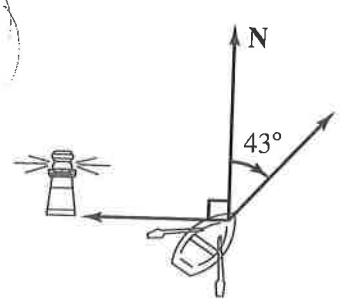
CLASS EXERCISES

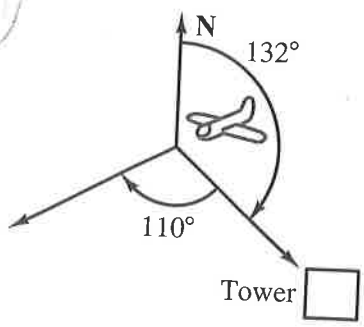
Course & Bearing

Give the course of each ship or airplane and its bearing to the lighthouse or tower.

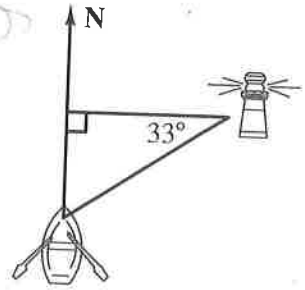
1.



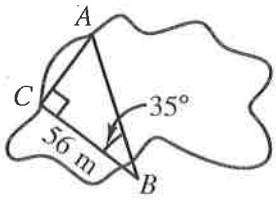
2.



3.



4. To find the distance AC across the western corner of Ocean Pond, a surveyor determined the measurements shown. Find AC.

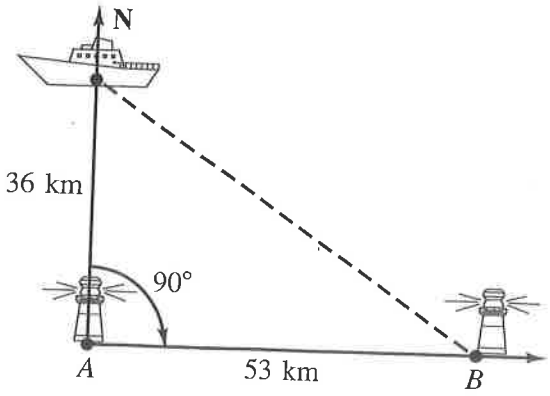


5. A hip roof is in the form of four congruent isosceles triangles. The base of each triangle is 24 ft and the height is 11 ft. Find the measure of each base angle.

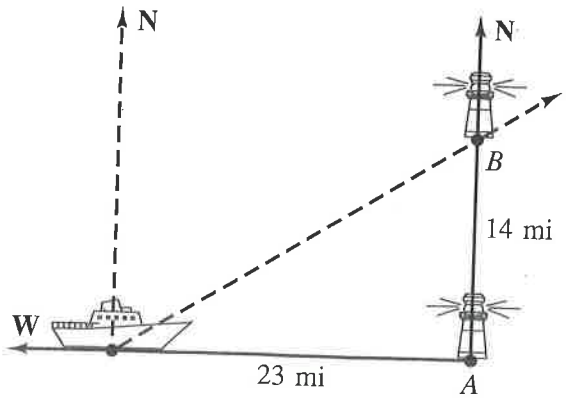
6. Each of the four congruent isosceles triangles that form a hip roof has a height of 12 ft and base angles of 36°. What is the length of the base of each triangle?

PRACTICE EXERCISES

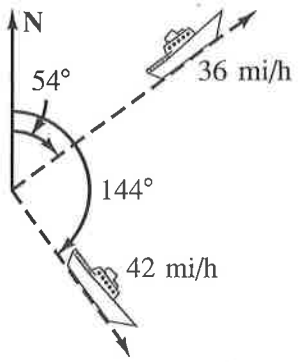
1. A tugboat is 36 km due north of lighthouse A. Lighthouse B has a bearing of 90° from lighthouse A. The lighthouses are 53 km apart. Find the bearing of lighthouse B from the tugboat and the distance from lighthouse B to the tugboat.



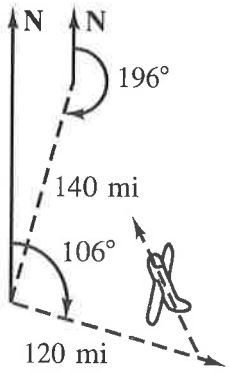
2. A boat is 23 mi due west of lighthouse A. Lighthouse B is 14 mi due north of lighthouse A. Find the bearing of lighthouse B from the boat and the distance from lighthouse B to the boat.



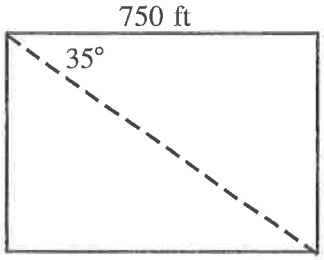
3. Two ships leave the same port at 7 AM. The first ship sails towards Europe on a 54° course at a constant rate of 36 mi/h. The second ship, with a tropical destination, sails on a 144° course at a constant speed of 42 mi/h. Find the distance between the ships at 11 AM.



