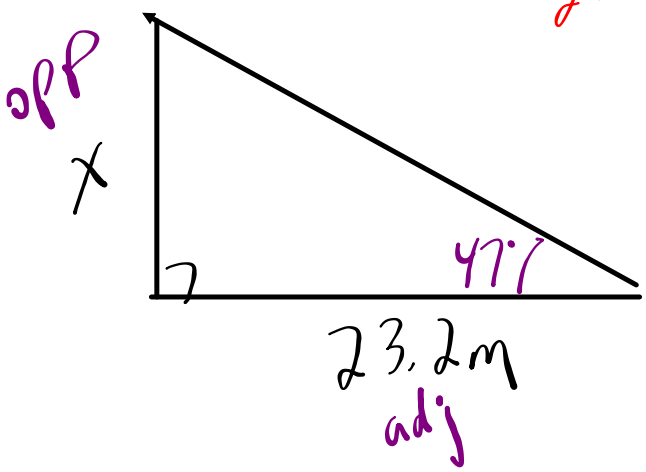
HOMEWORK Questions???

15. A tree casts a shadow 23.2 m long when the angle of elevation of the sun is 47°. Find the height of the tree. (A)



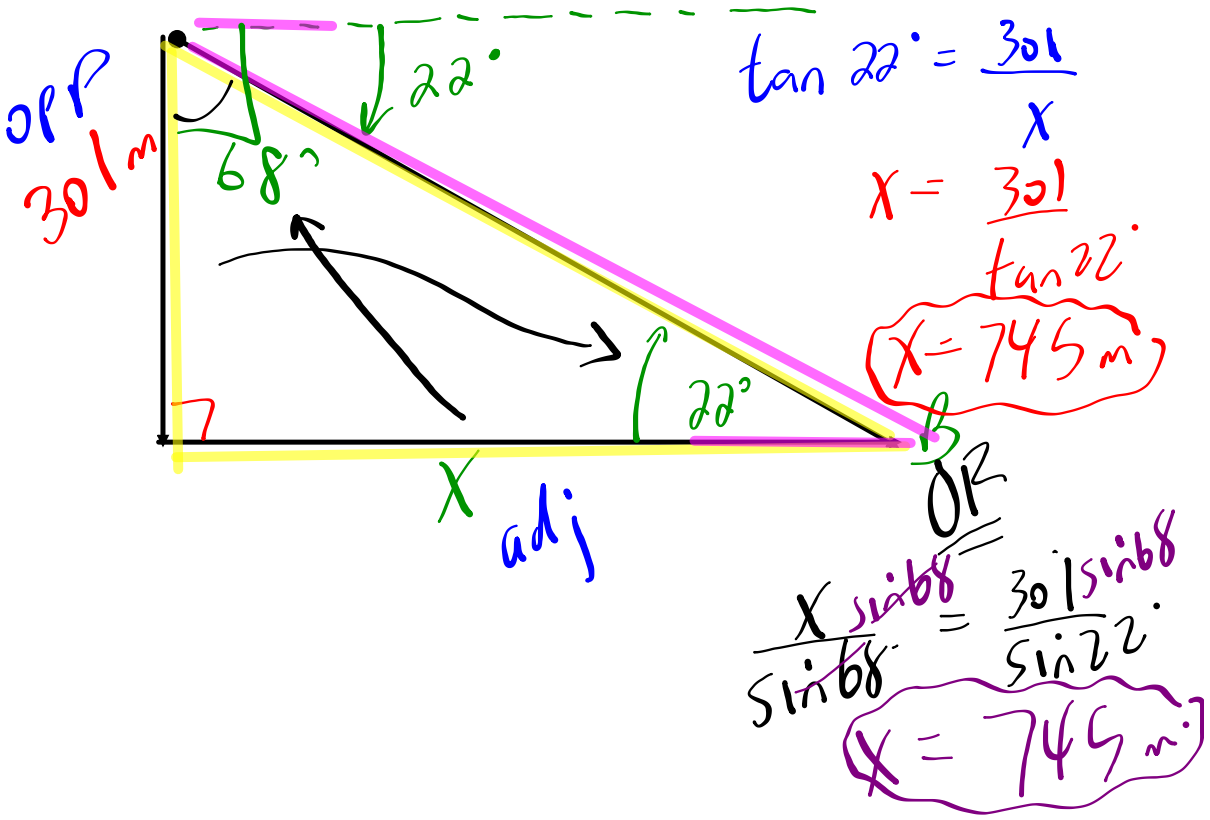
SOH CAH TOA

$23.2 \tan 47° = x$

$24.9 = x$

$x = 25$

11. From the top of a cliff 301 m high, the angle of depression of a sailboat on the water is 22°. How far is the boat from the cliff?



