LESSON MAKER PRO

Similar Shapes, Big Results

Use triangle similarity to find missing measures and justify matches.

HIGH SCHOOL · MA.912.GR.1

MA.912.GR.1 "Prove and apply geometric theorems to solve problems."

NAME _____ DATE _____

MATCH CORRESPONDING PARTS

If two angles in one triangle match two angles in another triangle, the triangles are similar by AA. Similar triangles have matching angles and proportional corresponding sides. Keep the vertex order consistent when you write ratios.

WORKED EXAMPLE

$\Delta ABC \sim \Delta DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. If $AB = 11$, $BC = 17$, and $DE = 22$, find EF.

1. AB corresponds to DE, so the scale factor is 22/11 = 2.
2. BC corresponds to EF.
3. EF = 17 × 2 = 34.

Answer: EF = 34

PRACTICE 6 problems

1 $\Delta ABC \sim \Delta DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. If $AB = 4$, $BC = 9$, and $DE = 16$, find EF.

ANSWER _____

2 $\Delta PQR \sim \Delta XYZ$, where $P \leftrightarrow X$, $Q \leftrightarrow Y$, and $R \leftrightarrow Z$. If $PQ = 18$, $QR = 26$, and $XY = 27$, find YZ.

ANSWER _____

3 In ΔJKL, $m\angle J = 42$ and $m\angle K = 68$. In ΔMNO, $m\angle M = 42$ and $m\angle N = 68$. Are the triangles similar? Write a correct similarity statement.

ANSWER _____

4 $\Delta RST \sim \Delta UVW$, where $R \leftrightarrow U$, $S \leftrightarrow V$, and $T \leftrightarrow W$. If $RS = 15$, $ST = 25$, and $UV = 24$, find VW.

ANSWER _____

5 $GH = 10$, $HI = 16$, and $GI = 18$. $JK = 15$, $KL = 24$, and $JL = 27$. Are ΔGHI and ΔJKL similar? If so, write a similarity statement and the scale factor from ΔGHI to ΔJKL.

ANSWER _____

6 $\Delta ABC \sim \Delta DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. If $AB = 30$, $DE = 18$, and $AC = 40$, find DF.

ANSWER _____

APPLY IT Show your work

1 A skateboard deck graphic is a triangle with side lengths 18 cm, 24 cm, and 30 cm. A similar sticker has a shortest side of 9 cm. What are the lengths of the sticker's other two sides?

WORK SPACE

ANSWER _____

2 At a school soccer game, a 5-foot sideline flagpole casts an 8-foot shadow. At the same time, a goalpost casts a 24-foot shadow. How tall is the goalpost?

WORK SPACE

ANSWER _____

CHALLENGE One step up

$\Delta ABC \sim \Delta DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. $AB = 2x + 3$, $BC = 3x - 1$, $DE = 15$, and $EF = 21$. Find x. Then explain in one sentence why AB must be compared with DE, not EF.

WORK SPACE AND ANSWER

ANSWER KEY # Similar Shapes, Big Results

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	ΔABC ~ ΔDEF, where A↔D, B↔E, and C↔F. If AB = 4, BC = 9, and DE = 16, find EF.	**EF = 36**
2	ΔPQR ~ ΔXYZ, where P↔X, Q↔Y, and R↔Z. If PQ = 18, QR = 26, and XY = 27, find YZ.	**YZ = 39**
3	In ΔJKL, m∠J = 42 and m∠K = 68. In ΔMNO, m∠M = 42 and m∠N = 68. Are the triangles similar? Write a correct similarity statement.	**Yes, ΔJKL ~ ΔMNO by AA similarity.**
4	ΔRST ~ ΔUVW, where R↔U, S↔V, and T↔W. If RS = 15, ST = 25, and UV = 24, find VW.	**VW = 40**
5	GH = 10, HI = 16, and GI = 18. JK = 15, KL = 24, and JL = 27. Are ΔGHI and ΔJKL similar? If so, write a similarity statement and the scale factor from ΔGHI to ΔJKL.	**Yes, ΔGHI ~ ΔJKL by SSS similarity. The scale factor is 3/2.**
6	ΔABC ~ ΔDEF, where A↔D, B↔E, and C↔F. If AB = 30, DE = 18, and AC = 40, find DF.	**DF = 24**

PART 2 · APPLY IT

1. **12 cm and 15 cm** The shortest side changes from 18 cm to 9 cm, so the scale factor is 1/2. Multiply 24 cm and 30 cm by 1/2.
2. **15 feet** The sun creates similar right triangles, so height/shadow is the same for both objects. Solve 5/8 = h/24 to get h = 15.

CHALLENGE

7(2x + 3) = 5(3x - 1), so x = 26. AB corresponds to DE because A↔D and B↔E, so they are matching sides.

Accept equivalent ratios and scale factors, such as 1.5 for 3/2. For the challenge, require both x = 26 and a statement that uses the given vertex correspondence to identify matching sides.