



IF YOU KNOW THIS,  
YOU KNOW **A LOT!**

**S**OH   **C**AH   **T**OA

IF YOU KNOW THIS,  
YOU KNOW A LOT!

S

C

T

O

A

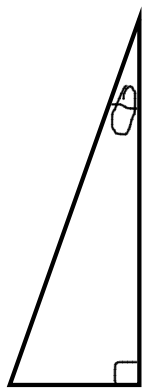
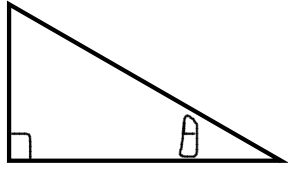
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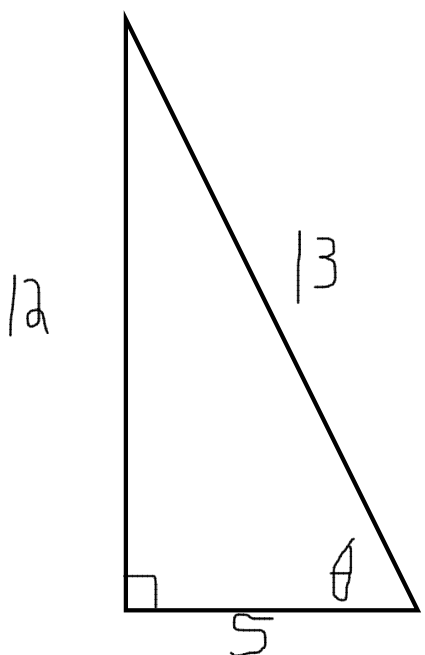
H

