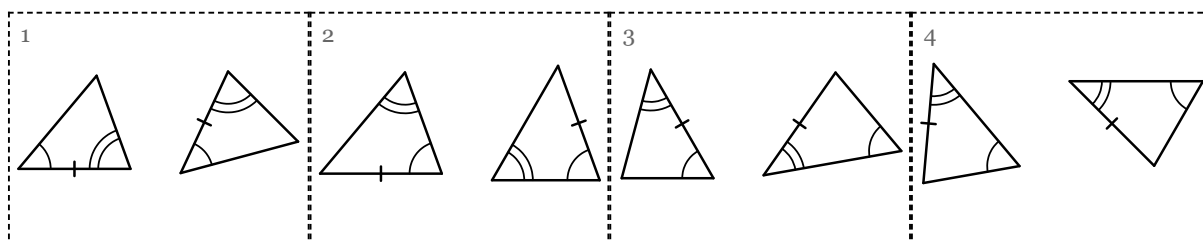


ASA AND AAS TRIANGLE CONGRUENCE

ASA, AAS, or Not Proved?

Two angles and a side · is the side in the right place?

FREE



Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue. Nothing else is needed.
2. **Say this once:** *“Angles with the same number of arcs are equal. Sides with a tick are equal. Look at both triangles. The tick must be in the same place in both, or nothing is proved.”*
3. **Check a sheet in ten seconds:** every row gets four pieces.

Student sheets	pages 3 and 4, one of each per student. Page 3 shows SAS, ASA and AAS as three small marked triangles.
Answers	page 5.

The last row is the hardest, and it is the most important. Many students believe that two angles and any side are enough. They are not. The side must be in the same place in both triangles. In three pieces of the last row, each triangle has a ticked side, but the ticks are in different places. Those triangles are not congruent: the second one is drawn larger or smaller. In one piece the difference is small, so the drawing does not give the answer away. The last piece has two pairs of equal angles and no ticked side. Equal angles give the same shape, but not the same size.

How to see the mistake. A student who reads only the first triangle of each piece gets nine of the twelve pieces right. The last row then holds only one or two pieces, and the other rows hold five or six. Ask that student to point to the tick in the second triangle.

Between the first two rows, a student looks at the ends of the ticked side. If both ends are marked corners, the side is between the two angles: ASA. If one end is the unmarked corner: AAS. The triangles are turned and flipped, so the tick is not always at the bottom. Guessing does not work: every simple guessing rule places at most six of the twelve pieces correctly.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
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ASA, AAS, or not proved?

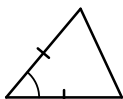
Two angles and a side

Name _____

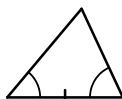
Period _____

Date _____

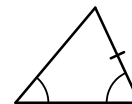
Cut out the twelve pieces on the next page. Each piece shows two triangles. **Decide which row the piece belongs in, and glue it there.**



SAS The **angle** is between the two sides.



ASA The **side** is between the two angles.



AAS The side is **not** between the two angles.

Angles with the same number of arcs are equal. Sides with a tick are equal. Find the two marked corners. If the ticked side joins them, it is ASA. If not, it is AAS, but only when the tick is in the same place in both triangles.

