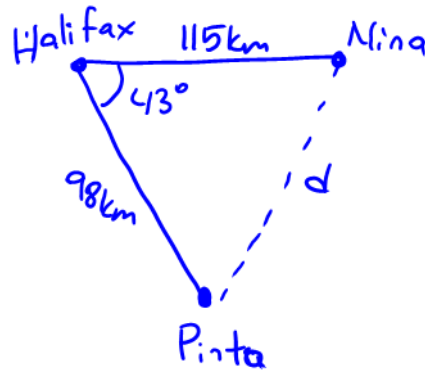
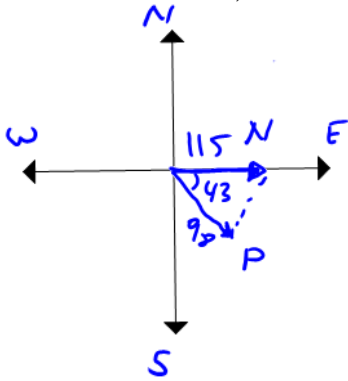


1. Two ships are sailing from Halifax. The Nina is sailing due east and the Pinta is sailing 43° south of east. After an hour, the Nina has travelled 115km and the Pinta has travelled 98km. How far apart are the two ships?



$$d^2 = 115^2 + 98^2 - 2 \cdot 115 \cdot 98 \cdot \cos 43$$

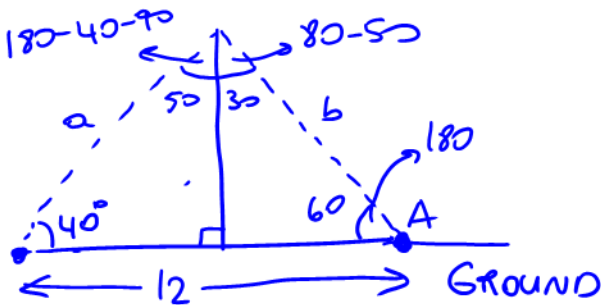
$$d^2 = 6344.2876$$

$$\sqrt{d^2} = \sqrt{6344.2876}$$

$$d = 79.65$$

\therefore Two ships are approximately 79.65 m apart.

2. A post is supported by two wires (one on each side going in opposite directions) creating an angle of 80° between the wires. The ends of the wires are 12m apart on the ground with one wire forming an angle of 40° with the ground. Find the lengths of the wires.



Step 1: side b

$$\frac{b}{\sin 40} = \frac{12}{\sin 80}$$

$$\sin 40 \cdot \frac{b}{\sin 40} = \frac{12}{\sin 80} \cdot \sin 40$$

$$b = 7.8$$

Step 2: side a

$$\angle A = 180 - 40 - 80$$

$$\angle A = 60^\circ$$

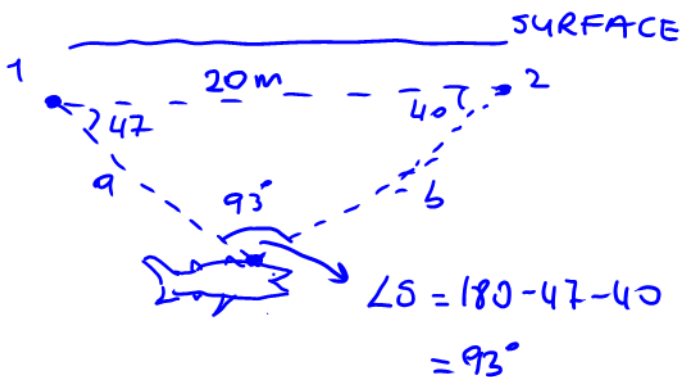
$$\frac{a}{\sin 60} = \frac{12}{\sin 80}$$

$$a = \frac{12}{\sin 80} \cdot \sin 60$$

$$a = 13.6$$

\therefore The two wires are 7.8m and 13.6m in length.

3. Two scuba divers are 20m apart below the surface of the water. They both spot a shark that is below them. The angle of depression from diver 1 to the shark is 47° and the angle of depression from diver 2 to the shark is 40° . How far are each of the divers from the shark?



Step 1: Diver 2

$$\frac{b}{\sin 47} = \frac{20}{\sin 93}$$

$$b = \frac{20}{\sin 93} \cdot \sin 47$$

$$\boxed{b \approx 14.6 \text{ m}}$$

Step 2: Diver 1

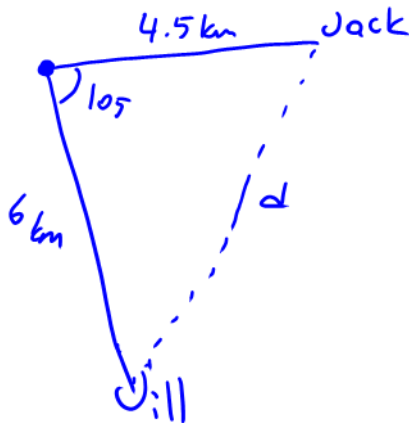
$$\frac{a}{\sin 40} = \frac{20}{\sin 93}$$

$$a = \frac{20}{\sin 93} \cdot \sin 40$$

$$\boxed{a \approx 12.9 \text{ m}}$$

\therefore Diver 1 is 12.9m
and diver 2 is 14.6m
away from the shark.

4. Jack and Jill both start at point A. They each walk in a straight line at an angle of 105° to each other. After 45 minutes Jack has walked 4.5km and Jill has walked 6km. How far apart are they?



$$d^2 = 4.5^2 + 6^2 - 2 \cdot 4.5 \cdot 6 \cdot \cos 105$$

$$d^2 = 70.2262$$

$$\sqrt{d^2} = \sqrt{70.2262}$$

$$d \approx 8.4$$

\therefore They're approximately 8.4 km apart.