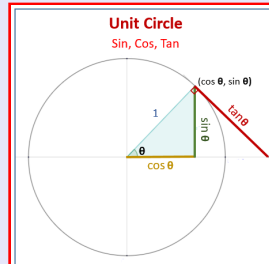


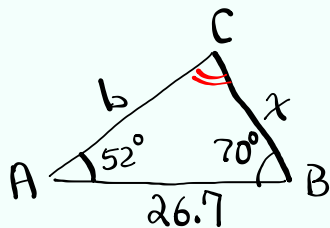
# Trigonometry

## Lecture 19



Feb 19-8:47 AM

Class QZ 4

Find  $x$ 

$$A + B + C = 180^\circ$$

$$52 + 70 + C = 180^\circ$$

$$\boxed{C = 58^\circ}$$

$$\frac{\sin A}{x} = \frac{\sin B}{b} = \frac{\sin C}{26.7}$$

$$\frac{\sin 52^\circ}{x} = \frac{\sin 58^\circ}{26.7}$$

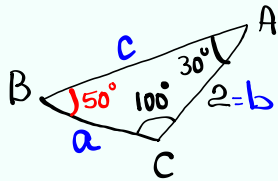
$$x \sin 58^\circ = 26.7 \sin 52^\circ$$

$$x = \frac{26.7 \sin 52^\circ}{\sin 58^\circ}$$

$$\boxed{x \approx 24.8}$$

Oct 1-10:22 AM

Solve the triangle below



$$A + B + C = 180^\circ$$

$$30 + B + 100 = 180^\circ$$

$$B = 50^\circ$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 30^\circ}{a} = \frac{\sin 50^\circ}{2} = \frac{\sin 100^\circ}{c}$$

$$a \sin 50^\circ = 2 \sin 30^\circ$$

$$a = \frac{2 \sin 30^\circ}{\sin 50^\circ} \quad | a \approx 1$$

$$c \sin 50^\circ = 2 \sin 100^\circ$$

$$c = \frac{2 \sin 100^\circ}{\sin 50^\circ}$$

$$| c \approx 3$$

Oct 1-10:38 AM

Solve triangle ABC if  $a=20$ ,  $c=45$ ,  $\angle A=125^\circ$ 

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 125^\circ}{20} = \frac{\sin B}{b} = \frac{\sin C}{45}$$

$$\frac{\sin 125^\circ}{20} = \frac{\sin C}{45}$$

$$20 \sin C = 45 \sin 125^\circ$$

$$\sin C = \frac{45 \cdot \sin 125^\circ}{20}$$

$$\sin C = 1.843$$

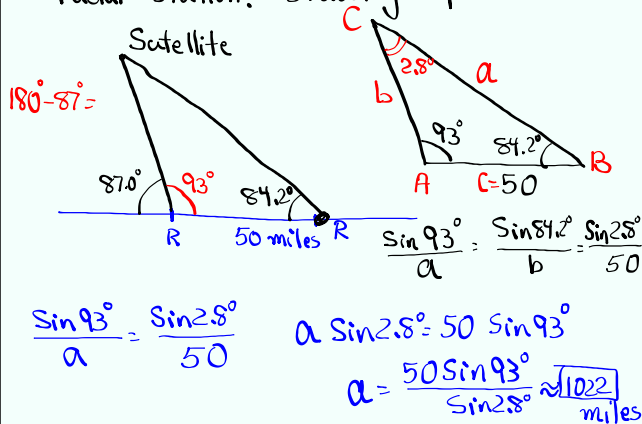
$$C = \sin^{-1}(1.843)$$

No Solution.

NO  
Such  
Triangle

Oct 1-10:44 AM

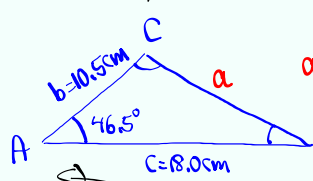
Two radar stations are 50 miles apart. one detects a Satellite with angle of elevation of  $87.0^\circ$ , and other one has angle of elevation of  $84.2^\circ$ . How far is the Satellite from each radar station? Drawing Required.



