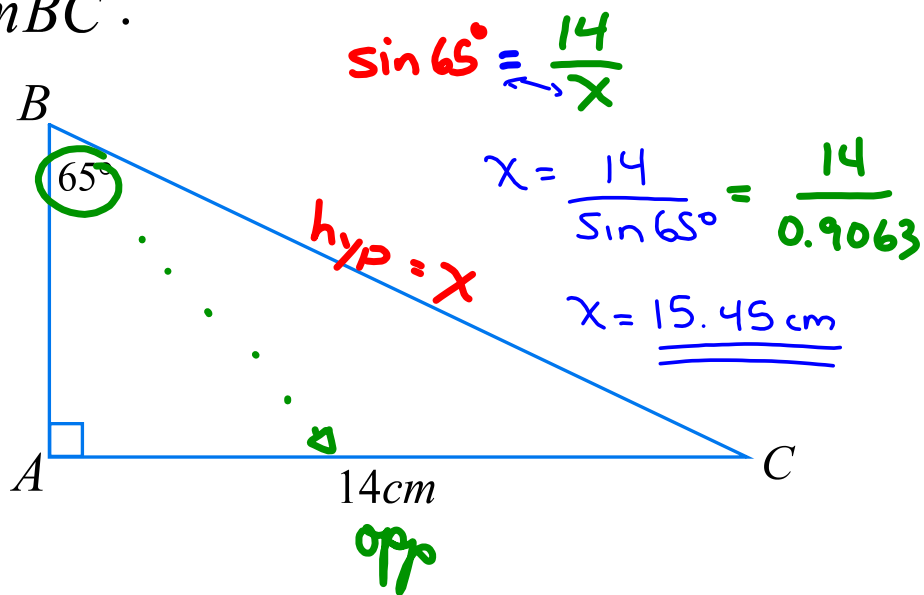


Determine  $m\overline{BC}$ .

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

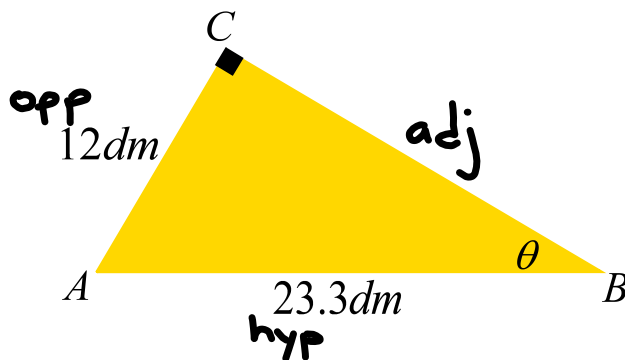
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$



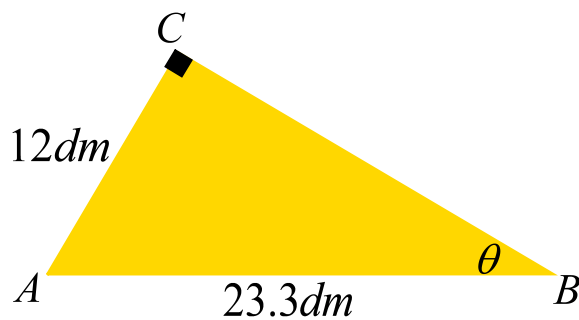
## Trigonometry

### Finding Missing Angles (given at least two sides)

Example:



- Locate the angle; determine, with respect to that angle, which sides you're given .
- Determine which trig ratio uses these sides.
- Set up the trig ratio, substituting the values in the appropriate places.
- Solve for the missing angle using **arccos**, **arcsin**, or **arctan** ( $\cos^{-1}$ ,  $\sin^{-1}$  or  $\tan^{-1}$  on the calculator).



Wanted angle:  $\angle B$

Given side: opp

Given side: hyp

Trig ratio: sine

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin \theta = \frac{12}{23.3} = 0.51502$$

$$\sin^{-1}(0.51502) = \theta$$

$$30.99888936^\circ = \theta$$

$$\theta = 31^\circ$$

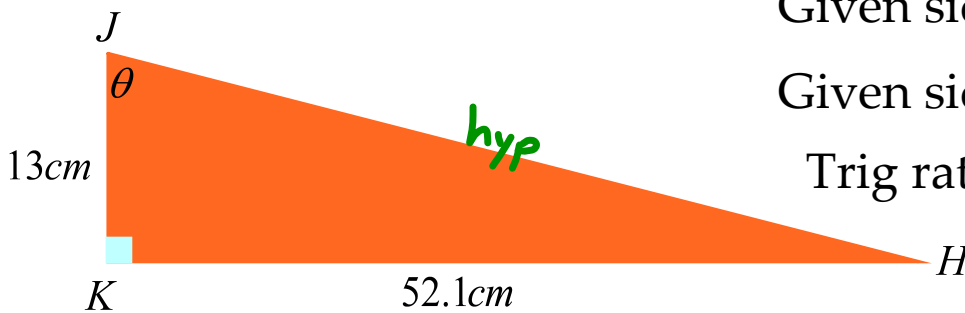
shift  
2nd

sin

0.51502

=

Example:



