

MYSTERY PICTURE

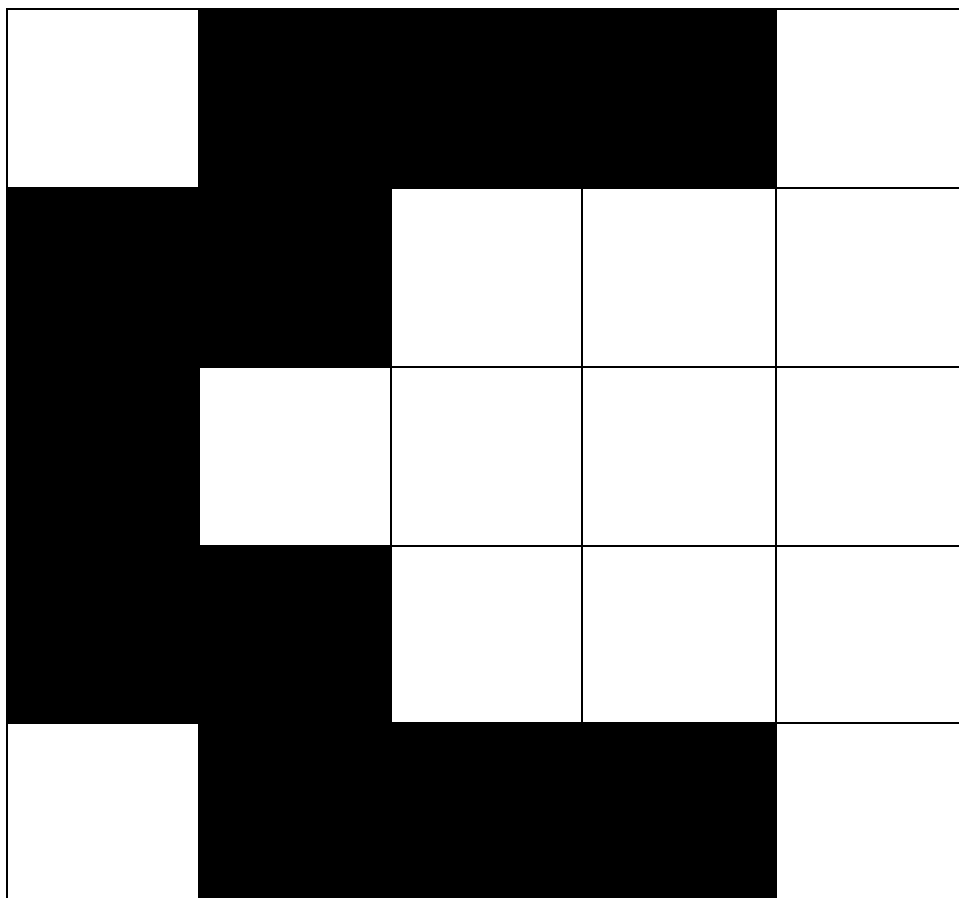


CHOOSING A TRIANGLE CONGRUENCE CRITERION

Proved or Not Proved?

25 pairs of triangles · SSS, SAS, ASA, AAS, HL, or nothing

FREE



25 squares · 1 student sheet · answer key · 4 pages

Geometry · Grades 8–10 · chooseyourlesson.com

1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“Do the marks prove the two triangles congruent? Look for a side in both triangles and for two lines that cross. Those give a pair with no mark. If the triangles are proved congruent, fill the square. If not, leave it white.”*
3. **When a student finishes, look at the picture.** If it is not the letter C, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. It shows SSS, SAS, ASA, AAS, HL and the two pairs with no mark as small drawings.
Answers	page 4: the finished picture and the reason for every square.

This sheet practices one decision: is there a criterion at all? A square is filled when SSS, SAS, ASA, AAS or HL proves the two triangles congruent. It is white when no criterion fits. Students do not have to name the criterion here. Many students believe that every pair of triangles on a worksheet must be congruent. So they add a fact from the look of the drawing. On this sheet, “not proved” is the answer for fourteen squares.

Pairs with no mark. In five filled squares, only two pairs are marked. The third pair has no mark. It is a side that lies in both triangles (it is equal to itself), or the two facing angles where two segments cross (vertical angles are equal). Students who miss these leave the square white.

The drawing does not decide. In seven white squares the two triangles are drawn the same size and shape, but the marks do not prove it. The white squares are two sides and an angle that is not between them (SSA), three angles and no side, or only two known pairs. Four squares give the facts in words, with no drawing. In two of them the order of the parts suggests the wrong answer. What counts is where each part sits in the triangle.

Eleven squares are filled and fourteen are white. Guessing does not work. Every simple guessing rule, such as filling the square when three pairs are marked, gets at least two squares wrong.



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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Mystery Picture

Proved or not proved?

Name _____

Period _____

Date _____

Each square shows two triangles, or tells you about two triangles. Do the marks prove that the two triangles are congruent? If yes, fill the square with slanted lines. If no, leave it white.



SSS Three pairs of sides.



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.



