LESSON MAKER PRO

Triangle Matchmakers

Use scale factors and motions to test similarity.

HIGH SCHOOL · GDA.GM.F.28

GDA.GM.F.28 "Verify criteria for showing triangles are similar using a similarity transformation (sequence of rigid motions and dilations) that maps one triangle to another. a..."

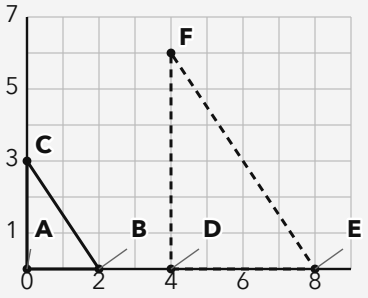
NAME _____ DATE _____

THE BIG IDEA

A rigid motion keeps side lengths and angles the same. A dilation multiplies every side by one scale factor and keeps angles the same. You can verify triangle similarity using AA, SSS, or SAS, then describe motions that map one triangle to the other.

WORKED EXAMPLE

Use the grid. Name a sequence that maps ABC to DEF, and give the scale factor.



1. Translate ABC 4 units right, so A lands on D.
2. Dilate by a factor of 2 centered at D.
3. B lands on E, and C lands on F.

Answer: Translate 4 units right, then dilate by 2 centered at D. The scale factor is 2.

PRACTICE 4 problems

1 ABC: AB=7, BC=9, AC=12. DEF: DE=21, EF=27, DF=36. Find the scale factor from ABC to DEF and name the similarity test.

ANSWER _____

2 Angle A=35° matches D=35°, and B=75° matches E=75°. If AB=6 and DE=24, find the scale factor from ABC to DEF and name the test.

ANSWER _____

3 AB=14, AC=21, and angle A=48°. DE=10, DF=15, and angle D=48°. Find the scale factor from ABC to DEF and name the test.

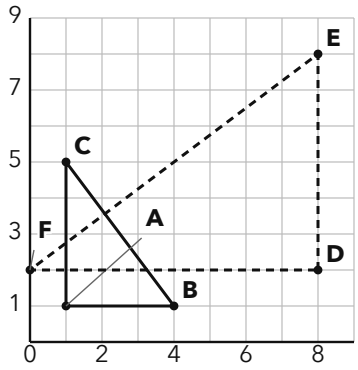
ANSWER _____

4 AB=5, AC=11, and angle A=40°. DE=10, DF=22, and angle D=55°. Are the triangles similar with A matching D? Explain.

ANSWER _____

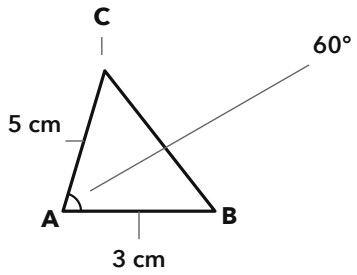
APPLY IT Show your work

1 A student rotates and enlarges a triangular laptop decal. Use the grid to give a sequence mapping ABC to DEF, including the scale factor.



ANSWER _____

2 A bike shop enlarges the triangular sign shown. The side matching AB becomes 12 cm, and its included angle still matches angle A. Find the side matching AC and name the similarity test.



ANSWER _____

CHALLENGE One step up

AB=9, AC=12, and angle A=70°. DE=15, DF=x, and angle D=70°. Find x, then explain how a dilation and rigid motions could map ABC to DEF.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	ABC: AB=7, BC=9, AC=12. DEF: DE=21, EF=27, DF=36. Find the scale factor from ABC to DEF and name the similarity test.	**3; SSS**
2	Angle A=35° matches D=35°, and B=75° matches E=75°. If AB=6 and DE=24, find the scale factor from ABC to DEF and name the test.	**4; AA**
3	AB=14, AC=21, and angle A=48°. DE=10, DF=15, and angle D=48°. Find the scale factor from ABC to DEF and name the test.	**5/7; SAS**
4	AB=5, AC=11, and angle A=40°. DE=10, DF=22, and angle D=55°. Are the triangles similar with A matching D? Explain.	**No. The corresponding included angles are not congruent.**

PART 2 · APPLY IT

1. **Translate 7 units right and 1 unit up, rotate 90° counterclockwise about D, then dilate by 2 centered at D.** After the translation, A is at D. The rotation and dilation send B to E and C to F.
2. **20 cm; SAS** The scale factor is 12/3=4, so the side matching AC is 5×4=20 cm. The included angles match, so SAS applies.

CHALLENGE

x=20. Dilate ABC by 5/3 centered at A. Then translate A to D and rotate or reflect as needed to align the matching sides; the equal included angles make C land on F.

Accept any valid sequence of rigid motions and dilations that maps corresponding vertices. In the challenge, accept equivalent explanations that use the scale factor and equal included angles.