$\tan 22° = \frac{301}{X}$

$X = \frac{301}{\tan 22°}$

$X = 745\ m$

OR

$\frac{X \sin 68°}{\sin 68°} = \frac{301 \sin 68°}{\sin 22°}$

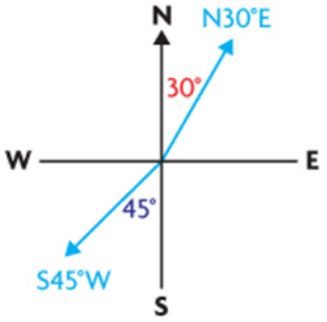
$X = 745\ m$

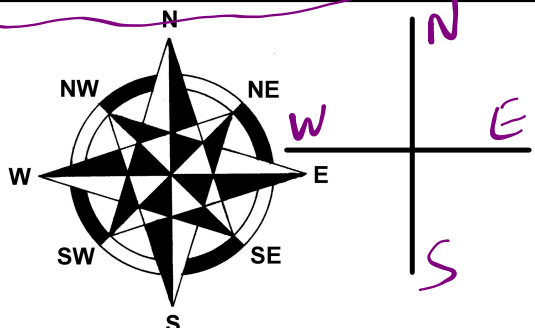
MORE APPLICATIONS... Bearings

NOTE:

Communication | *Tip*

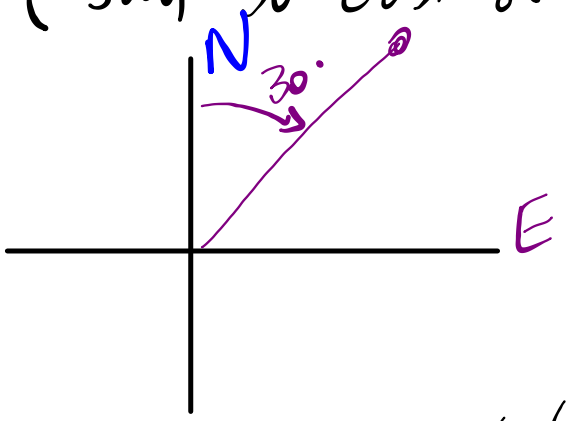
Directions are often stated in terms of north and south on a compass. For example, N30°E means travelling in a direction 30° east of north. S45°W means travelling in a direction 45° west of south.



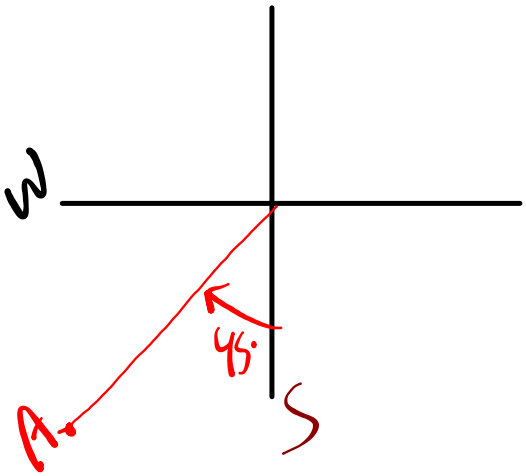


- Example -> Draw a bearing

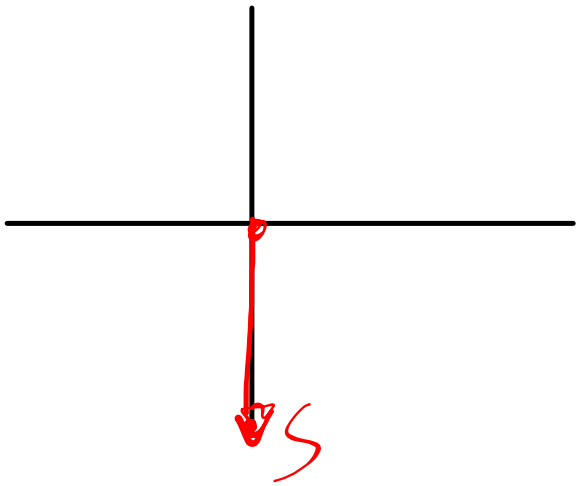
1) N30°E (say 30° East of North)



2) S45°W (say 45° West of South)



