

ANSWER MAZE



SSS AND SAS SIMILARITY

Which Criterion Gets You Out?

One page · 10–15 minutes · nothing to prepare

FREE

3

$\triangle ABC$: $AB = 6$, $BC = 9$, $CA = 8$.

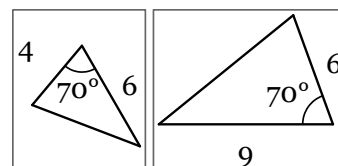
$\triangle DEF$: $DE = 16$, $EF = 12$, $FD = 18$.

No. $16 \div 6$ is not $12 \div 9$. → go to 7

Yes, by SSS Similarity. → go to 6

Write each triangle's sides from longest to shortest first.

6



Yes, by SAS Similarity. → go to 1

Not proved. The angle is not between the two sides. → go to 5

Find the corner where the two numbered sides meet.

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 3. Sort the sides from longest to shortest before you divide. For SAS Similarity, the equal angle must be between the two sides. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **3 6 1 8 4 2**: six boxes, then out.

Student sheet	page 3, one per student.
Answers	page 4.

Every wrong answer comes from one of two mistakes. The first mistake is in the numbers. The student divides the sides in the order of the letters instead of sorting them, checks only two of the three quotients, or sees that every side grew by 2 and calls that similar. These wrong answers send the student to box 7. The second mistake is about the angle. The student takes two equal ratios and any equal angle as SAS Similarity, even when the angle is not where the two sides meet. These wrong answers send the student to box 5. Boxes 7 and 5 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. The hint in every box says what to look at, never which answer is right.

The names on these sheets. The sheets write SSS Similarity and SAS Similarity, so that they are not mixed up with the congruence criteria SSS and SAS. The angle criterion is written AA. Some textbooks write SSS~ and SAS~, or use other definitions, so tell the class which ones this sheet uses.

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.



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 3 · similar or not?

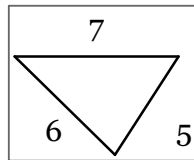
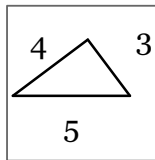
Name _____

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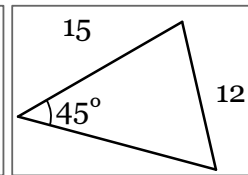
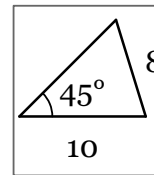
Are the two triangles similar? Every box asks this. **SSS Similarity:** all three pairs of sides are in the same ratio. **SAS Similarity:** two pairs of sides are in the same ratio, and the angles between them are equal. Match the sides by size, not by the letters. Write each triangle's sides from longest to shortest. Then divide longest by longest, middle by middle, and shortest by shortest. The angle **between** two sides is at the corner where they meet. Use only the numbers and marks, not the look of the drawing. Choose an answer, and go to the box it names.

1



Yes, by SSS Similarity. Every side is 2 longer.
→ go to 7
No. $5 \div 3$ is not $7 \div 5$. → go to 8
Divide each side by its partner instead of subtracting.

2



Not proved. The angle is not between the two sides.
→ you are out
Yes, by SAS Similarity. $15 \div 10 = 12 \div 8$. → go to 5
Find the arc. Then find the corner where the two numbered lengths meet.

3

$\triangle ABC$: AB = 6, BC = 9, CA = 8.
 $\triangle DEF$: DE = 16, EF = 12, FD = 18.

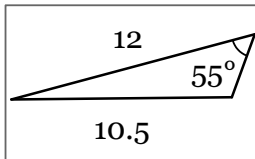
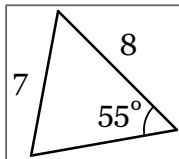
No. $16 \div 6$ is not $12 \div 9$. → go to 7
Yes, by SSS Similarity. → go to 6
Write each triangle's sides from longest to shortest first.

4

$\triangle ABC$: AB = 4, BC = 7, CA = 6.
 $\triangle DEF$: DE = 8, EF = 15, FD = 12.

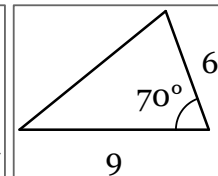
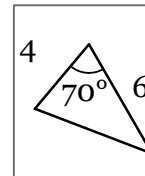
Yes, by SSS Similarity. $8 \div 4 = 12 \div 6 = 2$. → go to 7
No. $15 \div 7$ is not 2. → go to 2
Divide all three pairs of sides, not just two of them.

5



Yes, by SAS Similarity. $12 \div 8 = 10.5 \div 7$. → go to 6
Not proved. The angle is not between the two sides.
→ go to 1
Find the arc. Do both numbered lengths touch its corner?

