Section 7.1

The Sine Law

Lesson 2:

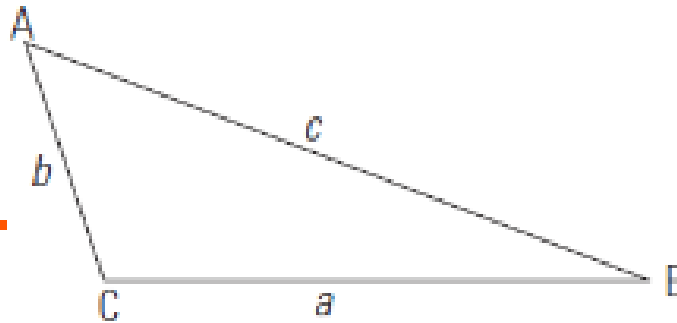**Using the Sine Law to find an Angle Measure in an Oblique Triangle**

The **sine law** can be used to solve for an unknown side length or an unknown angle measure of an oblique triangle in certain situations. The sine law states that, for a triangle ABC:
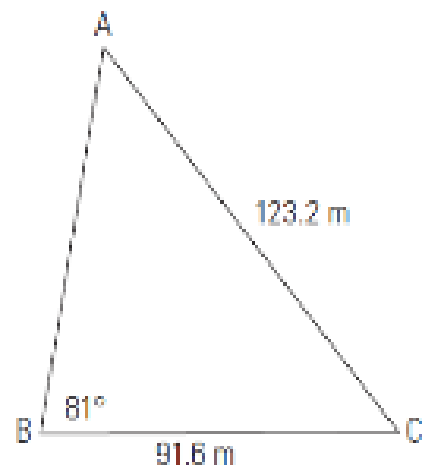
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \qquad \text{or} \qquad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

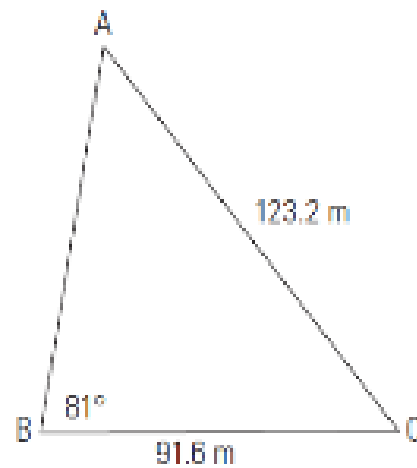**Use this version if you are trying to solve for a missing angle measure.**

Example 3

Calculate the sizes of ∠A and ∠C.

Example 3
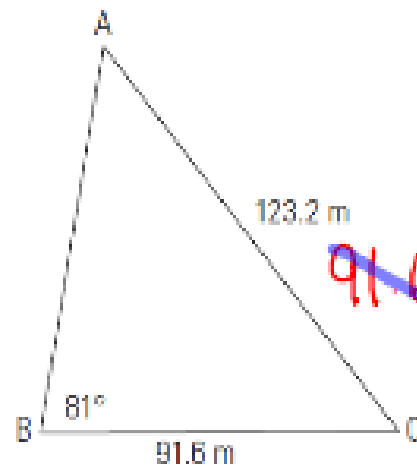
Calculate the sizes of ∠A and ∠C.

We will use the **Sine Law** to find one of the angles, and then use the 180 degree rule to find the third angle.

Example 3

Calculate the sizes of ∠A and ∠C.

A

123.2 m

81°

B   91.6 m   C

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

$$91.6 \times \frac{\sin A}{91.6} = \frac{\sin 81°}{123.2} \times 91.6$$

$$\sin A = \frac{91.6 \sin 81°}{123.2}$$

$$\sin A = 0.73435\ldots$$
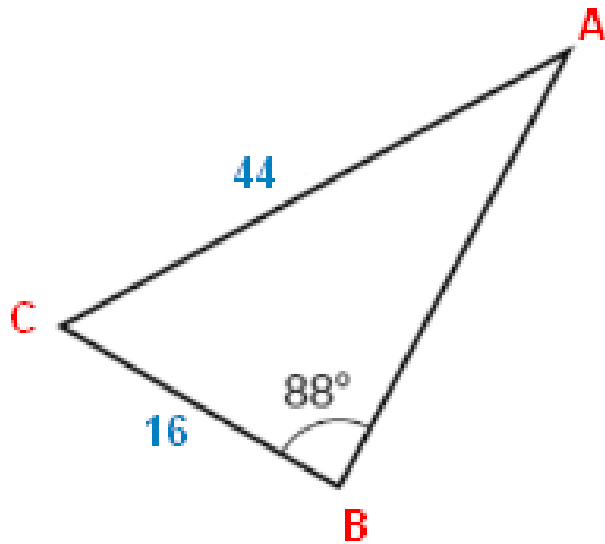
$$\angle A = 47.2525\ldots$$
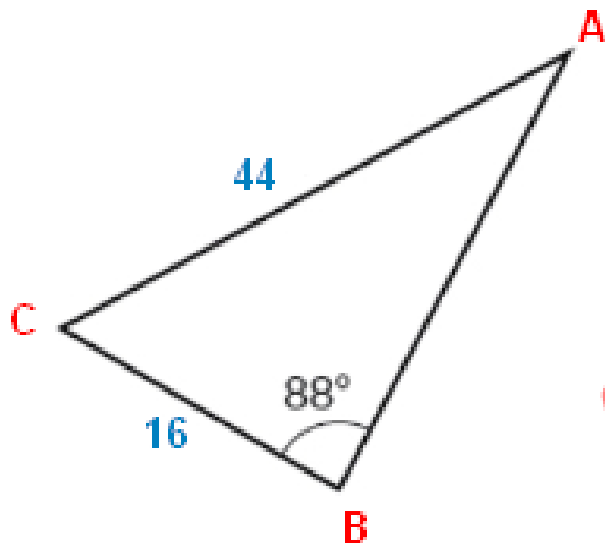
$$\angle A = 47°$$

$$\angle B = 180° - 81° - 47°$$

$$\angle B = 52°$$

Example: Solving a Triangle

Determine the measures of angle A and Angle C to the nearest degree, and the length of side c to one decimal place.

Example: Solving a Triangle

A

44

C

88°

16

B

Determine the measures of angle A and Angle C to the nearest degree, and the length of side c to one decimal place.

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

Find $\angle A$ is the first step.

$$16 \times \frac{\sin A}{16} = \frac{\sin 88°}{44} \times 16$$

$$\sin A = \frac{16 \sin 88°}{44}$$

$$\sin^{-1} \sin A = \sin^{-1} 0.363414\ldots$$

$$A = \sin^{-1}(0.363414\ldots)$$

$$A = 21.31006\ldots$$

$$\angle A = 21°$$

$$\angle C = 180° - 88° - 21°$$

$$\angle C = 71°$$

Missing side length for c :

$$\frac{c}{\sin C} = \frac{b}{\sin B}$$

$$\frac{\sin 71° \times c}{\sin 71°} = \frac{44 \times \sin 71°}{\sin 88°}$$

$$c = 41.628...$$

$$\boxed{c = 41.6}$$

Homework:

Build Your Skills
pg. 264
#4(a)(b)(c)

Practise Your New Skills
pg. 271
#1

Sine Law Worksheet - Finding Angles
#4, 5, 6, 7