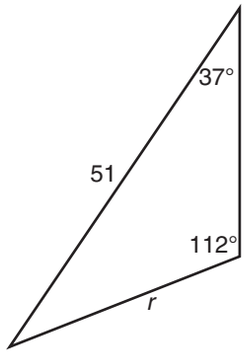
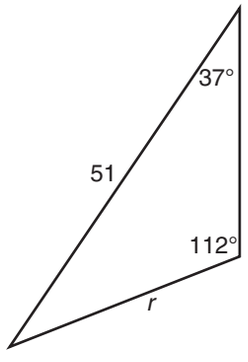
Practice Run

Determine the value of r.

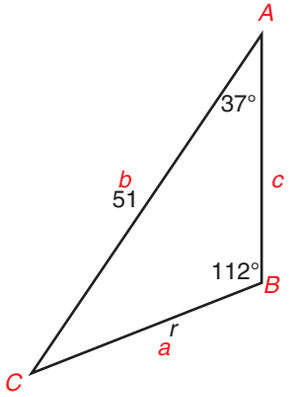


Compare your answers.

Determine the value of r.



Begin by labelling the diagram.



Now use the appropriate sine law equation.

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{r}{\sin 37^\circ} = \frac{51}{\sin 112^\circ}$$

$$r = \frac{51}{\sin 112^\circ} \cdot \sin 37^\circ$$

$$r = 33.10...$$

$$r \doteq 33.1$$

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The sine law can also be used to solve for unknown angles. The following example uses the sine law to help solve a surveying problem. Traditionally, surveying was based on a series of length and angle measurements. Once some values were known, calculations could be used to determine unknown values or to double check measurements.

USB Drive

Multimedia

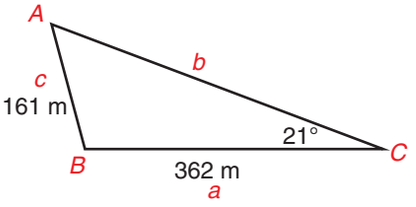
A video demonstration of the solution for Example 2 is provided.

Example 2

A surveyor was working in a field between three points that form an obtuse triangle. She found the distances between the points, on either side of the obtuse angle, to be 161 m and 362 m. She found the acute angle adjacent to the 362 m distance to be 21°.

a. What is the measure of the obtuse angle?

Begin by drawing a diagram to represent the situation.



The goal is to determine the value of B. Unfortunately, we don't know b so we cannot use the sine law directly to determine B. However, it is possible to determine A and then use the sum of the interior angles in a triangle to determine B.

continued…