5-3 Notes Law of Cosines Name _____
Pre-Calculus

I. Law of Cosines

Recall the cases mentioned in 5-2 Notes. There are two situations where the law of sines will not work; here we will use the **Law of Cosines**.

Case 3 – Two sides and the angle included between the two sides are known (SAS).
Case 4 – Three sides are known (SSS).

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

A. SSS

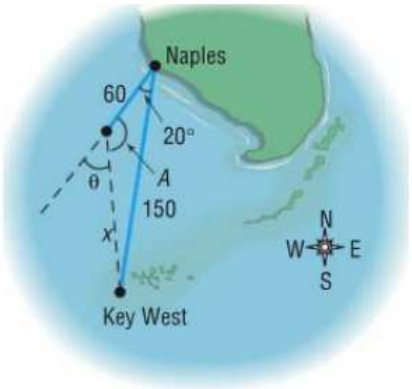
The sides of a triangle are: a = 3, b = 4, and c = 6. Find the angles of the triangle.

B. SAS

Solve the triangle ABC where C = 60°, a = 2 and b = 3.

II. Application

A motorized sail boat leaves Naples, Florida bound for Key West, 150 miles away. Maintaining a constant speed of 15 mph, but encountering heavy crosswinds and strong currents, the crew finds after 4 hours that the sailboat is off course by 20°.



1. How far is the sailboat from Key West at this time?

2. Through what angle should the sailboat turn to correct its course

3. How much time has been added to the trip because of this? Assume a constant speed of 15 mph.