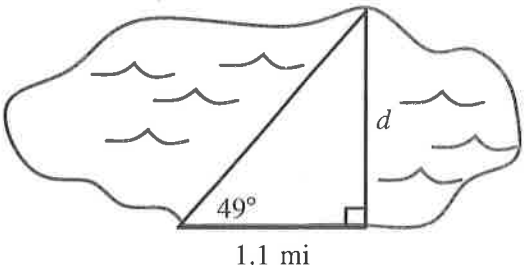
4. A jet flew 140 mi on a course of 196° and then 120 mi on a course of 106°. Then the jet returned to its starting point via the shortest route possible. Find the total distance that the jet traveled.



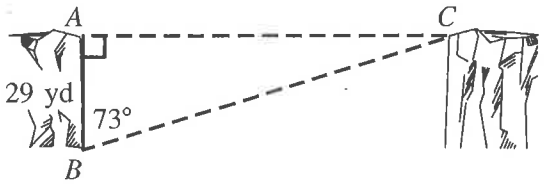
5. To find the length of a diagonal of a rectangular city block, a surveyor determined the measurements shown below. How long is the diagonal?



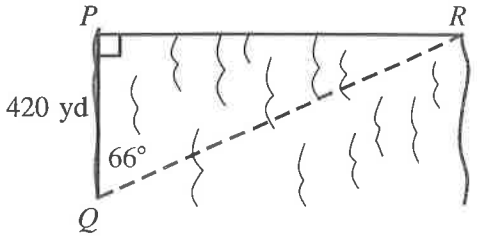
6. To find the distance d across a pond, a surveyor determined the measurements shown below. How far is it across the pond?



7. To find the distance AC across a canyon, a hiker walks 29 yd along one side from A to B. If segments AB and AC are perpendicular and $\angle B = 73°$, find AC.



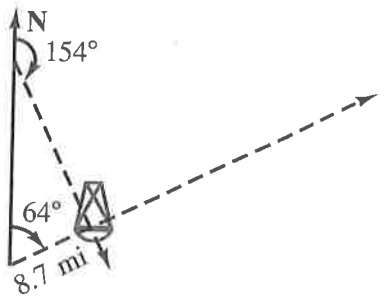
8. To find the width of a river between points P and R, a surveyor locates a point Q such that segments PQ and PR are perpendicular and $PQ = 420$ yd. Using a transit, the surveyor finds that $\angle Q = 66°$. Find PR, the width of the river.



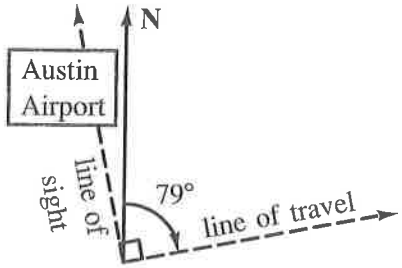
9. A hip roof is in the form of four congruent isosceles triangles with a common vertex that forms the peak of the roof. If each triangle has an 18-ft base and a height of 16 ft, find the measure of each base angle.

10. A hip roof is in the form of four congruent isosceles triangles with base angles of 30° and heights of 15 ft. Find the length of the base of each triangle.

11. The bearing of a buoy from a ship 8.7 mi away is 64°. The ship is headed due north, and the navigator plans to change course when the buoy has a bearing of 154°. How much farther will the ship travel before a change of course is needed?



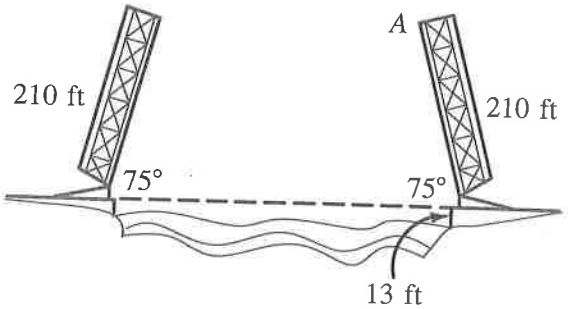
12. A pilot of a San Antonio-to-Houston express plane traveling on a course of 79° sights the Austin airport. His line of sight forms a right angle with the plane's line of travel, as shown below. Find the bearing of the Austin airport.



13. After the plane in Exercise 12 travels 45 min at 180 mi/h along the same course, the airport has a new bearing of 280°. How far is the plane from the airport then?

14. The navigator of a ship on a 44° course sights a buoy with bearing 134°. After the ship sails 15 km along the same course, the navigator sights the same buoy with bearing 168°. Find the distance between the ship and the buoy at the time of each sighting.

15. The two sections of the Sault Sainte Marie railroad bridge in Michigan are each 210 ft in length. Suppose that the maximum angle of elevation of each section is 75°. When the bridge is closed, the water level is normally 13 ft below the bridge. When the bridge is fully opened, what is the distance from the water to point A on the upper left corner of the right section?



16. When the Sault Sainte Marie bridge is fully opened, find the distance between the separated ends of the sections (see Exercise 15).