Land Ho!

Captain Hook is sailing his vessel along a coast when he spots a beacon's light. He wants to know how far his sailboat is from the beacon so that it does not venture into shallow waters. He decides to use an old sailor's rule called "doubling the angle on the bow". With the help of a hand-bearing compass, he gets a bearing of 35 degrees initially. This bearing is the degrees of the angle formed by the captain's line of sight with the beacon and the horizontal path of the boat. He carefully watches his bearings until the reading is double the initial bearing. Further calculations tell him that he has traveled 100 yards between the initial and final bearings. How can Captain Hook use geometry and "doubling the angle on the bow" to determine his distance from the beacon and avoid running his sailboat aground?

1. Make a drawing using a straight edge and protractor to show the bearings made by Captain Hook. Label the drawing using S for the initial position of the boat with a bearing of 35°, F for the final bearing , B for the position of the beacon, and P for the position of the boat along its path past the beacon.

2. Use geometric terms to describe the drawing. What assumptions must you make?

3. What do you know about the angle relationships at vertex F? about the sum of the interior angles of the triangle formed?

4. What can you determine about triangle SFB?

5. How can this information help you answer the question?