3) Due South



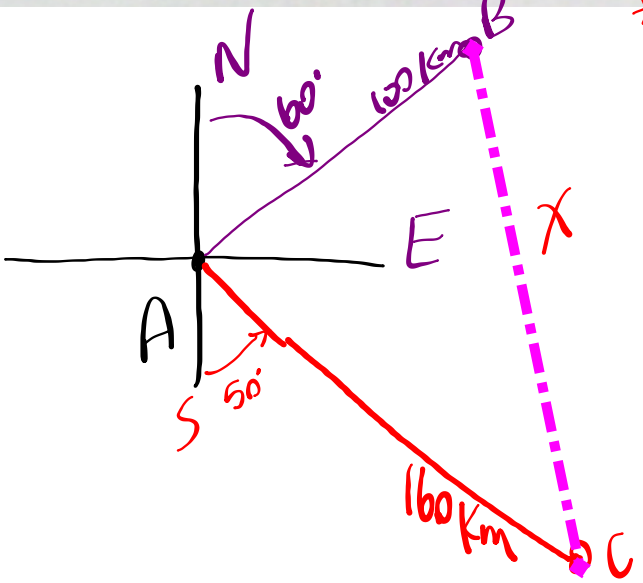
Booklet Questions... 10.12: #8 - 12

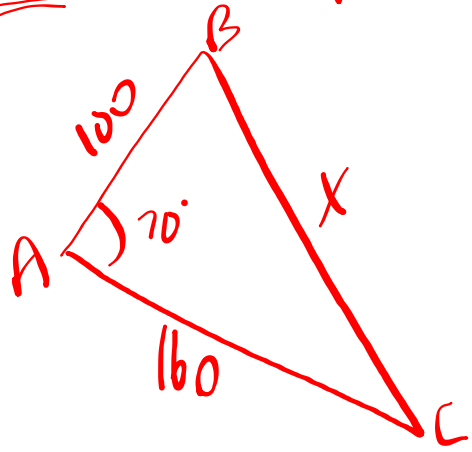
HW: #9-12

Let's do #8 TOGETHER...

8 In an airport control tower A, 2 planes at B and C are located at the same altitude on a radar screen. The range finder determines one plane to bear N60°E at 100 km while the other bears S50°E at 160 km. How far apart are the planes from each other?

*KEY -> Draw 2 pictures





$x^2 = 100^2 + 160^2 - 2(100)(160)\cos 70°$

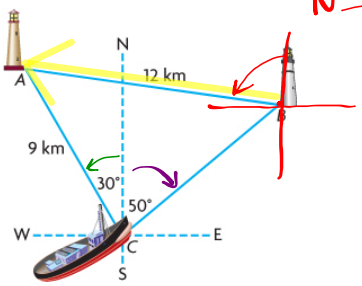
$x^2 = 24655.4$

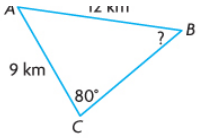
$x = 157$ km

Applications: Bearings

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*.





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.

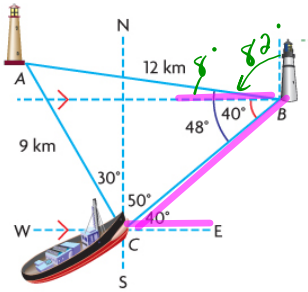
$$\frac{\sin B}{9} = \frac{\sin 80°}{12}$$
$$9\left(\frac{\sin B}{9}\right) = 9\left(\frac{\sin 80°}{12}\right)$$
$$\sin B = 9\left(\frac{\sin 80°}{12}\right)$$
$$\sin B = 0.7386...$$

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.

NOTE:

Communication Tip

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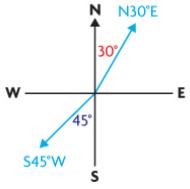
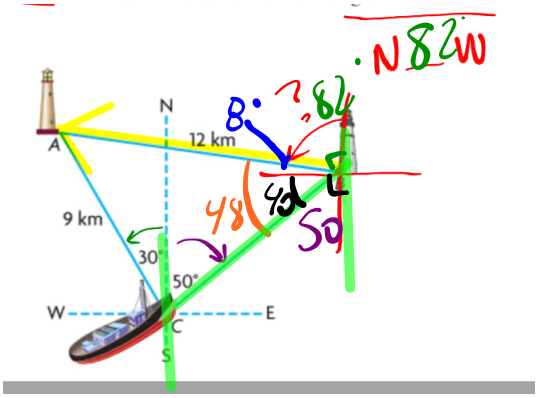
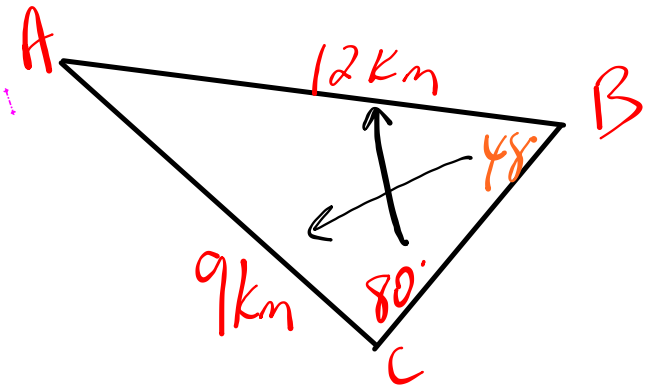


Compass Rose Animation





$$\frac{9\sin\theta}{9} = \frac{9\sin 80^\circ}{12}$$

$$\sin\theta = (0.7386)$$

$$\theta = 48^\circ$$

10.12 # 9-12
Assignment

HW

* Thurs

Text [P. 152 # 3
P. 154 # 11, 12