

ANSWER MAZE



THE AA SIMILARITY CRITERION

Two Angles, or Not Enough?

One page · 10–15 minutes · nothing to prepare

FREE

5

Are the two triangles similar?



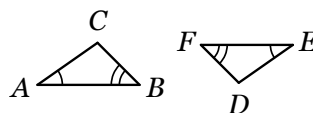
Cannot tell. The third pair is not marked. → go to 3

Yes. Two pairs of angles are equal. → go to 2

Count the kinds of arcs. Each kind marks a pair.

2

The triangles are similar. Which angle matches $\angle C$?



$\angle D$. Neither one has an arc. → go to 7

$\angle F$. C and F are both last letters. → go to 6

Find the unmarked angle in each triangle.

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 5. Count the pairs of equal angles before you choose. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **5 2 7 4 1 8**: six boxes, then out.

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.

Every wrong answer comes from one of two mistakes. The first mistake is counting the pairs of equal angles wrongly. Some students want all three pairs marked, but two are enough, because the angles of a triangle add to 180° . Some take one pair as enough. Others miss a pair that is not marked: an angle both triangles share, or the facing angles where two segments cross. These wrong answers send the student to box 3.

The second mistake is matching the angles by the order of the letters instead of by the marks, or thinking that similar triangles have equal sides. These wrong answers send the student to box 6. Boxes 3 and 6 ask the same kind of question again, and both of their answers lead back to the route.

The row at the bottom is the check. A clean run is six numbers. Each wrong answer adds at least one more. Guessing does not get a student out: every simple guessing rule, such as always taking the first answer, goes wrong within the first four boxes.

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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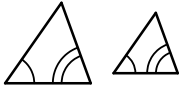
Answer Maze

Start at box 5 · two angles, or not enough?

Name _____

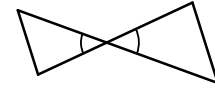
Period _____

Date _____



Two pairs of equal angles: **similar**.

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

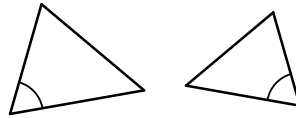


Where two segments **cross**, the facing angles are a pair.

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.** $\triangle ABC \sim \triangle DEF$ means the triangles are similar, with A matching D, B matching E and C matching F. Choose an answer in each box, and go to the box it names.

1

Are the two triangles similar?

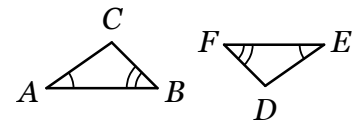


Cannot tell. Only one pair is marked. → go to 8
Yes. They look the same shape. → go to 3

Count the kinds of arcs on each triangle.

2

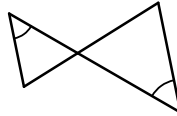
The triangles are similar. Which angle matches $\angle C$?



$\angle D$. Neither one has an arc. → go to 7
 $\angle F$. C and F are both last letters. → go to 6
Find the unmarked angle in each triangle.

3

Are the two triangles similar?



Yes. The crossing gives a second pair. → go to 2
Cannot tell. Only one pair is marked. → go to 5

Look at the point in the middle of the drawing.

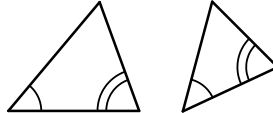
4

Must side AB be as long as side DE? $\triangle ABC \sim \triangle DEF$.

No. Similar triangles can be different sizes. → go to 1
Yes. Matching sides are equal. → go to 6
Think of a small drawing and a larger copy of it.

5

Are the two triangles similar?

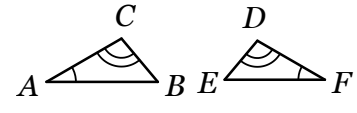


Cannot tell. The third pair is not marked. → go to 3
Yes. Two pairs of angles are equal. → go to 2

Count the kinds of arcs. Each kind marks a pair.

6

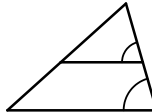
The triangles are similar. Which angle matches $\angle A$?



$\angle D$. A and D are both first letters. → go to 2
 $\angle F$. Both have one arc. → go to 7
Find the partner of each marked angle, one triangle at a time.

7

Are the small triangle and the large triangle similar?

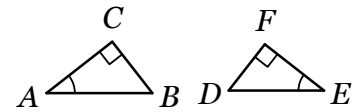


Cannot tell. Only one pair is marked. → go to 3
Yes. They share the angle at the top. → go to 4

Find the corner that belongs to both triangles.

