

Triangle Match-Up

Use triangle criteria, then solve with matching sides.

HIGH SCHOOL • HSG-SRT.B.5

CCSS.Math.Content.HSG-SRT.B.5 "Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures."

NAME _____

DATE _____

PROVE, MATCH, SOLVE

Use SSS, SAS, ASA, or AAS to prove triangles congruent. Use AA, SAS similarity, or SSS similarity to prove triangles similar. After proving similarity, match corresponding vertices in order and write proportions with matching sides.

WORKED EXAMPLE

$\triangle RST \sim \triangle UVW$. $RS = 8$, $ST = 12$, and $UV = 14$. Find VW .

1. Corresponding sides are $RS \leftrightarrow UV$ and $ST \leftrightarrow VW$.
2. The scale factor from $\triangle RST$ to $\triangle UVW$ is $14/8 = 7/4$.
3. $VW = 12 \times 7/4 = 21$.

Answer: $VW = 21$

PRACTICE 6 problems

- 1** $\triangle ABC \sim \triangle DEF$. $AB = 5$, $BC = 9$, and $DE = 15$. Find EF .

ANSWER _____

- 2** $\triangle JKL \sim \triangle MNP$. $JL = 6$, $KL = 18$, and $MP = 25$. Find NP .

ANSWER _____

- 3** In $\triangle ABC$ and $\triangle DEF$, angle A is congruent to angle D , and the sides around those angles are proportional. $AB = 4$, $DE = 10$, $AC = 7$, and $DF = x$. Find x .

ANSWER _____

- 4** In $\triangle PQR$, S lies on PQ and T lies on PR . ST is parallel to QR . $PS = 3$, $SQ = 2$, and $PT = 9$. Find PR .

ANSWER _____

- 5** One triangle has side lengths 5, 9, and 11. Another triangle has side lengths 10, 18, and 22. Are the triangles similar? If yes, name the criterion and give the scale factor from the first triangle to the second.

ANSWER _____

- 6** $\triangle ABC$ and $\triangle DEF$ have $AB = DE = 13$, $BC = EF = 17$, and $AC = DF = 19$. Find the perimeter of $\triangle DEF$ and name the congruence criterion.

ANSWER _____

APPLY IT Show your work

- 1** At the same time of day, a 5-foot safety post casts a 6-foot shadow. A large screen for a school event casts a 30-foot shadow. Assuming the ground is level, how tall is the screen?

WORK SPACE

ANSWER _____

- 2** A practice skate ramp has a right-triangle cross section that rises 3 feet over a horizontal run of 5 feet. A planned full-size ramp has a similar cross section with a horizontal run of 15 feet. How high will the full-size ramp rise?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Triangle ABC has $AB = 10$, $BC = 16$, and $AC = 18$. Triangle DEF has $DE = 15$, $EF = 24$, and $DF = 27$. A student says $\triangle ABC \sim \triangle DEF$. Is the claim correct? Explain using a similarity criterion and a correspondence.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	$\triangle ABC \sim \triangle DEF$. $AB = 5$, $BC = 9$, and $DE = 15$. Find EF .	EF = 27
2	$\triangle JKL \sim \triangle MNP$. $JL = 6$, $KL = 18$, and $MP = 25$. Find NP .	NP = 75
3	In $\triangle ABC$ and $\triangle DEF$, angle A is congruent to angle D, and the sides around those angles are proportional. $AB = 4$, $DE = 10$, $AC = 7$, and $DF = x$. Find x .	x = 35/2
4	In $\triangle PQR$, S lies on PQ and T lies on PR. ST is parallel to QR. $PS = 3$, $SQ = 2$, and $PT = 9$. Find PR.	PR = 15
5	One triangle has side lengths 5, 9, and 11. Another triangle has side lengths 10, 18, and 22. Are the triangles similar? If yes, name the criterion and give the scale factor from the first triangle to the second.	Yes, by SSS similarity; scale factor = 2
6	$\triangle ABC$ and $\triangle DEF$ have $AB = DE = 13$, $BC = EF = 17$, and $AC = DF = 19$. Find the perimeter of $\triangle DEF$ and name the congruence criterion.	Perimeter = 49; SSS congruence

PART 2 • APPLY IT

- 25 feet** The post and screen form similar right triangles because the sun angle is the same. Set $5/6 = h/30$, so $h = 25$.
- 9 feet** The ramps have similar triangular cross sections. The run is multiplied by $15/5 = 3$, so the rise is $3 \times 3 = 9$ feet.

CHALLENGE

Yes. $AB/DE = BC/EF = AC/DF = 2/3$, so the triangles are similar by SSS similarity. The correspondence is $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$.

Accept equivalent proportion statements and scale factors written as 2 or 2/1. For the challenge, students must identify SSS similarity and use the correspondence $A \leftrightarrow D$, $B \leftrightarrow E$, $C \leftrightarrow F$.