

## Sec. 8.4 - Trigonometry

### Trigonometry:

Greek words: "trigon" - triangle  
"metron" - measure

- used on any right triangle

- Trigonometric Ratio is a ratio of the lengths of 2 sides of a right triangle

### Trigonometry

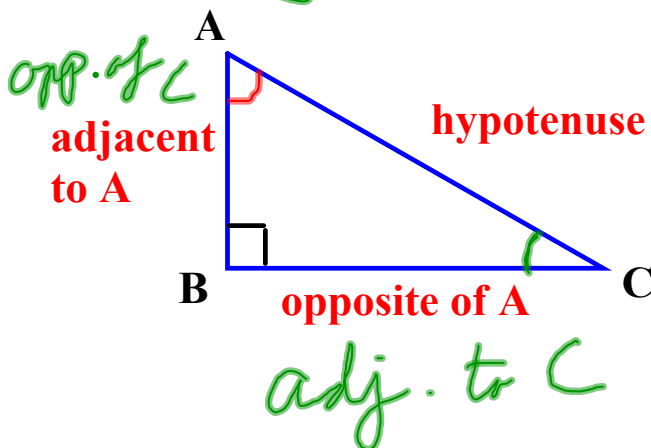
Sine ; Cosine ; Tangent

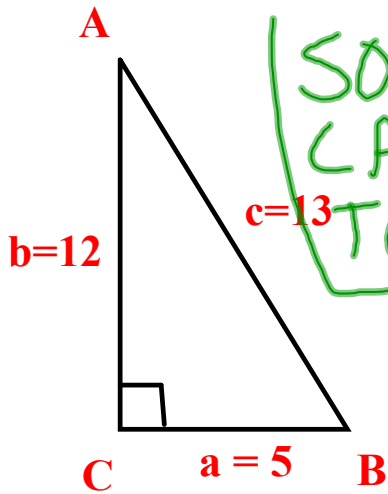


$$\sin A = \frac{\text{opp.}}{\text{hyp.}}$$

$$\cos A = \frac{\text{adj.}}{\text{hyp.}}$$

$$\tan A = \frac{\text{opp.}}{\text{adj.}}$$





SOH  
CAH  
TOA

Side opposite  $\angle A = \underline{5}$   
 Side adjacent  $\angle A = \underline{12}$

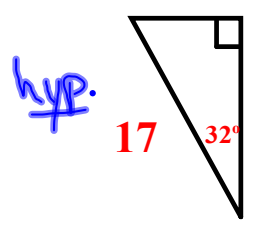
Side opposite  $\angle B = \underline{12}$   
 Side adjacent  $\angle B = \underline{5}$

Hypotenuse = 13

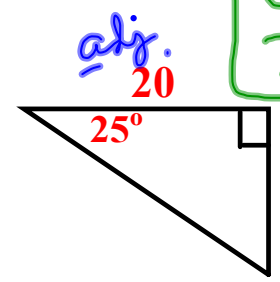
$\sin A = \frac{5}{13} \approx 0.384$   
 $\cos A = \frac{12}{13} \approx 0.923$   
 $\tan A = \frac{5}{12} \approx 0.417$

$\sin B = \frac{12}{13} \approx 0.923$   
 $\cos B = \frac{5}{13} \approx 0.384$   
 $\tan B = \frac{12}{5} = 2.4$

Find the value of the variable in each figure.