8

Which similarity statement is correct?



$\triangle ABC \sim \triangle DEF \rightarrow$ go to 6
 $\triangle ABC \sim \triangle EDF \rightarrow$ you are out

Pair the angles by their marks first. Then write the letters in that order.

Write each box number as you reach it:

--	--	--	--	--	--	--	--	--



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Answer Maze — answers

For the teacher

The route, in order. Boxes 3 and 6 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table.

5 → 2 → 7 → 4 → 1 → 8 → out

	Box and its question	Right answer, and why	Wrong answer, and why a student picks it
1	Box 5 Are the two triangles similar? (<i>two triangles apart; one pair of angles has one arc, another pair two arcs</i>)	Yes. Two pairs of angles are equal. One arc and two arcs mark two pairs of equal angles. The third pair is equal too, because the angles of a triangle add to 180°.	“Cannot tell. The third pair is not marked.” goes to box 3. A student who thinks all three pairs must be marked picks this.
2	Box 2 The triangles are similar. Which angle matches $\angle C$? ($\triangle ABC$ and $\triangle DEF$ apart; $\angle A$ and $\angle E$ have one arc, $\angle B$ and $\angle F$ two arcs)	$\angle D$. Neither one has an arc. $\angle A$ matches $\angle E$ (one arc) and $\angle B$ matches $\angle F$ (two arcs). So $\angle C$ matches $\angle D$, the angle left over.	“ $\angle F$. C and F are both last letters.” goes to box 6. A student who matches the letters in alphabetical order picks this.
3	Box 7 Are the small triangle and the large triangle similar? (<i>a triangle with a segment across it; one pair of angles has one arc</i>)	Yes. They share the angle at the top. One pair is marked. The angle at the top is in both triangles, so it is a second pair.	“Cannot tell. Only one pair is marked.” goes to box 3. A student who does not see the angle both triangles share picks this.
4	Box 4 $\triangle ABC \sim \triangle DEF$. Must side AB be as long as side DE?	No. Similar triangles can be different sizes. Similar triangles have the same shape. Their sides can be different lengths, so AB and DE do not have to be equal.	“Yes. Matching sides are equal.” goes to box 6. A student who mixes up similar and congruent picks this.
5	Box 1 Are the two triangles similar? (<i>two triangles apart that look alike; one pair of angles has one arc</i>)	Cannot tell. Only one pair is marked. Only one pair of angles is marked. The triangles look alike, but a drawing is not a measurement, and one pair is never enough.	“Yes. They look the same shape.” goes to box 3. A student who trusts the look, or takes one pair as enough, picks this.
6	Box 8 Which similarity statement is correct? ($\triangle ABC$ and $\triangle DEF$ apart; $\angle C$ and $\angle F$ are right angles, $\angle A$ and $\angle E$ have one arc)	$\triangle ABC \sim \triangle EDF$ $\angle C$ and $\angle F$ are the right angles. $\angle A$ and $\angle E$ have one arc. So $\angle B$ matches $\angle D$. The letters go in that order: A with E, B with D, C with F.	“ $\triangle ABC \sim \triangle DEF$ ” goes to box 6. A student who writes the letters in alphabetical order picks this.
	Box 3 Are the two triangles similar? (<i>two triangles meeting where two segments cross; one pair of angles has one arc</i>)	Yes. The crossing gives a second pair. One pair is marked. Where two segments cross, the two facing angles are equal, so they are a second pair.	“Cannot tell. Only one pair is marked.” goes to box 5. A student who sees the crossing as one angle, not as a pair, picks this.
	Box 6 The triangles are similar. Which angle matches $\angle A$? ($\triangle ABC$ and $\triangle DEF$ apart; $\angle A$ and $\angle F$ have one arc, $\angle C$ and $\angle D$ two arcs)	$\angle F$. Both have one arc. $\angle A$ and $\angle F$ both have one arc. $\angle C$ and $\angle D$ both have two arcs. So $\angle B$ matches $\angle E$.	“ $\angle D$. A and D are both first letters.” goes to box 2. A student who still matches the letters in alphabetical order picks this.

How to check any box. Count the pairs of equal angles, one angle of each pair in each triangle. Angles with the same number of arcs are a pair. So are two right angles, an angle both triangles share, and the facing angles where two segments cross. Two pairs make the triangles similar. To match the angles, pair them by their marks, never by the order of the letters.

A student can find the last four boxes of the route by following the arrows backward from “you are out.” So ask a student with a clean row to explain one box.