LESSON MAKER PRO

Angle Detective

Use parallel lines to unlock missing angles.

GRADE 8 · 8.GM.B.25

8.GM.B.25 "Analyze and apply properties of parallel lines cut by a transversal to determine missing angle measures. a. Use informal arguments to establish that the sum of the interior angles of a triangle is 180 degrees."

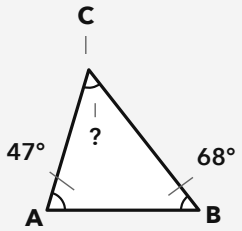
NAME _____ DATE _____

THE BIG IDEA

When a line crosses parallel lines, corresponding and alternate interior angles are equal. Same-side interior angles add to 180°. A line through a triangle's vertex, parallel to the opposite side, places copies of the other two angles beside the vertex angle on a straight line. This shows why a triangle's angles add to 180°.

WORKED EXAMPLE

Find angle C in the triangle.

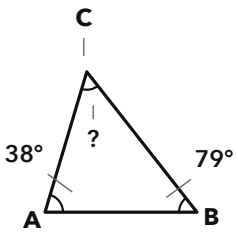


1. Imagine a line through C parallel to AB. It makes angles of 47° and 68° beside angle C.
2. Those three angles form a straight angle: 47° + 68° + C = 180°.
3. C = 180° - 115° = 65°.

Answer: 65°

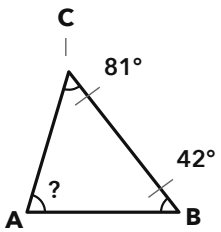
PRACTICE 6 problems

1 Find angle C.



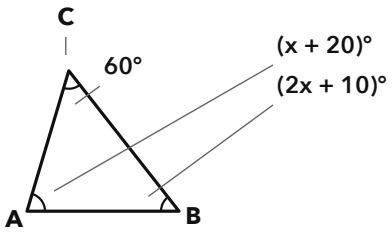
ANSWER _____

2 Find angle A.



ANSWER _____

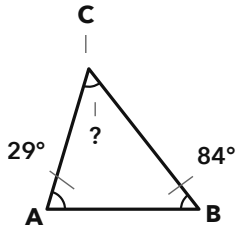
3 Find x and all three angle measures.



ANSWER _____

_____

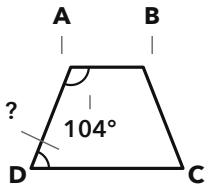
4 Find angle C. In one sentence, explain why your calculation works.



ANSWER _____

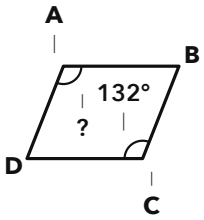
_____

5 In this trapezoid, AB is parallel to CD. Find angle D.



ANSWER _____

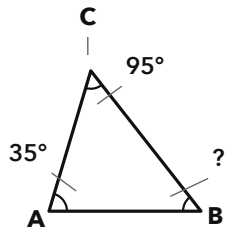
6 Find angle A in the parallelogram.



ANSWER _____

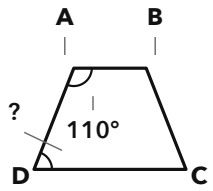
APPLY IT Show your work

1 A game designer is making the triangular icon shown. What is angle B?



ANSWER _____

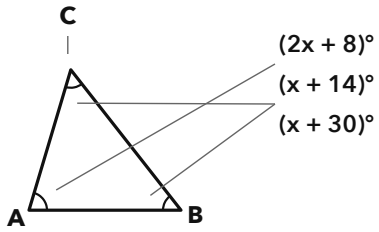
2 A skate park plan shows two parallel platform edges, AB and CD. What is angle D?



ANSWER _____

CHALLENGE One step up

Find x and each angle. In two sentences, explain how a line through A parallel to BC shows that the angles add to 180°.



WORK SPACE AND ANSWER

ANSWER KEY

Angle Detective

GRADE 8 · 8.GM.B.25

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find angle C.	**63°**
2	Find angle A.	**57°**
3	Find x and all three angle measures.	**x = 30; angle A = 50°, angle B = 70°, angle C = 60°**
4	Find angle C. In one sentence, explain why your calculation works.	**67°. The three angles form a straight angle when the base angles are copied beside angle C, so 180° - 29° - 84° = 67°.**
5	In this trapezoid, AB is parallel to CD. Find angle D.	**76°**
6	Find angle A in the parallelogram.	**132°**

PART 2 · APPLY IT

1. **50°** The triangle's angles add to 180°, so angle B is 180° - 35° - 95° = 50°.
2. **70°** AD crosses the parallel edges, making angles A and D same-side interior angles. Angle D is 180° - 110° = 70°.

CHALLENGE

The angles total 180°, so 4x + 52 = 180, x = 32, and angles A, B, and C are 72°, 46°, and 62°. A line through A parallel to BC copies angles B and C beside angle A, where the three angles form a straight angle.

For explanations, accept any accurate argument using a straight angle and parallel lines. In the trapezoids, angles A and D are same-side interior angles; in the parallelogram, opposite angles are equal.