

MYSTERY PICTURE

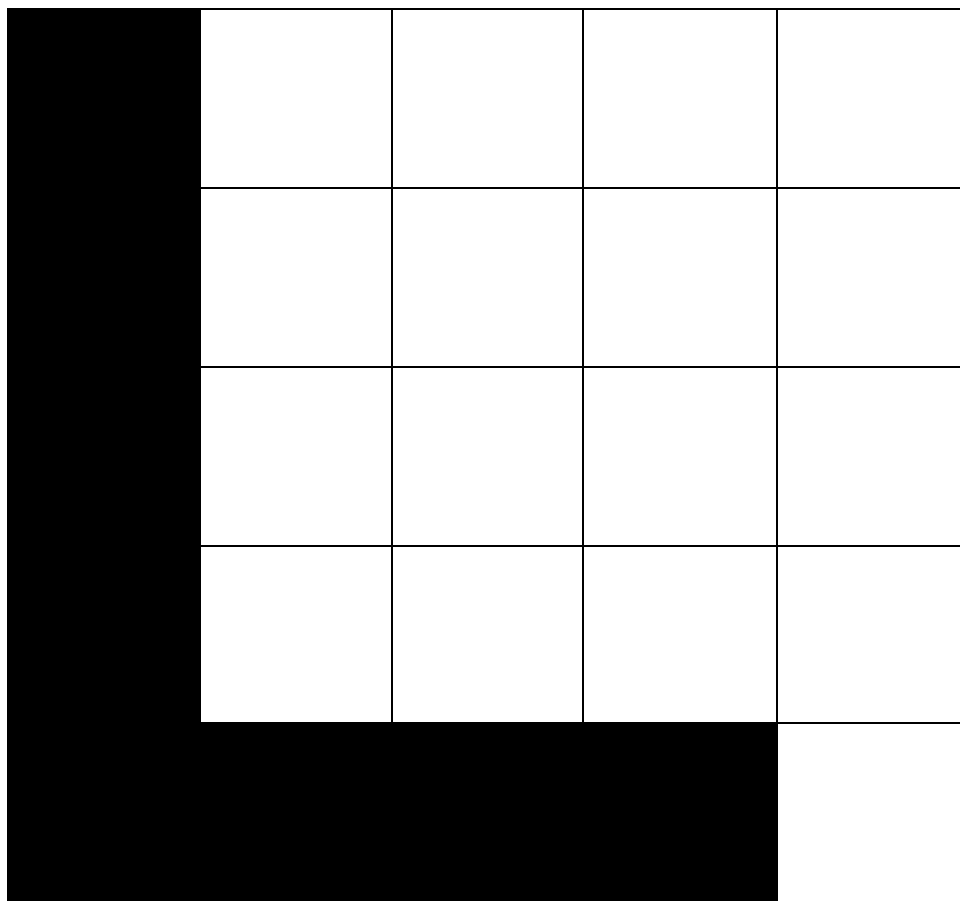


THE SSS TRIANGLE CONGRUENCE CRITERION

Does SSS Prove It?

25 pairs of triangles · tick marks, shared sides and look-alikes

FREE



1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“SSS needs three pairs of equal sides. A side that belongs to both triangles counts as one pair. If the marks prove the triangles congruent, fill the square with slanted lines. If not, leave it white.”*
3. **When a student finishes, look at the picture.** If it is not the letter L, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. It shows, as small pictures, what tick marks mean and a side that belongs to two triangles.
Answers	page 4: the finished picture and the reason for every square.

Eight squares are filled and seventeen are white. The finished picture is the letter L. A square is filled only when the marks or the numbers prove three pairs of equal sides. It stays white when the triangles are not congruent, and also when the marks do not tell.

The most common mistake is forgetting a shared side. In three filled squares, two triangles share a side and only two pairs are ticked. The shared side is equal to itself, so it is the third pair. A student who counts only the ticks leaves these white, and the L has gaps. Three white squares test the opposite mistake: a shared side and only one more pair make just two pairs.

Other squares test other common mistakes. In five filled squares, one triangle is a mirror image of the other. A mirror image is congruent. In four white squares, the two triangles are drawn exactly alike, but the marks prove only two pairs, or only angles. Students should trust the marks, not the look. The near misses, such as 12 against 13, are sentences with their numbers.

Your class may have met SSS in either of two ways. Some classes prove it with rigid motions. Others accept it as a starting fact and build triangles with a compass. Every answer here is the same either way.

Guessing does not work. Every simple guessing rule, such as filling every square with three kinds of tick marks, gets at least seven 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

Does SSS prove it?

