<u>9-3 The Law of Sines</u>

Prove the Law of Sine's from the area of a triangle.

$$K = \frac{1}{2} abSinC = \frac{1}{2} bcSinA = \frac{1}{2} acSinB$$

1. A civil engineer wants to determine the distances from points A and B to an inaccessible point C. From direct measurement the engineer knows that $AB = 25m, m\angle A = 110^\circ$, and $m\angle B = 20^\circ$. Draw ΔABC and find AC and BC.

Activity

For this activity, use a ruler, compass and protractor. Draw $\angle A$ with a measure of 30°. Along one ray of $\angle A$, locate point C , 10cm from point A. For each of the following compass settings, draw a large arc. Then tell whether the arc crosses the other ray of $\angle A$ and , if so, in how many points.

a. Compass at C and open to 4 cm

b. Compass at C and open to 5cm

c. Compass at C and open to 6 cm

Now show your answers in Activity 1 agree with what the law of sines would give in each of the following SSA situations.

a. If $\angle A = 30^\circ, b = 10, \text{ and } a = 4, \text{ and } \angle B$

b. If $\angle A = 30^\circ, b = 10, \text{ and } a = 5, \text{ and } \angle B$

c. If $\angle A = 30^\circ, b = 10, \text{ and } a = 6, \text{ and } \angle B$

Problem: Find all parts of the triangle if $\angle B = 36^\circ, a = 10, b = 8$.