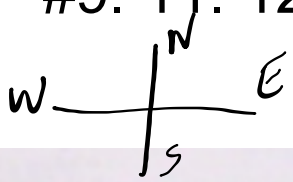
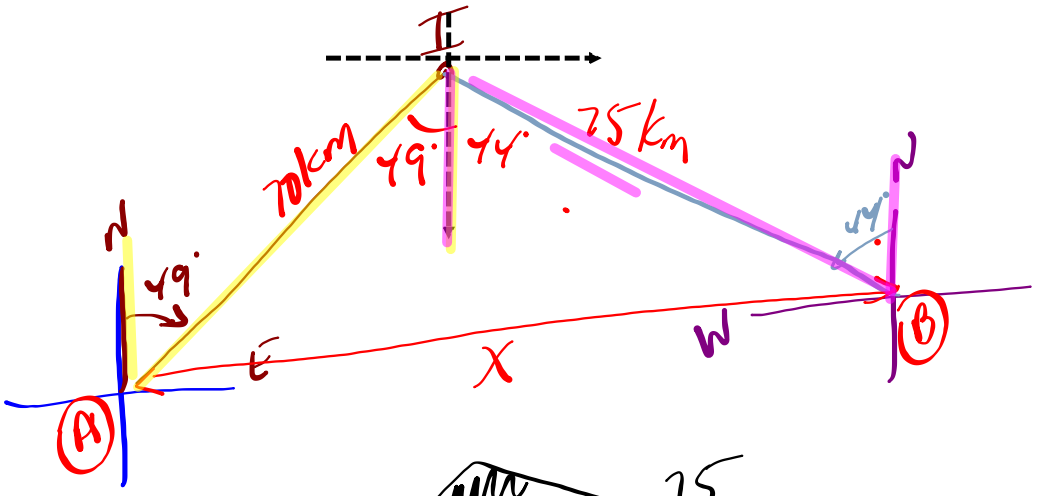
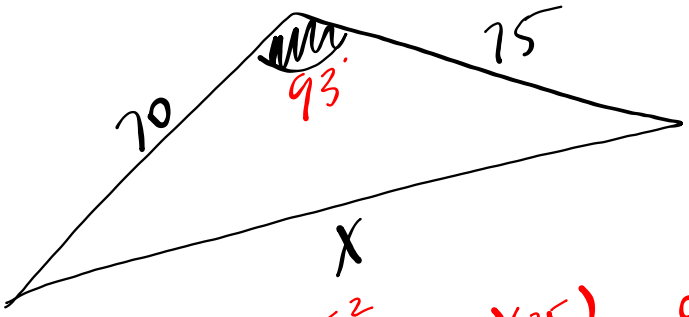
Booklet Questions... 10.12: #9. 11. 12

Questions...



12 Two ships take separate bearings on the same island. From ship A, the island is N49°E and from ship B it is N44°W. If ship A and ship B are respectively 70 km and 75 km from the island, find the distance between the two ships.





$X^2 = 70^2 + 75^2 - 2(70)(75)\cos 93°$

$X^2 = 11074.52754$

$X = 105.2355812$

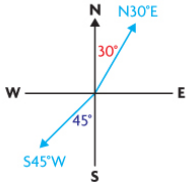
$X = 105.2\text{ km}$

Applications: Bearings

NOTE:

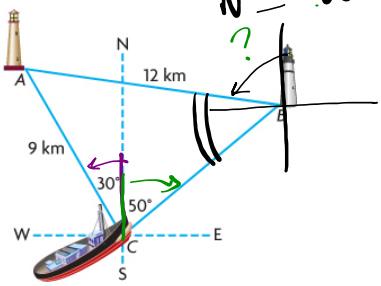
Communication Tip

Directions are often stated in terms of north and south on a compass. For example, N30°E means travelling in a direction 30° east of north. S45°W means travelling in a direction 45° west of south.