6



Yes, by SAS Similarity. → go to 1
Not proved. The angle is not between the two sides.
→ go to 5
Find the corner where the two numbered sides meet.

7

$\triangle ABC$: AB = 4, BC = 6, CA = 5.
 $\triangle DEF$: DE = 10, EF = 8, FD = 12.

Yes, by SSS Similarity. → go to 6
No. $10 \div 4$ is not $8 \div 6$. → go to 3
Sort the six lengths before dividing anything.

8

$\angle B = \angle E$.
AB = 6, AC = 4. DE = 12, DF = 8.

Not proved. $\angle B$ is not between AB and AC. → go to 4
Yes, by SAS Similarity. $12 \div 6 = 8 \div 4$. → go to 5
Name the corner where AB and AC meet.

Write each box number as you reach it:

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The route, in order. Boxes 7 and 5 are not on it. A student reaches them only by a wrong answer.

3 → 6 → 1 → 8 → 4 → 2 → out

Box and question	Right answer, and why	Wrong answer, and why a student picks it
1 Box 3 Are the two triangles similar? $\triangle ABC$: $AB = 6$, $BC = 9$, $CA = 8$. $\triangle DEF$: $DE = 16$, $EF = 12$, $FD = 18$.	Yes, by SSS Similarity. Sorted: 9, 8, 6 and 18, 16, 12. Every quotient is 2.	"No. $16 \div 6$ is not $12 \div 9$." goes to box 7. A student who divides in the order of the letters picks this.
2 Box 6 Are the two triangles similar? Sides 4 and 6 with 70° between them, and sides 6 and 9 with 70° between them.	Yes, by SAS Similarity. The 70° angles are where the numbered sides meet, and $6 \div 4 = 9 \div 6 = 1.5$.	"Not proved. The angle is not between the two sides." goes to box 5. A student who does not find where the two numbered sides meet picks this.
3 Box 1 Are the two triangles similar? Sides 3, 4, 5 and sides 5, 6, 7.	No. $5 \div 3$ is not $7 \div 5$. Sorted: 5, 4, 3 and 7, 6, 5. The quotients are not all the same number.	"Yes, by SSS Similarity. Every side is 2 longer." goes to box 7. A student who subtracts instead of dividing picks this.
4 Box 8 Are the two triangles similar? $\angle B = \angle E$. $AB = 6$, $AC = 4$. $DE = 12$, $DF = 8$.	Not proved. $\angle B$ is not between AB and AC. AB and AC meet at A , not at B . Two different triangles fit these facts.	"Yes, by SAS Similarity. $12 \div 6 = 8 \div 4$." goes to box 5. A student who takes any equal angle with two ratios picks this.
5 Box 4 Are the two triangles similar? $\triangle ABC$: $AB = 4$, $BC = 7$, $CA = 6$. $\triangle DEF$: $DE = 8$, $EF = 15$, $FD = 12$.	No. $15 \div 7$ is not 2. Sorted: 7, 6, 4 and 15, 12, 8. Two quotients are 2, but the third is not.	"Yes, by SSS Similarity. $8 \div 4 = 12 \div 6 = 2$." goes to box 7. A student who checks two quotients and not the third picks this.
6 Box 2 Are the two triangles similar? Sides 10 and 8 with a 45° angle that is not between them, and sides 15 and 12 with the 45° angle in the same place.	Not proved. The angle is not between the two sides. The 45° angles are not where the numbered sides meet. Two different triangles fit these numbers.	"Yes, by SAS Similarity. $15 \div 10 = 12 \div 8$." goes to box 5. A student who takes any equal angle with two ratios picks this.
Box 7 Are the two triangles similar? $\triangle ABC$: $AB = 4$, $BC = 6$, $CA = 5$. $\triangle DEF$: $DE = 10$, $EF = 8$, $FD = 12$.	Yes, by SSS Similarity. Sorted: 6, 5, 4 and 12, 10, 8. Every quotient is 2.	"No. $10 \div 4$ is not $8 \div 6$." goes to box 3. A student who divides in the order of the letters picks this.
Box 5 Are the two triangles similar? Sides 8 and 7 with a 55° angle that is not between them, and sides 12 and 10.5 with the 55° angle in the same place.	Not proved. The angle is not between the two sides. The 55° angles are not where the numbered sides meet. These two triangles are not even similar.	"Yes, by SAS Similarity. $12 \div 8 = 10.5 \div 7$." goes to box 6. A student who takes any equal angle with two ratios picks this.

Yes is right only when SSS Similarity or SAS Similarity fits: three sorted quotients that are all the same, or two quotients that agree with the equal angle where those two sides meet. The arrows, followed backward from "you are out," show the last four boxes of the route. So ask a student with a clean row to explain one box.