

MYSTERY PICTURE

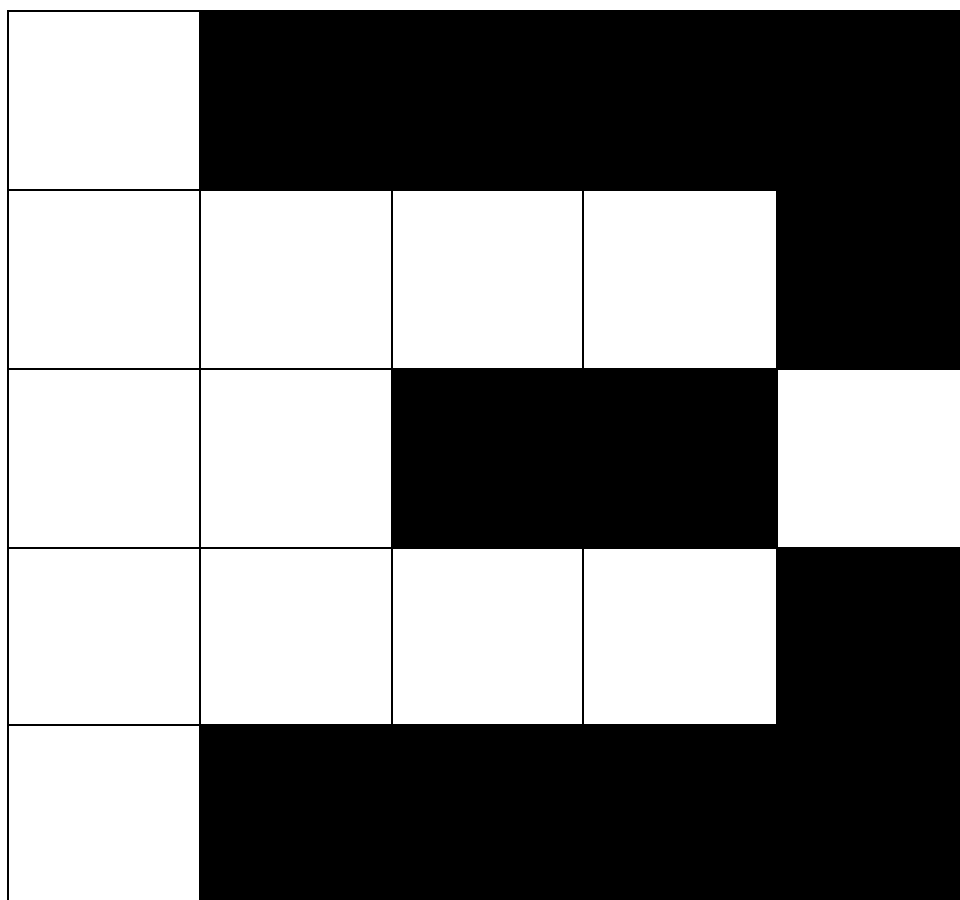


THE AA SIMILARITY CRITERION

Do Two Angles Make Them Similar?

25 squares · similar, or cannot tell?

FREE



1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“Count the pairs of equal angles. Look for a corner both triangles share, and for two segments that cross. Two pairs: fill the square. One pair: leave it white.”*
3. **When a student finishes, look at the picture.** If it is not the number 3, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. It shows the AA rule and the places a second pair of angles hides, as small drawings.
Answers	page 4: the finished picture and the reason for every square.

This sheet practices one skill: are two pairs of equal angles known? If they are, the triangles are similar, because the third pair is then equal too. The angles of a triangle add to 180° . One pair alone is never enough. There are no numbers to work with. The marks are the information.

Twenty squares are drawings and five are sentences. In six filled drawings, the marks show only one pair or none. The second pair is not marked: it is an angle both triangles share, the facing angles where two segments cross, the angles that parallel sides make, or two right angles. In nine white drawings, the triangles look alike, but nothing proves a second pair. A drawing is not a measurement. Four white squares (9, 15, 18 and 21) give two equal angles inside one triangle. That says nothing about the other triangle.

Twelve squares are filled and thirteen are white. Guessing does not work. Every simple guessing rule, such as filling the squares where the triangles look alike, gets at least six squares wrong.

What the sheets call the rule. Some classes prove the AA rule and call it a theorem. Other classes accept it without proof and call it a postulate. These sheets only use it, so they call it “the AA rule”: if two angles of one triangle are equal to two angles of another, the triangles are similar. Some textbooks use other definitions, so tell the class which ones this sheet uses.



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

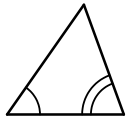
Similar, or cannot tell?

Name _____

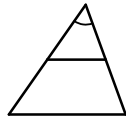
Period _____

Date _____

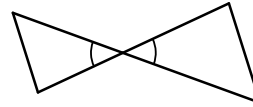
Each square shows two triangles, or tells you about two triangles. Do you know two pairs of equal angles, with one angle of each pair in each triangle? If yes, the triangles are similar: fill the square with slanted lines. If not, you cannot tell: leave the square white.



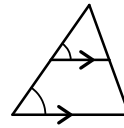
Two pairs of equal angles:
similar.



An angle **both triangles share** is a pair.



Where two segments **cross**, the facing angles are a pair.



Parallel sides (arrows) give a pair.

Angles with the same number of arcs are equal. With two pairs, the third pair is equal too, because the angles of a triangle add to 180° . A small square marks a right angle, and two right angles are a pair. **One pair alone is never enough.** The sign $\cong$ means the two angles are equal.

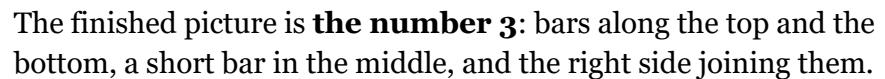
When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.

1 	2 	3 	4 $\triangle ABC$ and $\triangle DEF$: $\angle A \cong \angle D$ and $\angle B \cong \angle E$.	5
6 	7 	8 $\triangle ABC$ and $\triangle DEF$: $\angle B \cong \angle E$. Nothing else is known.	9 	10
11 	12 	13 	14 	15 In $\triangle ABC$, $\angle A \cong \angle B$. In $\triangle DEF$, $\angle D \cong \angle E$.
16 	17 	18 	19 $\triangle ABC$ and $\triangle DEF$: $\angle C$ and $\angle F$ are right angles.	20
21 	22 	23 $\triangle ABC$ and $\triangle DEF$: $\angle C$ and $\angle F$ are right angles, and $\angle A \cong \angle D$.	24 	25



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For the teacher



To check a square with a student, ask: “Which two pairs?” Then point to each pair, one angle in each triangle.

Two pairs: the pair marked with one arc, and the facing angles where the segments cross. So the triangles are similar.

10 • FILL
Two pairs: the angle both triangles share, and the two right angles. So the triangles are similar.

15 • white
Two angles marked alike are in the same triangle. That says nothing about the other triangle. No pair is known across the two.

20 • FILL
Two pairs: the pair marked with one arc, and the angle both triangles share. So the triangles are similar.

25 · FILL
Two pairs: the pair marked with one arc, and the two right angles. So the triangles are similar.