Oct 1-10:51 AM

Solve triangle ABC where

$\Delta A = 46.5^\circ$ ,  $b = 10.5$  cm, and  $C = 18.0$  cm



SAS

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

$$a^2 = 10.5^2 + 18.0^2 - 2(10.5)(18.0) \cos 46.5^\circ$$

$b^2 = a^2 + c^2 - 2ac \cos B$

$a^2 = 174.0519..$

$2ac \cos B = a^2 + c^2 - b^2$

$a = \sqrt{174.052}$

$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$

$a \approx \boxed{13.2 \text{ cm}}$

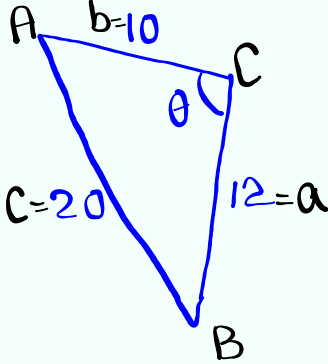
$\cos B = \frac{13.2^2 + 18^2 - 10.5^2}{2(13.2)(18)}$

$\cos B = .8164772$   $B = \cos^{-1}(.8164772) \approx \boxed{35.3^\circ}$

$A + B + C = 180^\circ$   
 $46.5 + 35.3 + C = 180^\circ$   $\rightarrow \boxed{C \approx 98.2^\circ}$

Oct 1-11:01 AM

find  $\theta$



$$c^2 = a^2 + b^2 - 2ab \cos \theta$$

$$2ab \cos \theta = a^2 + b^2 - c^2$$

$$\cos \theta = \frac{a^2 + b^2 - c^2}{2ab}$$

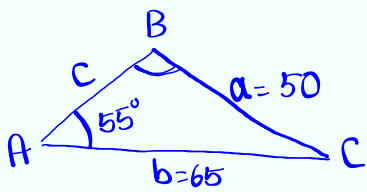
$$\cos \theta = \frac{12^2 + 10^2 - 20^2}{2(12)(10)}$$

$$\cos \theta = -.65 \quad \theta = \cos^{-1}(-.65)$$

$$\theta \approx 131^\circ$$

Oct 1-11:13 AM

Solve triangle ABC  
if  $a=50$ ,  $b=65$ , and  $\angle A=55^\circ$



$$a^2 = b^2 + c^2 - 2bc \cos 55^\circ$$

$$50^2 = 65^2 + c^2 - 2(65)c \cos 55^\circ$$

Pause

$$\frac{\sin 55^\circ}{50} = \frac{\sin B}{65}$$

$$50 \sin B = 65 \sin 55^\circ$$

$$\sin B = \frac{65 \sin 55^\circ}{50}$$

$$\sin B = 1.06489$$

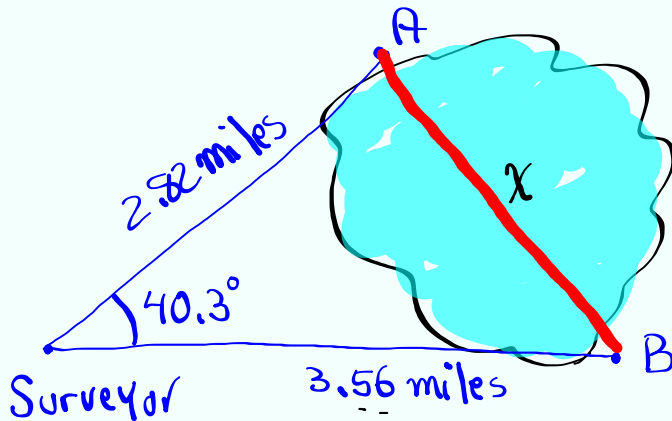
$$B = \sin^{-1}(1.06489)$$

Error

**NO  
Such  
Triangle**

Oct 1-11:20 AM

How wide is the lake below?



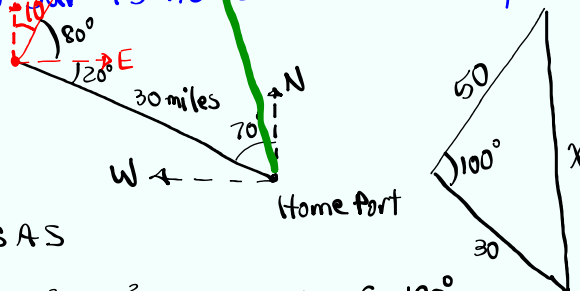
SAS  
Law of  
Cosines

$$x^2 = 2.82^2 + 3.56^2 - 2 \cdot 2.82 \cdot 3.56 \cdot \cos 40.3^\circ$$

$$x^2 = 5.313 \quad x \approx \sqrt{5.313} \approx \boxed{2.30 \text{ miles}}$$

Oct 1-11:28 AM

A fisherman leave homeport using N 70° W  
for 30 miles. At this location, he sails  
N 10° E for 50 miles  
How far is he from his homeport?



SAS

$$x^2 = 30^2 + 50^2 - 2 \cdot 30 \cdot 50 \cdot \cos 100^\circ$$

$$x^2 = 3920.944533 \quad x = \sqrt{3920.944533}$$

$$x \approx \boxed{63 \text{ miles}}$$

Oct 1-11:33 AM