

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

$\triangle ABC \sim \triangle DEF$, 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. $EF = 17 \times 2 = 34$.

Answer: $EF = 34$

PRACTICE 6 problems

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

ANSWER _____

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

ANSWER _____

- 3** In $\triangle JKL$, $m\angle J = 42$ and $m\angle K = 68$. In $\triangle MNO$, $m\angle M = 42$ and $m\angle N = 68$. Are the triangles similar? Write a correct similarity statement.

ANSWER _____

- 4** $\triangle RST \sim \triangle UVW$, 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 $\triangle GHI$ and $\triangle JKL$ similar? If so, write a similarity statement and the scale factor from $\triangle GHI$ to $\triangle JKL$.

ANSWER _____

- 6** $\triangle ABC \sim \triangle DEF$, 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

CHALLENGE

$\triangle ABC \sim \triangle DEF$, 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 .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	$\triangle ABC \sim \triangle DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. If $AB = 4$, $BC = 9$, and $DE = 16$, find EF .	EF = 36
2	$\triangle PQR \sim \triangle XYZ$, where $P \leftrightarrow X$, $Q \leftrightarrow Y$, and $R \leftrightarrow Z$. If $PQ = 18$, $QR = 26$, and $XY = 27$, find YZ .	YZ = 39
3	In $\triangle JKL$, $m\angle J = 42$ and $m\angle K = 68$. In $\triangle MNO$, $m\angle M = 42$ and $m\angle N = 68$. Are the triangles similar? Write a correct similarity statement.	Yes, $\triangle JKL \sim \triangle MNO$ by AA similarity.
4	$\triangle RST \sim \triangle UVW$, where $R \leftrightarrow U$, $S \leftrightarrow V$, and $T \leftrightarrow W$. 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 $\triangle GHI$ and $\triangle JKL$ similar? If so, write a similarity statement and the scale factor from $\triangle GHI$ to $\triangle JKL$.	Yes, $\triangle GHI \sim \triangle JKL$ by SSS similarity. The scale factor is $3/2$.
6	$\triangle ABC \sim \triangle DEF$, where $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$. If $AB = 30$, $DE = 18$, and $AC = 40$, find DF .	DF = 24

PART 2 • APPLY IT

- 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 $1/2$.
- 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 $A \leftrightarrow D$ and $B \leftrightarrow E$, 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.