

Angle Detective Lab

Use triangle and parallel-line angle facts to solve each case.

GRADE 8 • NY-8.G.5

NY-8.G.5 "Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles."

NAME _____

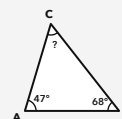
DATE _____

ANGLE CLUES

The three interior angles of a triangle add to 180° . An exterior angle equals the sum of its two remote interior angles. When parallel lines are cut by a transversal, matching angle relationships can prove triangles similar by AA.

WORKED EXAMPLE

Use the triangle in the figure to find $m\angle C$.

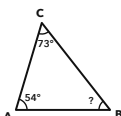


1. $m\angle A + m\angle B + m\angle C = 180^\circ$.
2. $47^\circ + 68^\circ + m\angle C = 180^\circ$.
3. $m\angle C = 180^\circ - 115^\circ = 65^\circ$.

Answer: $m\angle C = 65^\circ$

PRACTICE 6 problems

- 1** Find $m\angle B$ in the triangle.



ANSWER _____

- 2** In triangle ABC, ray CD extends side CA, making an exterior angle of 112° at C. If $m\angle A = 49^\circ$, find $m\angle B$.

ANSWER _____

- 3** Two remote interior angles of a triangle measure 39° and 71° . Find the exterior angle at the third vertex.

ANSWER _____

- 4** Lines l and m are parallel and are cut by transversal t . One angle measures 124° . What is the measure of its alternate interior angle?

ANSWER _____

- 5** Two same-side interior angles formed by parallel lines and a transversal measure $(x + 17)^\circ$ and $(3x + 3)^\circ$. Find x .

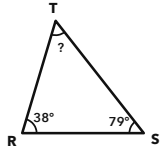
ANSWER _____

- 6** Triangle ABC has $m\angle A = 52^\circ$ and $m\angle B = 74^\circ$. Triangle DEF has $m\angle D = 52^\circ$ and $m\angle E = 74^\circ$. Are the triangles similar? If so, give the matching vertices.

ANSWER _____

APPLY IT Show your work

- 1** A robotics club uses the triangular brace shown to support a display board. Find the missing angle of the brace.



ANSWER _____

- 2** At a concert, two parallel light rails are crossed by one support cable. One interior angle on the same side of the cable is 117° . Find the other same-side interior angle.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Triangle ABC has an exterior angle of 137° at C and $m\angle A = 59^\circ$. Triangle DEF has $m\angle D = 59^\circ$ and $m\angle E = 78^\circ$. Are the triangles similar? Explain using angle facts and give the matching vertices.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find $m\angle B$ in the triangle.	$m\angle B = 53^\circ$
2	In triangle ABC, ray CD extends side CA, making an exterior angle of 112° at C. If $m\angle A = 49^\circ$, find $m\angle B$.	$m\angle B = 63^\circ$
3	Two remote interior angles of a triangle measure 39° and 71° . Find the exterior angle at the third vertex.	110°
4	Lines l and m are parallel and are cut by transversal t. One angle measures 124° . What is the measure of its alternate interior angle?	124°
5	Two same-side interior angles formed by parallel lines and a transversal measure $(x + 17)^\circ$ and $(3x + 3)^\circ$. Find x.	$x = 40$
6	Triangle ABC has $m\angle A = 52^\circ$ and $m\angle B = 74^\circ$. Triangle DEF has $m\angle D = 52^\circ$ and $m\angle E = 74^\circ$. Are the triangles similar? If so, give the matching vertices.	Yes. Triangle ABC is similar to triangle DEF, with $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$.

PART 2 • APPLY IT

- 63°** Add the two known interior angles: $38^\circ + 79^\circ = 117^\circ$. Subtract from 180° to get 63° .
- 63°** Same-side interior angles formed by parallel lines are supplementary. Compute $180^\circ - 117^\circ = 63^\circ$.

CHALLENGE

Yes. The exterior angle of 137° equals $m\angle A + m\angle B$, so $m\angle B = 78^\circ$. The triangles have two matching angles, 59° and 78° , so triangle ABC is similar to triangle DEF by AA, with $A \leftrightarrow D$, $B \leftrightarrow E$, and $C \leftrightarrow F$.

Accept angle measures written with or without the degree symbol. For similarity items, accept an equivalent correctly ordered similarity statement that preserves the vertex correspondence.