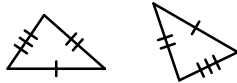
Name _____

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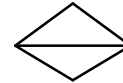
Date _____

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

SSS: if three pairs of sides are equal, the two triangles are congruent. A flipped triangle counts. Count the pairs you are sure of. Do not trust how the drawing looks.



The same number of ticks means equal sides.



The middle side belongs to both triangles. It counts as one pair.

Leave the square white if the triangles are not congruent. Also leave it white if the marks do not tell you. 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 Triangle 1 has sides 12, 7 and 9. Triangle 2 has sides 13, 7 and 9.	3 	4 Two sides of triangle 1 are equal to two sides of triangle 2.	5
6 Triangle 1 has sides 5, 12 and 9. Triangle 2 has sides 9, 5 and 12.	7 	8 	9 Triangle 1 has sides 6, 8 and 9. Triangle 2 has sides 9, 12 and 13.5.	10
11 	12 Triangle ABC and triangle ABD share side AB. Also $AC = AD$.	13 Both triangles have sides that add up to 21. They are 5, 7, 9 and 6, 7, 8.	14 	15 Triangle 1 has sides 5, 6 and 8. Triangle 2 has sides 5, 6 and 7.
16 	17 	18 Triangle 1 has sides 7, 7 and 10. Triangle 2 has sides 7, 10 and 10.	19 	20 The three angles of triangle 1 are equal to the three angles of triangle 2.
21 One triangle is the mirror image of the other. Both have sides 4, 6 and 7.	22 	23 	24 	25

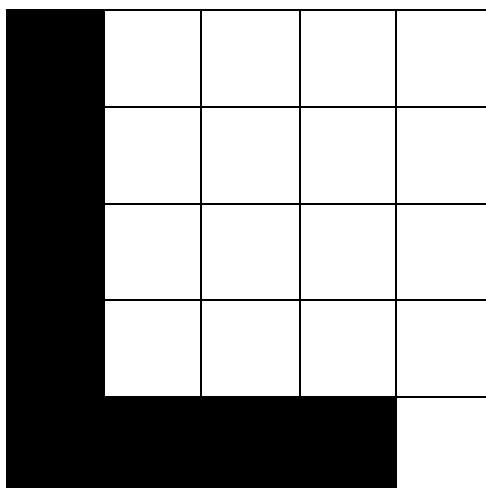


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Mystery Picture — answers

For the teacher

The finished picture is **the letter L**: a bar down the left side, and a foot along the bottom. A square is filled only when three pairs of sides are known to be equal. Tick marks, printed numbers and a side that belongs to both triangles each count. The table gives the reason for every square.



1–5	1 · FILL Two pairs are ticked, and the middle side belongs to both triangles. That is three pairs.	2 · white The sides 12 and 13 are not equal, so only two pairs match. They are not congruent.	3 · white Only two pairs of sides are marked. The drawing looks alike, but the marks prove only two pairs.	4 · white Two pairs are not enough. SSS needs three pairs of equal sides.	5 · white Only angles are marked. Equal angles do not fix the size, and here one triangle is larger.
6–10	6 · FILL Both have sides 5, 9 and 12. The order they are listed in does not matter.	7 · white Only two pairs of sides are ticked. The third pair is not marked.	8 · white One ticked pair and the shared side make only two pairs. The other sides are not marked.	9 · white Only the 9s match. Triangle 2 is larger, so they are not congruent.	10 · white Only two pairs of sides are ticked. The third sides are not marked, so the marks do not tell.
11–15	11 · FILL Two pairs are ticked, and the diagonal is a side of both triangles. That is three pairs.	12 · white Side AB and AC = AD make only two pairs. Nothing is known about BC and BD.	13 · white Only the 7s match. The same total does not make the sides equal.	14 · white Only angles are marked. SSS needs sides, and equal angles do not fix the size.	15 · white The third sides are 8 and 7. Only two pairs match.
16–20	16 · FILL All three pairs of sides are ticked. One triangle is turned, and that does not matter.	17 · white Only two pairs of sides are ticked. The third pair is not marked.	18 · white In order, the sides are 7, 7, 10 and 7, 10, 10. They do not match.	19 · white One ticked pair and the shared side make only two pairs.	20 · white Equal angles do not fix the size. One triangle can be a larger copy.
21–25	21 · FILL The three sides match: 4, 6 and 7. A mirror image is congruent.	22 · FILL Two pairs are ticked, and the middle segment is a side of both triangles. That is three pairs.	23 · FILL All three pairs are ticked. Match the ticks, not the places on the page.	24 · FILL All three pairs of sides are ticked. A mirror image is congruent.	25 · white Only one pair of sides is marked. SSS needs three pairs.