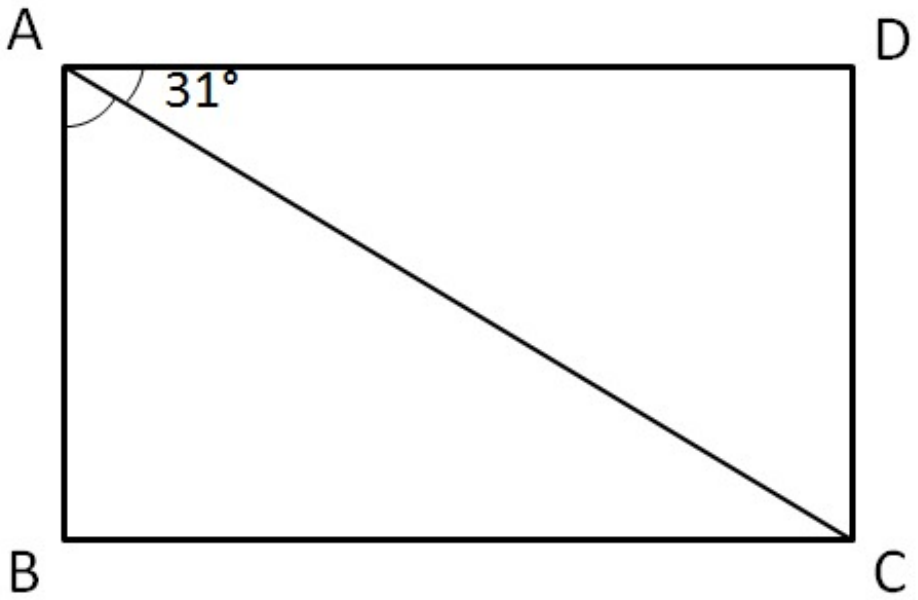
4.MD,G Finding an unknown angle

Alignments to Content Standards: 4.G.A.2 4.MD.C.7

Task

In the figure, $ABCD$ is a rectangle and $\angle CAD = 31^\circ$. Find $\angle BAC$.



IM Commentary

The purpose of this task is to give 4th grade students a problem involving an unknown quantity that has a clear visual representation. Students must understand that the four

interior angles of a rectangle are all right angles (4.G.2) and that right angles have a measure of 90° and that angle measure is additive (4.MD.7). In a teaching scenario, students may be allowed to verify the computations using a protractor to measure the angles. However, care should be taken beforehand to ensure that the measurements of the printed figure match the stated measurements.

The task may also be viewed as preparation for later work when, in 6th grade, students are introduced to algebraic expressions. In that context, unknown angle problems will use variables to label missing angles, and students will write and solve equations to find the missing angle measures.

This task includes an experimental GeoGebra worksheet, with the intent that instructors might use it to more interactively demonstrate the relevant content material. The file should be considered a draft version, and feedback on it in the comment section is highly encouraged, both in terms of suggestions for improvement and for ideas on using it effectively. The file can be run via the free online application GeoGebra, or run locally if GeoGebra has been installed on a computer.

This applet allows the teacher to first enter the any angle. After setting the angle, the problem appears and can be given to the student.

Edit this solution

Solution

All four angles in a rectangle are right angles, so $\angle BAD$ is 90°. Since $\angle BAC + \angle CAD = \angle BAD$, we have that

$$\angle BAC + 31^\circ = 90^\circ$$

which is the same as saying

$$\angle BAC = 90^\circ - 31^\circ.$$

Thus, $\angle BAC = 59^\circ$.