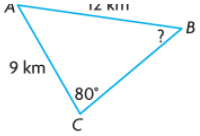


Ex #1:(p. 122) **Using reasoning to determine the measure of an angle**

The captain of a small boat is delivering supplies to two lighthouses, as shown. His compass indicates that the lighthouse to his left is located at N30°W and the lighthouse to his right is located at N50°E. Determine the compass direction he must follow when he leaves lighthouse B for lighthouse A.



Compass Rose Animation



I drew a diagram. I labelled the sides of the triangle I knew and the angle I wanted to determine.

$$\frac{\sin B}{AC} = \frac{\sin C}{AB}$$

I knew AC, AB, and $\angle C$, and I wanted to determine $\angle B$. So I used the sine law that includes these four quantities.

I used the proportion with sin B and sin C in the numerators so the unknown would be in the numerator.

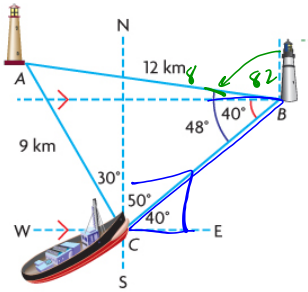
$$\frac{\sin B}{9} = \frac{\sin 80°}{12}$$
$$9\left(\frac{\sin B}{9}\right) = 9\left(\frac{\sin 80°}{12}\right)$$
$$\sin B = 9\left(\frac{\sin 80°}{12}\right)$$
$$\sin B = 0.7386...$$

I substituted the given information and then solved for sin B.

$$\angle B = \sin^{-1}(0.7386...)$$
$$\angle B = 47.612...°$$

The measure of $\angle B$ is 48°.

The answer seems reasonable. $\angle B$ must be less than 80°, because 9 km is less than 12 km.

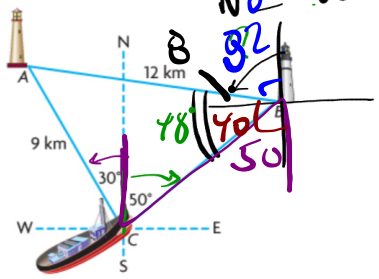


I drew a diagram and marked the angles I knew. I knew east-west lines are all parallel, so the alternate interior angle at B must be 40°.

The captain must head N82°W from lighthouse B.

The line segment from lighthouse B to lighthouse A makes an 8° angle with west-east. I subtracted this from 90° to determine the direction west of north.

The captain of a small boat is delivering supplies to two lighthouses, as shown. His compass indicates that the lighthouse to his left is located at N30°W and the lighthouse to his right is located at N50°E. Determine the compass direction he must follow when he leaves lighthouse *B* for lighthouse *A*.



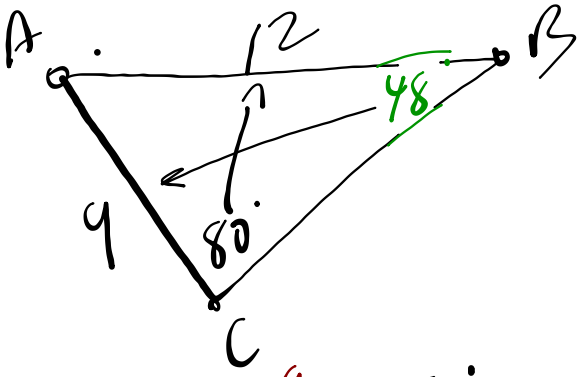
N82W

82

48

40

50



$$\frac{9}{\sin B} = \frac{9}{\sin 80^\circ}$$

$$\frac{12}{1}$$

$$\sin B = (0.7386)$$

$$\sin^{-1}$$

$$\angle B = 48^\circ$$

When your finished the quiz...

HOMEWORK: Bearings

Page 126 #12
Page 129 #8
Page 154 #11, 12
Page 174 #9

Attachments

Logic - Figure Out The Digits.doc

Puzzle Review - Primary Trig, Law of Sines_Cosines.pdf

Puzzle Review Solutions.pdf