LESSON MAKER PRO

Triangle Match Test

Check sides and angles to decide when triangles are similar.

HIGH SCHOOL · GDA.GM.F.28.a

GDA.GM.F.28.a "Verify that two triangles are similar if and only if corresponding pairs of sides are proportional and corresponding pairs of angles are congruent."

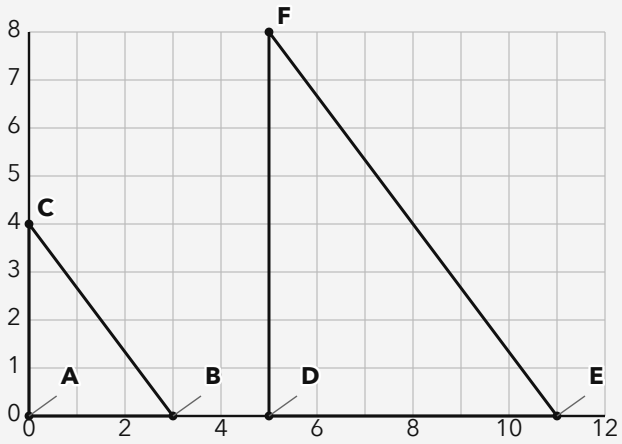
NAME _____ DATE _____

THE SIMILARITY TEST

Triangles are similar exactly when corresponding side lengths have the same ratio and corresponding angles are congruent. You can verify similarity with three matching side ratios, or with two pairs of congruent angles.

WORKED EXAMPLE

Use the grid. Are triangles ABC and DEF similar? Match their vertices.



1. AB = 3, AC = 4, and BC = 5.
2. DE = 6, DF = 8, and EF = 10.
3. 3/6 = 4/8 = 5/10 = 1/2, so the corresponding angles are congruent.

Answer: Yes. ABC is similar to DEF, with A ↔ D, B ↔ E, and C ↔ F.

PRACTICE 4 problems

1 AB/DE = 7/14, BC/EF = 9/18, and AC/DF = 11/22. Are triangles ABC and DEF similar? Why?

ANSWER _____

2 AB/DE = 7/14, BC/EF = 9/18, and AC/DF = 11/21. Are triangles ABC and DEF similar? Why?

ANSWER _____

3 ∠A ≅ ∠D and ∠B ≅ ∠E. If AB = 14, DE = 21, BC = 18, and EF = x, find x.

ANSWER _____

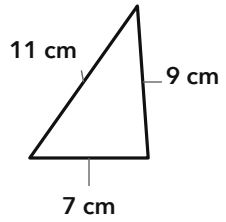
4 ∠A ≅ ∠D and ∠B ≅ ∠E. If ∠C = 71° and ∠F = x°, find x. Are the triangles similar?

ANSWER _____

_____

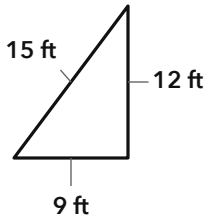
APPLY IT Show your work

1 A designer enlarges the triangular badge shown. Its new sides, in the same order, are 14 cm, 18 cm, and 22 cm. Is the new badge similar? Explain.



ANSWER _____

2 A stage crew builds a larger triangular frame based on the frame shown. The sides matching 9 ft and 12 ft will be 18 ft and 24 ft. How long must the side matching 15 ft be for the frames to be similar?



ANSWER _____

CHALLENGE One step up

A maker reports AB/DE = 7/14, BC/EF = 9/18, AC/DF = 11/x, ∠A = 42°, and ∠D = 43°. Find x to make the side ratios equal. Can all the reported facts be true? Explain.

WORK SPACE AND ANSWER

ANSWER KEY # Triangle Match Test

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	AB/DE = 7/14, BC/EF = 9/18, and AC/DF = 11/22. Are triangles ABC and DEF similar? Why?	**Yes. All three corresponding side ratios equal 1/2.**
2	AB/DE = 7/14, BC/EF = 9/18, and AC/DF = 11/21. Are triangles ABC and DEF similar? Why?	**No. 11/21 does not equal 1/2.**
3	∠A ≅ ∠D and ∠B ≅ ∠E. If AB = 14, DE = 21, BC = 18, and EF = x, find x.	**x = 27**
4	∠A ≅ ∠D and ∠B ≅ ∠E. If ∠C = 71° and ∠F = x°, find x. Are the triangles similar?	**x = 71; yes, the triangles are similar.**

PART 2 · APPLY IT

1. **Yes. The badges are similar.** The corresponding ratios are 7/14 = 9/18 = 11/22 = 1/2. Equal side ratios verify similarity and congruent corresponding angles.
2. **30 ft** Both given sides double. The remaining side must also double: 15 × 2 = 30 ft.

CHALLENGE

x = 22, but the facts cannot all be true. Equal corresponding side ratios require ∠A and ∠D to be congruent, yet 42° ≠ 43°.

Accept any correct explanation using equal corresponding side ratios or congruent corresponding angles. In the challenge, students must identify both x = 22 and the angle contradiction.