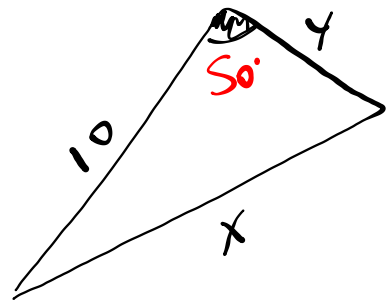
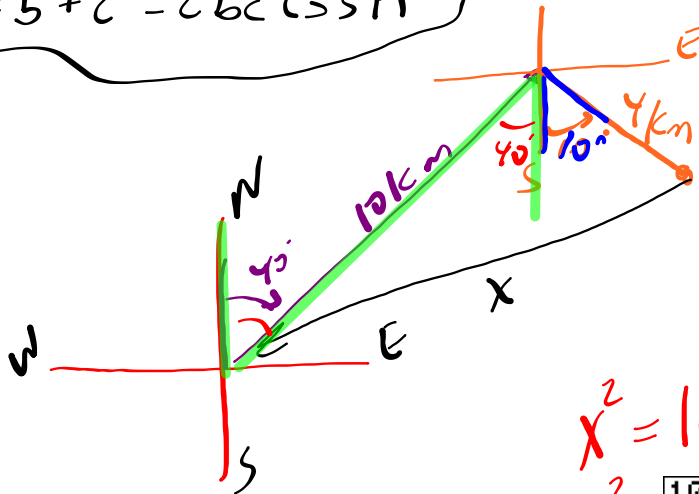


# Homework Questions... 10.12 #9, 11, 12

11 Jean is a cross-country skier and skis 10 km in a direction  $N40^\circ E$  of the ski lodge. At this point she turns and skis  $S10^\circ E$  for 4 km and arrives at a chalet. How far is Jean from the lodge?

$$a^2 = b^2 + c^2 - 2bc \cos A$$



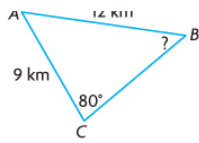
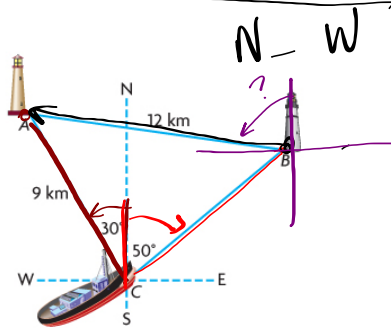
$$x^2 = 10^2 + 4^2 - 2(10)(4)\cos 50^\circ$$

```
x^2 = 10^2 + 4^2 - 2*10*4*cos(50)
64.57699123
√(Ans)
8.035981037
x = 8.0 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  $N30^\circ W$  and the lighthouse to his right is located at  $N50^\circ E$ . 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.

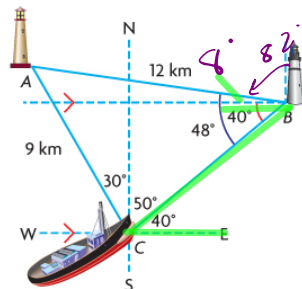
$$\begin{aligned} \frac{\sin B}{9} &= \frac{\sin 80^\circ}{12} \\ 9\left(\frac{\sin B}{9}\right) &= 9\left(\frac{\sin 80^\circ}{12}\right) \\ \sin B &= 9\left(\frac{\sin 80^\circ}{12}\right) \\ \sin B &= 0.7386... \end{aligned}$$

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

$$\begin{aligned} \angle B &= \sin^{-1}(0.7386...) \\ \angle B &= 47.612...^\circ \end{aligned}$$

The measure of  $\angle B$  is  $48^\circ$ .

The answer seems reasonable.  $\angle B$  must be less than  $80^\circ$ , 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  $40^\circ$ .

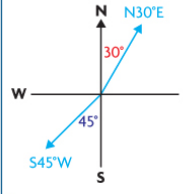
The captain must head  $N82^\circ W$  from lighthouse  $B$ .

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

## NOTE:

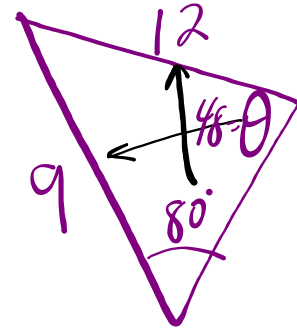
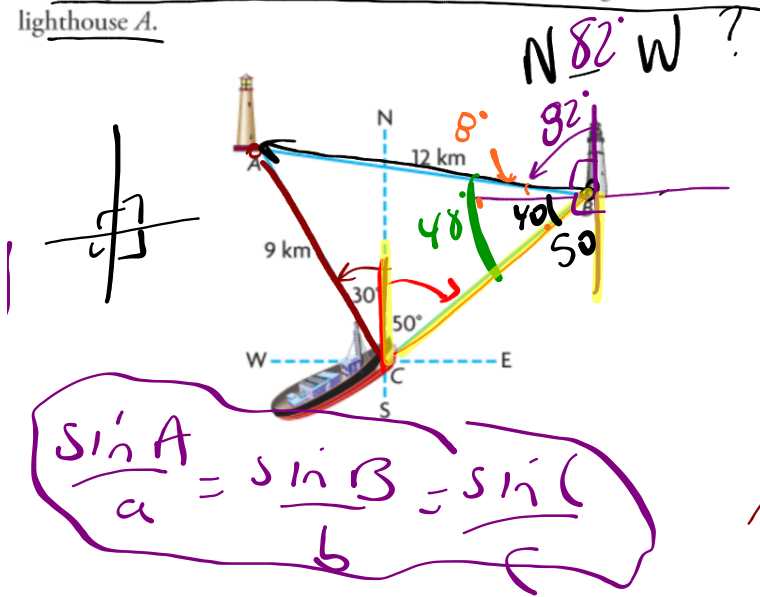
### Communication Tip

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



### Compass Rose Animation

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  $N30^\circ W$  and the lighthouse to his right is located at  $N50^\circ E$ . Determine the compass direction he must follow when he leaves lighthouse  $B$  for lighthouse  $A$ .



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

$$\sin^{-1} \sin \theta = \sin^{-1} (0.7386)$$

$$\theta = 48^\circ$$

**When your finished the quiz...**

**HOMEWORK: Bearings...**

**Page 126 #12**

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**Page 154 #11, 12**

**Page 174 #9**