Wanted angle:  $\angle J$

Given side: adj 13

Given side: opp 52.1

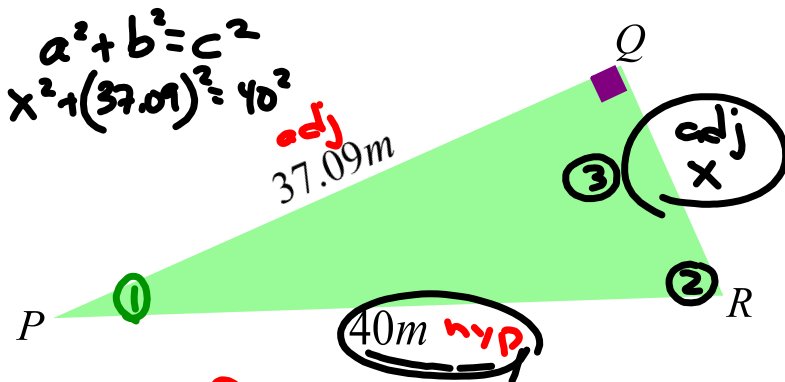
Trig ratio: tangent

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \Rightarrow \tan \theta = \frac{52.1}{13} \Rightarrow \tan \theta = 4.00769$$

$$\tan^{-1}(4.00769) = \theta$$

$$\underline{76^\circ} = 75.99^\circ = 75.98964^\circ = \theta$$

Example: *Solve* the following triangle.



Find all missing measurements (sides & angles)

①  $m\angle R$

②  $m\angle P$

③  $m\angle Q$

①  $\cos P = \frac{37.09}{40}$

$m\angle P = \cos^{-1}\left(\frac{37.09}{40}\right) = \cos^{-1}(0.92725) = 21.99^\circ = 22^\circ$

②  $m\angle R = 180^\circ - 22^\circ - 90^\circ$

$\underline{\underline{R}} = 90 - 22^\circ$   
 $= 68^\circ$

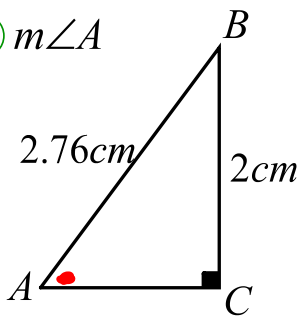
③  $m\angle Q \Rightarrow \cos 68^\circ = \frac{x}{40}$

$x = 40 \cdot \cos 68^\circ$

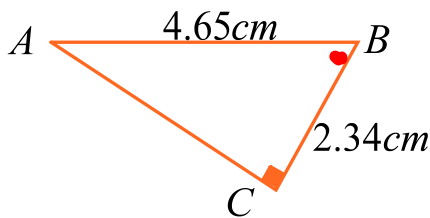
$x = 14.96\text{m}$

Calculate:

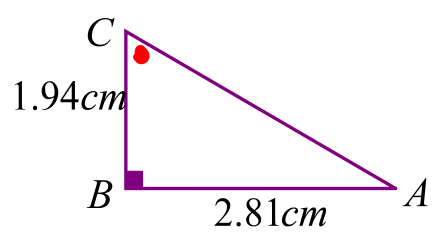
①  $m\angle A$



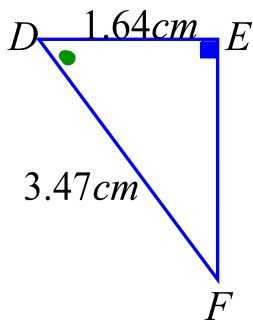
②  $m\angle B$



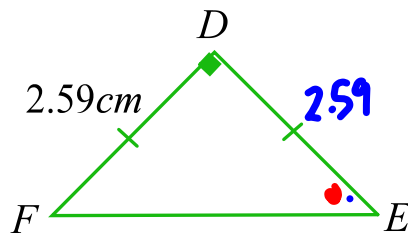
③  $m\angle C$



④  $m\angle D$



⑤  $m\angle E$



⑥  $m\angle F$