H

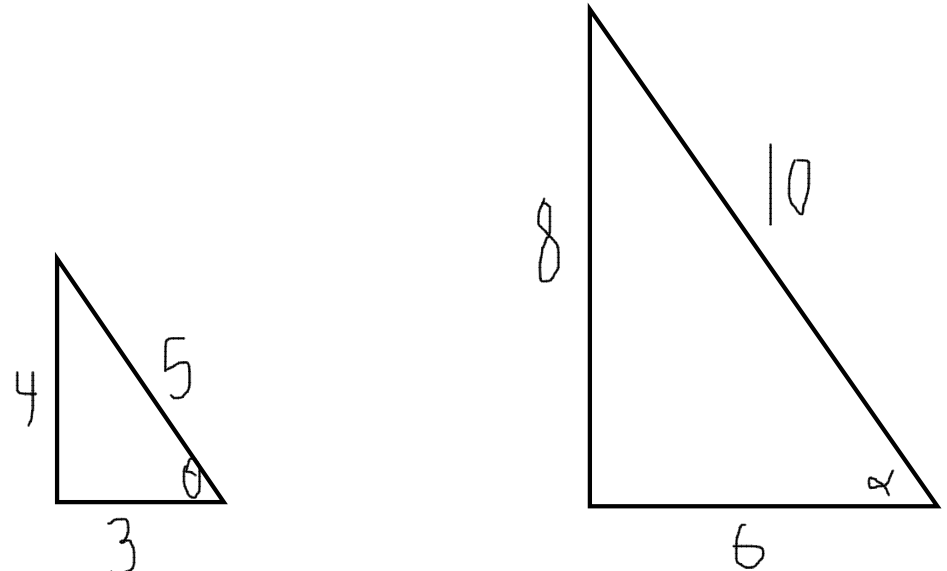
A

label the sides:  
opposite  
adjacent  
hypotenuse

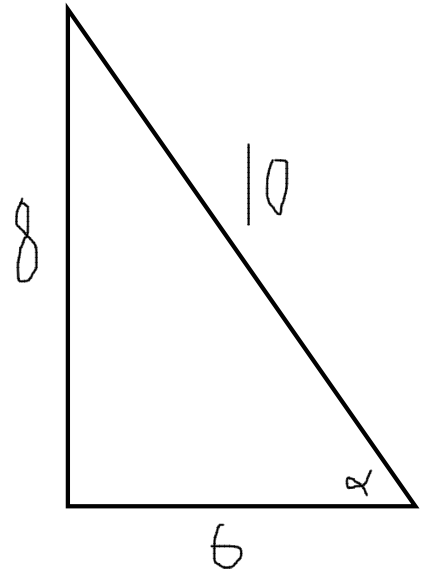




$\sin \theta =$   
 $\cos \theta =$   
 $\tan \theta =$



$\sin \theta$   
 $\cos \theta$   
 $\tan \theta$



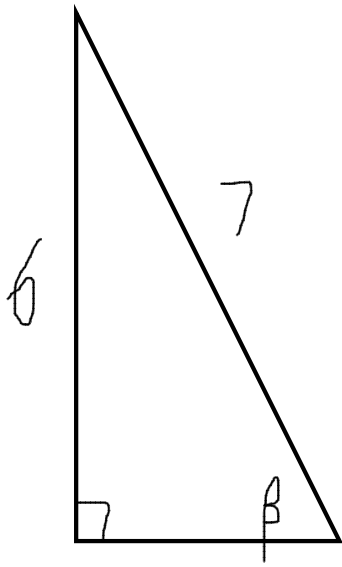
$\sin \alpha$   
 $\cos \alpha$   
 $\tan \alpha$

## IMPERATIVE!

Draw a mathematical conclusion from the last set of triangles!

the trigonometric function values of an angle do NOT depend on the **size** of the triangle

(but instead depend on the ratio/proportion of the sides)



Find the:

$$\sin \beta$$

$$\cos \beta$$

$$\tan \beta$$

Given:  $\tan(x)=2$ .

Find:  $\sin(x)=$

$\cos(x)=$

Check yo'self!

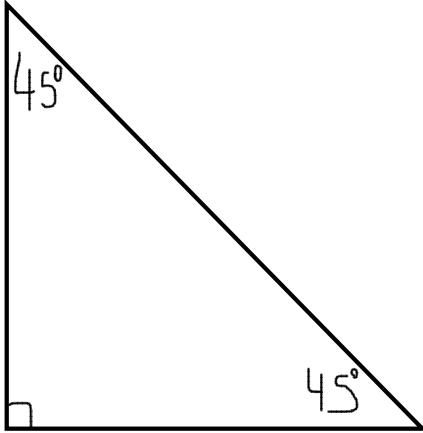
Given:  $\cos(x) = 24/25$

Find:  $\sin(x) =$

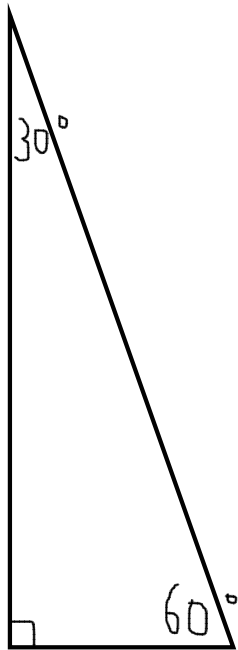
$\tan(x) =$

# SPECIAL RIGHT TRIANGLES

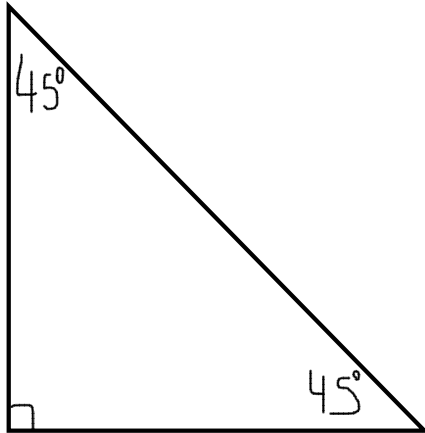
45-45-90



30-60-90

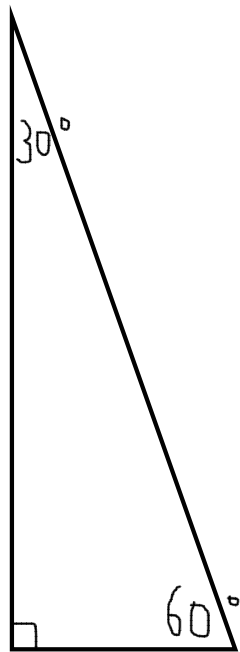


45-45-90



$$\begin{aligned}\sin(45^\circ) &= \\ \cos(45^\circ) &= \\ \tan(45^\circ) &= \end{aligned}$$

30-60-90



$$\begin{aligned}\sin(30^\circ) &= \\ \cos(30^\circ) &= \\ \tan(30^\circ) &= \end{aligned}$$

$$\begin{aligned}\sin(60^\circ) &= \\ \cos(60^\circ) &= \\ \tan(60^\circ) &= \end{aligned}$$

Let's be clear...

