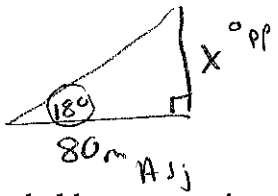
Solve the following word problems. For each question, draw a diagram to help you.

31) An airplane is flying at an altitude of 6000 m over the ocean directly toward a coastline. At a certain time, the angle of depression to the coastline from the airplane is 14°. How much farther (to the nearest kilometer) does the airplane have to fly before it is directly above the coastline?

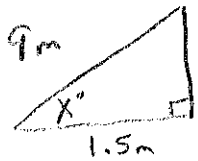
32) From a horizontal distance of 80.0 m, the angle of elevation to the top of a flagpole is 18°. Calculate the height of the flagpole to the nearest tenth of a metre.



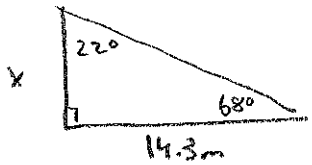
$\tan 18° = \frac{x}{80}$

$x = 25.994\text{ m}$

33) A 9.0 m ladder rests against the side of a wall. The bottom of the ladder is 1.5 m from the base of the wall. Determine the measure of the angle between the ladder and the ground, to the nearest degree.



34) The angle of elevation of the sun is 68° when a tree casts a shadow 14.3 m long. How tall is the tree, to the nearest tenth of a metre?



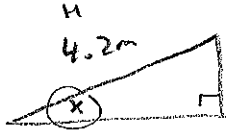
$\tan 68° = \frac{x}{14.3}$

$x = 35.394$

$\frac{14.3}{\sin 22} = \frac{x}{\sin 68°}$

$x = 35.394$

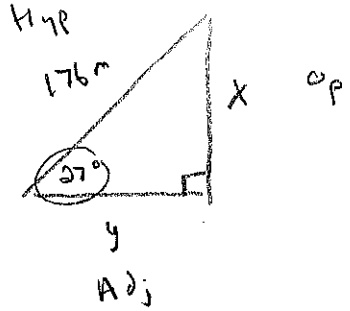
35) A wheelchair ramp is 4.2 m long. It rises 0.7 m. What is its angle of inclination to the nearest degree?



$\sin x° = \frac{.7}{4.2}$

$x = 9.594°$

36) A person flying a kite has released 176 m of string. The string makes an angle of 27° with the ground. How high is the kite? How far away is the kite horizontally? Answer to the nearest metre.



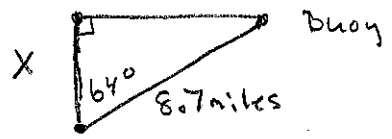
$(176)\sin 27° = \frac{x}{176}$ (176)

79.902 m high = x

$(176)\cos 27° = \frac{y}{176}$ (176)

156.817 m = y horizontally

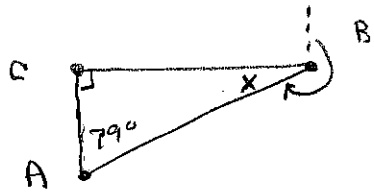
37. The bearing from a ship to a buoy 8.7 miles away is 64°. The ship is headed due north, and the navigator plans to change course when the buoy is due east of the ship. How much farther will the ship travel before a change of course is needed?



$\cos 64° = \frac{X}{8.7}$

$X = 3.8138 \approx$ **3.814 miles**

38. The bearing from A to B is 79°. C is due north of A. The bearing from C to B is 90°. Find the bearing from B to A.

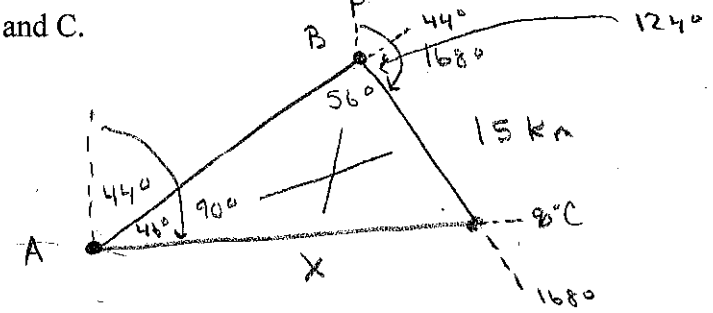


$180 - 79 - 90 = 11°$

Bearing from B to A: $270 - x°$

$270 - 11 =$ **259°**

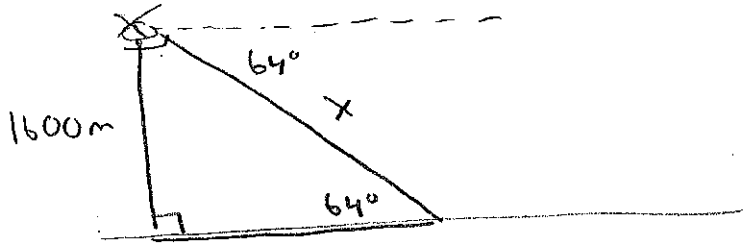
39. The bearing from A to B is 44°. The bearing from B to C is 168°. The distance between B and C is 15 km. The bearing from A to C is due east. Find the distance between A and C.



$\frac{X}{\sin 56°} = \frac{15}{\sin 46°}$

$X = 17.287$ km

40. The angle of depression from a helicopter to its landing port is 64°. If the altitude of the helicopter is 1600 meters, find the direct distance from the helicopter to the landing port.



$\sin 64° = \frac{1600}{X}$

$X = \frac{1600}{\sin 64°}$

$=$ **1780.163 m**