

Angle Match-Up

Prove triangle similarity with two matching angles.

HIGH SCHOOL • HSG-SRT.A.3

CCSS.Math.Content.HSG-SRT.A.3 "Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar."

NAME _____

DATE _____

AA SIMILARITY

If two angles of one triangle match two angles of another triangle, the triangles are similar by AA. The third angles also match because each triangle has 180 degrees.

WORKED EXAMPLE

Triangle ABC has $m\angle A = 38$ and $m\angle B = 71$. Triangle DEF has $m\angle D = 38$ and $m\angle E = 71$. Are the triangles similar?

1. $m\angle C = 180 - 38 - 71 = 71$.

2. $m\angle F = 180 - 38 - 71 = 71$.

3. $\angle A = \angle D$ and $\angle B = \angle E$.

4. Two angle pairs match, so use AA.

Answer: Yes, triangle ABC ~ triangle DEF.

PRACTICE 5 problems

- 1** Triangle ABC has $m\angle A = 42$ and $m\angle B = 63$. Triangle DEF has $m\angle D = 42$ and $m\angle E = 63$. Are they similar?

ANSWER _____

- 2** Triangle PQR has $m\angle P = 55$ and $m\angle Q = 70$. Triangle RST has $m\angle R = 55$ and $m\angle S = 70$. Are they similar?

ANSWER _____

- 3** Triangle GHI has $m\angle G = 48$ and $m\angle H = 77$. Triangle JKL has $m\angle J = 48$ and $m\angle K = 76$. Are they similar?

ANSWER _____

- 4** Triangle LMN has $m\angle L = 90$ and $m\angle M = 28$. Triangle XYZ has $m\angle X = 90$ and $m\angle Y = 28$. Are they similar?

ANSWER _____

- 5** Triangle ABC has $m\angle A = 35$ and $m\angle B = 65$. Triangle DEF has $m\angle D = 80$ and $m\angle E = 35$. Write a similarity statement.

ANSWER _____

APPLY IT Show your work

- 1** At a skate park, a practice ramp side view is triangle PQR with angles $P = 24$ and $Q = 66$. A full ramp side view is triangle XYZ with angles $X = 24$ and $Y = 66$. Are the side views similar?

WORK SPACE

ANSWER _____

- 2** A student makes two triangular phone stands. Stand ABC has angles $A = 30$ and $B = 85$. Stand DEF has angles $D = 30$ and $E = 84$. Can one stand be a scaled copy of the other?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Lines AC and BD intersect at O. In triangles AOB and COD, $m\angle BAO = 52$ and $m\angle DCO = 52$. Are the triangles similar? Explain using angle relationships.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Triangle ABC has $m\angle A = 42$ and $m\angle B = 63$. Triangle DEF has $m\angle D = 42$ and $m\angle E = 63$. Are they similar?	Yes, triangle ABC ~ triangle DEF.
2	Triangle PQR has $m\angle P = 55$ and $m\angle Q = 70$. Triangle RST has $m\angle R = 55$ and $m\angle S = 70$. Are they similar?	Yes, triangle PQR ~ triangle RST.
3	Triangle GHI has $m\angle G = 48$ and $m\angle H = 77$. Triangle JKL has $m\angle J = 48$ and $m\angle K = 76$. Are they similar?	No, the triangles are not similar.
4	Triangle LMN has $m\angle L = 90$ and $m\angle M = 28$. Triangle XYZ has $m\angle X = 90$ and $m\angle Y = 28$. Are they similar?	Yes, triangle LMN ~ triangle XYZ.
5	Triangle ABC has $m\angle A = 35$ and $m\angle B = 65$. Triangle DEF has $m\angle D = 80$ and $m\angle E = 35$. Write a similarity statement.	Triangle ABC ~ triangle EFD.

PART 2 • APPLY IT

- Yes, triangle PQR ~ triangle XYZ.** Angles P and X match, and angles Q and Y match. AA proves the triangles are similar.
- No, the triangles are not similar.** Only one angle pair matches. The other given angles are different, so AA does not apply.

CHALLENGE

Yes, triangle AOB ~ triangle COD. $\angle BAO = \angle DCO$, and $\angle AOB = \angle COD$ because vertical angles are congruent, so AA applies.

Accept any correctly ordered similarity statement with matching vertices. For non-similar answers, accept a clear statement that two angle pairs do not match.