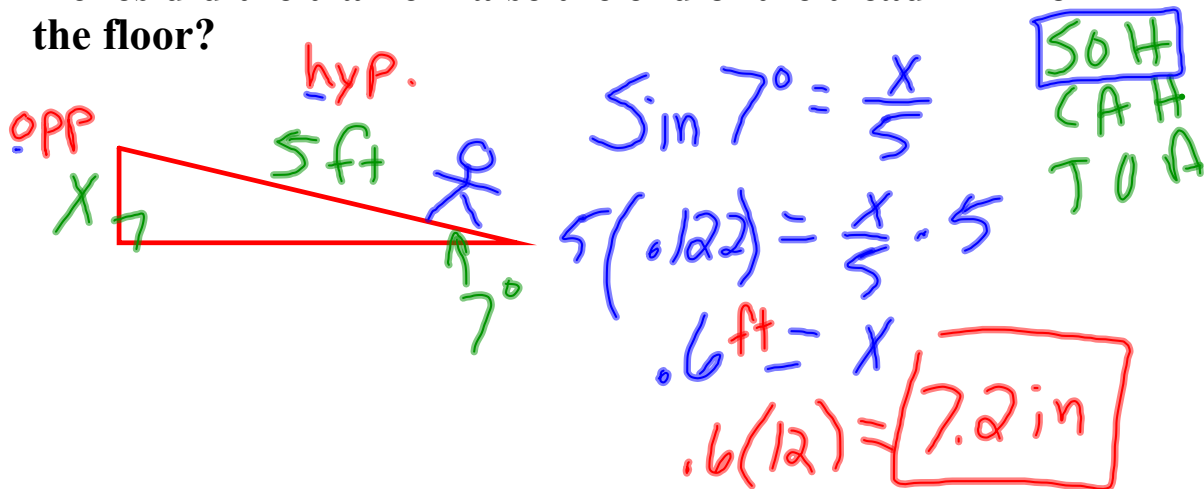
$\cos 32^\circ = \frac{y}{17}$   
 $17(.848) = \frac{y}{17} \cdot 17$   
 $14.4 = y$



$\tan 25^\circ = \frac{t}{20}$   
 $20(.466) = \frac{t}{20} \cdot 20$   
 $9.3 = t$

SOH  
CAH  
TOA

A fitness trainer sets the incline on a treadmill to  $7^\circ$ . The walking surface is 5 feet long. Approximately how many inches did the trainer raise the end of the treadmill from the floor?



### Inverse Trigonometric Ratios

- used to find the angle measure when given the length of the sides

- If  $\angle A$  is an acute angle & the **sine of A** is  $x$ , then the **inverse sine of  $x$**  is the measure of  $\angle A$ .

- If  $\sin A = x$ , then  $\sin^{-1} x = m \angle A$

- If  $\angle A$  is an acute angle & the **cosine of A** is  $x$ , then the **inverse cosine of  $x$**  is the measure of  $\angle A$ .

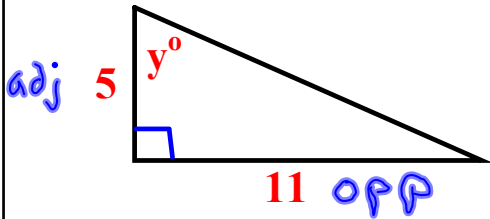
- If  $\cos A = x$ , then  $\cos^{-1} x = m \angle A$

- If  $\angle A$  is an acute angle & the **tangent of A** is  $x$ , then the **inverse tangent of  $x$**  is the measure of  $\angle A$ .

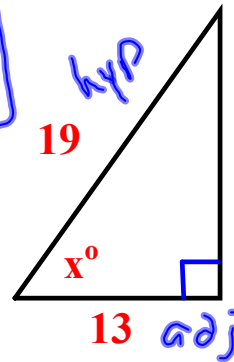
- If  $\tan A = x$ , then  $\tan^{-1} x = m \angle A$

Find the measure of each angle:

SOH  
CAH  
TOA



$$\tan y = \frac{11}{5}$$
$$\tan^{-1} \frac{11}{5} = \tan^{-1} 2.2$$
$$y = 66^\circ$$



$$\cos x = \frac{13}{19}$$
$$\cos x = .684$$
$$x = 47^\circ$$

## Homework:

p.567, # 16, 28-34 evens, 35,  
36, 40, 42, 47, 52, 66-71 all