HL A right angle, the long side, and one more side.



Free side A side in both triangles counts as a pair.



Free angles Where two lines cross, the two facing angles count as a pair.

Some pairs have no mark. We call them free pairs. A side that is in **both** triangles is equal to itself. Where two segments cross, the two **facing** angles are equal. Count these pairs too. Do not trust how the drawing looks. Only the marks and the free pairs count. Two sides and an angle that is not between them prove nothing. Three angles prove nothing. In a square with letters, A goes with D, B with E, and C with F.

When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.

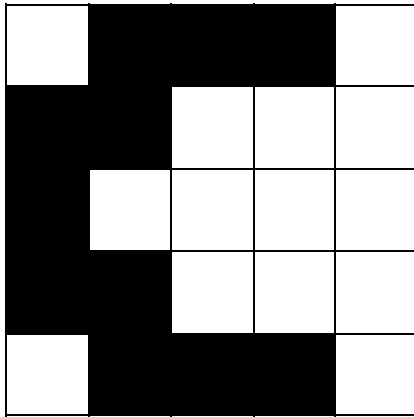
1 	2 	3 	4 	5
6 	7 $\triangle ABC$ and $\triangle DEF$: $AB \cong DE$ $BC \cong EF$ $\angle B \cong \angle E$	8 $\triangle ABC$ and $\triangle DEF$: $AB \cong DE$ $\angle A \cong \angle D$ $BC \cong EF$	9 	10
11 	12 	13 	14 	15 $\triangle ABC$ and $\triangle DEF$: $\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$
16 	17 	18 	19 	20
21 $\triangle ABC$ and $\triangle DEF$: $AC \cong DF$ $BC \cong EF$ $\angle A \cong \angle D$	22 	23 	24 	25



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Mystery Picture — answers

For the teacher



The finished picture is **the letter C**: a curve open on the right, thicker on its left side.

A square is filled when a criterion (SSS, SAS, ASA, AAS or HL) proves the triangles congruent. Count the marked pairs and the pairs with no mark: a side in both triangles, and the facing angles where two segments cross.

A square is white when no criterion fits, even if the triangles look the same.

1–5

1 · white
Known: two marked pairs of sides, one marked pair of angles. The angle is not between the two sides (SSA): not proved.

2 · FILL
Known: two marked pairs of sides, the facing angles at the crossing. The angle is between the two sides: SAS.

3 · FILL
Known: three marked pairs of sides. Three pairs of sides: SSS.

4 · FILL
Known: one marked pair of sides, one marked pair of angles, the side in both triangles. The angle is between the two sides: SAS.

5 · white
Known: one marked pair of sides, the facing angles at the crossing. Only two pairs are known: not proved. They look the same, but the marks do not prove it.

6–10

6 · FILL
Known: two marked pairs of sides, the side in both triangles. Three pairs of sides: SSS.

7 · FILL
Angle B is between sides AB and BC, so it is SAS. The order of the rows does not matter.

8 · white
The angle is at A, and it is not between the two sides. That is SSA: not proved.

9 · white
Known: one marked pair of sides, the side in both triangles. Only two pairs are known: not proved. They look the same, but the marks do not prove it.

10 · white
Known: two marked pairs of sides, one marked pair of angles. The angle is not between the two sides (SSA): not proved. They look the same, but the marks do not prove it.

11–15

11 · FILL
Known: one marked pair of sides, two marked pairs of angles. The side is not between the two angles: AAS.

12 · white
Known: one marked pair of sides, one marked pair of angles, the side in both triangles. The angle is not between the two sides (SSA): not proved.

13 · white
Known: two marked pairs of angles, the facing angles at the crossing. Three angles and no side: not proved. They look the same, but the marks do not prove it.

14 · white
Known: two marked pairs of angles. Only two pairs are known: not proved. They look the same, but the marks do not prove it.

15 · white
Three angles and no side: not proved. The triangles could be different sizes.

16–20

16 · FILL
Known: one marked pair of sides, one marked pair of angles, the facing angles at the crossing. The side is not between the two angles: AAS.

17 · FILL
Known: one marked pair of sides, two marked pairs of angles. The side is between the two angles: ASA.

18 · white
Known: one marked pair of sides, the right angles. Only two pairs are known: not proved. They look the same, but the marks do not prove it.

19 · white
Known: two marked pairs of sides, the facing angles at the crossing. The angle is not between the two sides (SSA): not proved.

20 · white
Known: two marked pairs of sides. Only two pairs are known: not proved. They look the same, but the marks do not prove it.

21–25

21 · white
The angle is at A, and it is not between the two sides. That is SSA: not proved.

22 · FILL
Known: two marked pairs of sides, the right angles. Right angles, the long sides, and one more pair of sides: HL.

23 · FILL
Known: two marked pairs of angles, the side in both triangles. The side is between the two angles: ASA.

24 · FILL
Known: two marked pairs of sides, one marked pair of angles. The angle is between the two sides: SAS.

25 · white
Known: three marked pairs of angles. Three angles and no side: not proved.