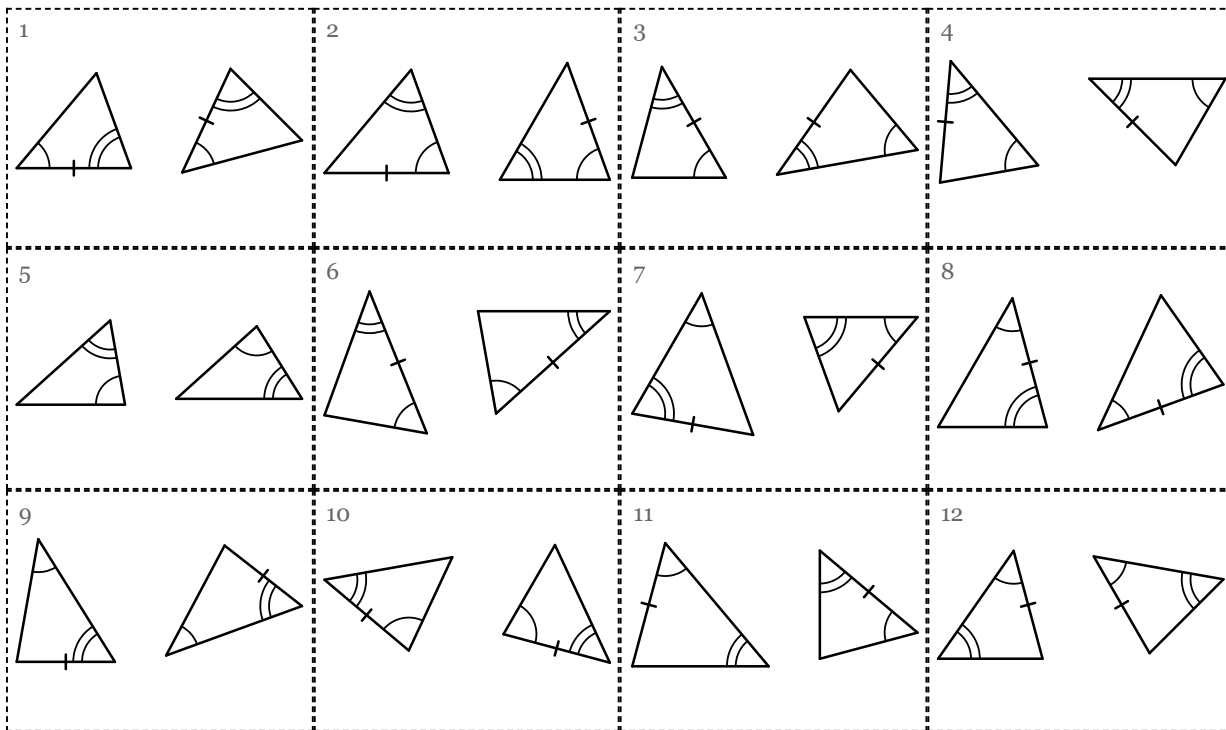
ASA. The ticked side is between the two marked angles.

AAS. The ticked side is not between the two marked angles. In both triangles it is across from the angle with the same number of arcs.

Not proved. No side has a tick, or the ticked sides are in different places in the two triangles.

The twelve pieces

Cut along the dotted lines



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Cut & Glue Sort — answers

For the teacher

ASA	1 — The ticked side joins the one-arc corner and the two-arc corner in both triangles, so it is between the two angles.	6 — In both triangles the tick is on the side joining the two marked corners.	8 — The ticked side runs from the one-arc corner to the two-arc corner in both triangles.	10 — Both ends of the ticked side are marked corners, in both triangles. One triangle is flipped, which does not matter.
AAS	2 — The ticked side has the unmarked corner at one end. In both triangles it is across from the two-arc angle.	4 — The ticked side is not between the angles. In both triangles it is across from the one-arc angle.	9 — The ticked side joins the two-arc corner to the unmarked corner. In both triangles it is across from the one-arc angle.	12 — The ticked side joins the one-arc corner to the unmarked corner. In both triangles it is across from the two-arc angle.
Not proved	3 — In the first triangle the tick is between the two angles. In the second it is across from the one-arc angle. The ticked sides are in different places, so nothing is proved. The triangles look alike, but the second is a little larger.	5 — Two pairs of angles match, but no side is ticked. Equal angles alone do not prove two triangles congruent.	7 — In the first triangle the tick is across from the one-arc angle. In the second it is across from the two-arc angle. So the ticked sides are not matching sides.	11 — In the first triangle the tick is across from the two-arc angle. In the second it is between the two angles. The ticked sides are not matching sides.

Every row holds four pieces. In every piece, the angles with one arc are equal, and the angles with two arcs are equal. A piece goes in the ASA row when the ticked side joins the two marked corners in both triangles. It goes in the AAS row when the ticked side has the unmarked corner at one end, and it is across from the same kind of angle (one arc or two arcs) in both triangles. It goes in the last row when no side is ticked, or when the ticks are in different places in the two triangles.

To check a piece with a student, point to the ticked side in the first triangle and ask which angle it is across from. Then ask the same about the second triangle.