LESSON MAKER PRO

Triangle Angle Clues

Use straight angles to reason about triangles.

GRADE 8 · 8.GM.B.25.a

8.GM.B.25.a "Use informal arguments to establish that the sum of the interior angles of a triangle is 180 degrees."

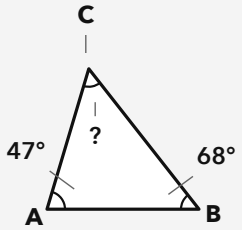
NAME _____ DATE _____

WHY 180°?

The three inside angles of a triangle add to 180°. Imagine a line through one vertex parallel to the opposite side. The angles at the other two vertices match angles along that line, so all three fit together to make a straight angle.

WORKED EXAMPLE

Find the angle marked ? in triangle ABC.

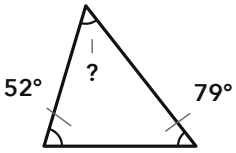


1. Imagine a line through C parallel to AB. Angles matching 47° and 68° sit beside the angle marked ?.
2. Those three angles form a straight angle: 47° + 68° + ? = 180°.
3. 47° + 68° = 115°.
4. ? = 180° - 115° = 65°.

Answer: 65°

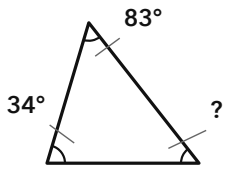
PRACTICE 6 problems

1 Find the angle marked ?.



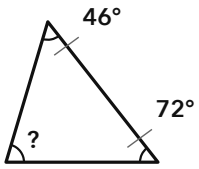
ANSWER _____

2 Find the angle marked ?.



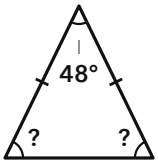
ANSWER _____

3 Find the angle marked ?.



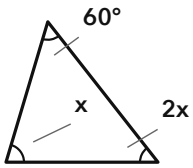
ANSWER _____

4 The marked sides have equal lengths. Find the measure of each angle marked ?.



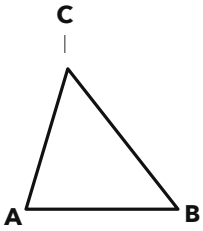
ANSWER _____

5 Find x, the measure of the angle labeled x.



ANSWER _____

6 Imagine a line through C parallel to AB. Explain why the three inside angles of triangle ABC add to 180°.

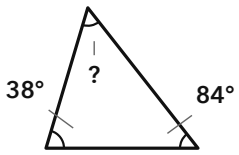


ANSWER _____

_____

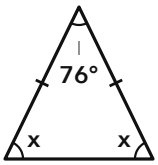
APPLY IT Show your work

1 An esports team designs a triangular logo with the angles shown. What is the measure of the angle marked ??



ANSWER _____

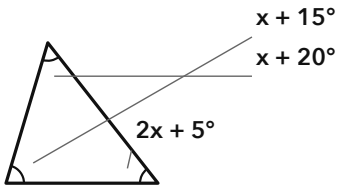
2 A phone stand has a triangular support. Its marked sides have equal lengths. What is the measure of each angle labeled x?



ANSWER _____

CHALLENGE One step up

Find x and all three angle measures. Explain why your equation is valid.



WORK SPACE AND ANSWER

ANSWER KEY

Triangle Angle Clues

GRADE 8 · 8.GM.B.25.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the angle marked ?.	**49°**
2	Find the angle marked ?.	**63°**
3	Find the angle marked ?.	**62°**
4	The marked sides have equal lengths. Find the measure of each angle marked ?.	**66° each**
5	Find x, the measure of the angle labeled x.	**x = 40°**
6	Imagine a line through C parallel to AB. Explain why the three inside angles of triangle ABC add to 180°.	**The angles at A and B match angles along the parallel line through C. Those two angles and the angle at C form a straight angle, which measures 180°.**

PART 2 · APPLY IT

1. **58°** Subtract the two given angles from 180°: 180° - 38° - 84° = 58°.
2. **x = 52°** The equal sides make the two angles labeled x equal. Each is (180° - 76°) / 2 = 52°.

CHALLENGE

x = 35; the angles are 50°, 75°, and 55°. The equation (x + 15) + (2x + 5) + (x + 20) = 180 is valid because a triangle's inside angles form a straight angle when brought together along a parallel line.

For the explanation items, accept reasoning that uses a parallel line to match two angles and shows that the three angles form a straight angle. In the challenge, the angle measures are listed in figure order.