$\sin( )$

$\cos( )$

$\tan( )$

are **functions!**

they take in an **input** (an **angle**)

and spew out an **output** (a ratio of **sides**)

NEW FUNCTIONS! NEW FUNCTIONS! NEW  
FUNCTIONS! NEW FUNCTIONS! NEW FUNCTIONS!  
NEW FUNCTIONS! NEW FUNCTIONS! NEW  
FUNCTIONS! NEW FUNCTIONS! NEW FUNCTIONS!  
NEW FUNCTIONS! NEW FUNCTIONS! NEW  
FUNCTIONS! NEW FUNCTIONS! NEW FUNCTIONS!  
NEW FUNCTIONS! NEW FUNCTIONS! NEW  
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NEW FUNCTIONS! NEW FUNCTIONS! NEW  
FUNCTIONS! NEW FUNCTIONS! NEW FUNCTIONS!  
NEW FUNCTIONS! NEW FUNCTIONS! NEW

(but actually...  
not so new)

cosecant       $\csc(x)$

secant         $\sec(x)$

cotangent     $\cot(x)$

hyp/opp       $\csc(x)$

hyp/adj       $\sec(x)$

adj/opp       $\cot(x)$

$1/\sin(x)$        $\csc(x)$

$1/\cos(x)$        $\sec(x)$

$1/\tan(x)$        $\cot(x)$

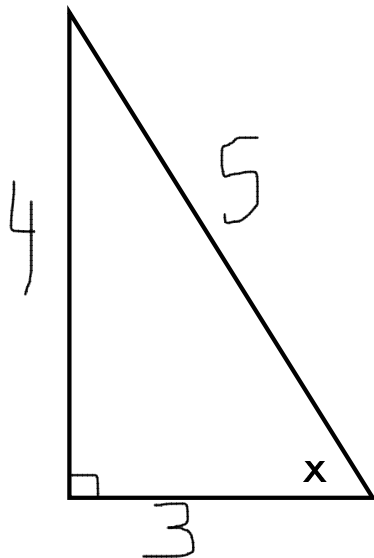
how I remember this

**S** and **C** go together!

**s**in(x) and **c**sc(x)

**c**os(x) and **s**ec(x)

and obviously **t**an(x) and **c**ot(x) go together



$$\sin(x) =$$

$$\csc(x) =$$

$$\cos(x) =$$

$$\sec(x) =$$

$$\tan(x) =$$

$$\cot(x) =$$

Given:  $\csc(x)=1.5$

Find: the value of the other five trig functions!

Lastly, here are some identities:

$$\sin(90^\circ-\theta)=\cos(\theta)$$

$$\cos(90^\circ-\theta)=\sin(\theta)$$

$$\csc(90^\circ-\theta)=\sec(\theta)$$

$$\sec(90^\circ-\theta)=\csc(\theta)$$

Lastly, here are some identities:

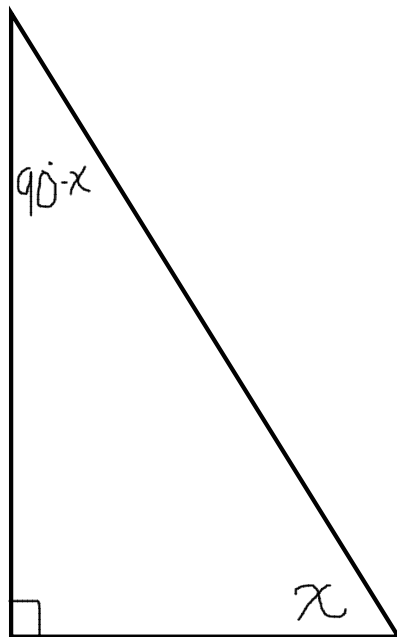
$$\sin(90^\circ - \theta) = \cos(\theta)$$

$$\cos(90^\circ - \theta) = \sin(\theta)$$

$$\csc(90^\circ - \theta) = \sec(\theta)$$

$$\sec(90^\circ - \theta) = \csc(\theta)$$

WHY?



HW: Section 5.1 #1-3,6,7,9-15 odd, 17-28(all),29