

Trig 5.2

Find the values of trig ratios for acute angles*

right triangle

leg

hypotenuse

adjacent

opposite

trigonometric ratio

sin

sine

soh

$\frac{\text{opp}}{\text{hyp}}$

cos

cosine

cah

$\frac{\text{adj}}{\text{hyp}}$

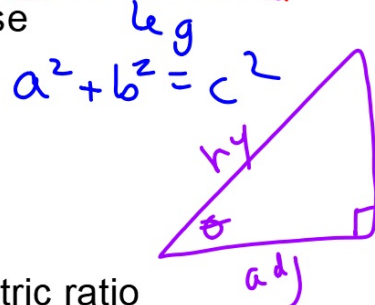
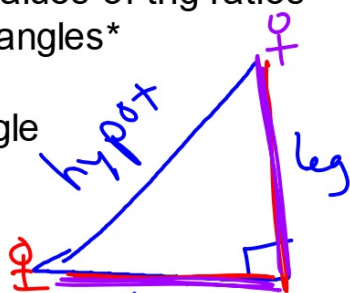
tan

tangent

toa

$\frac{\text{opp}}{\text{adj}}$

Song: SohCahToa!



Theta Θ

reciprocal

cosecant

secant

cotangent

special angles

cofunctions

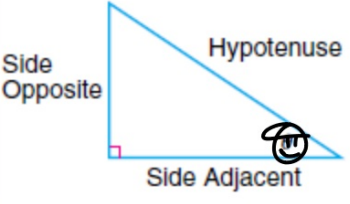
*Geometry
Ch. 14

csc

sec

cot

Mr. Johnson
Miss Langholdt

	Words	Symbol	Definition	
Trigonometric Ratios	sine θ	$\sin \theta$	$\sin \theta = \frac{\text{side opposite}}{\text{hypotenuse}}$	
	cosine θ	$\cos \theta$	$\cos \theta = \frac{\text{side adjacent}}{\text{hypotenuse}}$	
	tangent θ	$\tan \theta$	$\tan \theta = \frac{\text{side opposite}}{\text{side adjacent}}$	

SOH-CAH-TOA is a mnemonic device commonly used for remembering these ratios.

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

SOHCAHTOA!

(Handel's Hallelujah Chorus)

Soh Cah Toa!
Soh Cah Toa!
Learn it, and use it!
Soh Cah Toa!

Sine is opposite over hypotenuse.
Soh Cah Toa
Soh Cah Toa
Learn it, and use it!

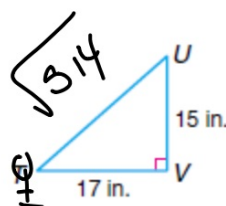
Cosine is adjacent over hypotenuse.
Soh Cah Toa
Soh Cah Toa
Learn it, and use it!

Tangent is opposite over adjacent!
Soh Cah Toa
Soh Cah Toa

SOH CAH TOA!

5. Find the values of the sine, cosine, and tangent for $\angle T$.

$$\begin{aligned}\sin T &= \frac{15}{\sqrt{314}} = \frac{15\sqrt{314}}{314} \\ \cos T &= \frac{17}{\sqrt{314}} = \frac{17\sqrt{314}}{314} \\ \tan T &= \frac{15}{17}\end{aligned}$$



$$\frac{15}{17} = \frac{15\sqrt{314}}{314}$$

EXACT: Fraction (and/or radical) vs APPROX: decimal form (round off)

$$18^2 + x^2 = 33^2$$

$$x^2 = 765 = 3\sqrt{85}$$

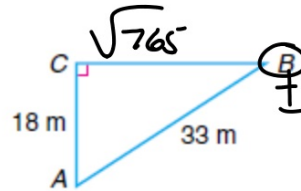
$$\begin{array}{c} 765 \\ \wedge \\ 5 \quad 153 \\ \wedge \\ 3 \quad 51 \\ \wedge \\ 3 \quad 17 \end{array}$$

1 Find the values of the sine, cosine, and tangent for $\angle B$.

$$\sin B = \frac{18}{33} = \frac{6}{11}$$

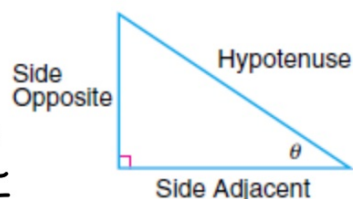
$$\cos B = \frac{3\sqrt{85}}{33} = \frac{\sqrt{85}}{11}$$

$$\tan B = \frac{18}{3\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{18\sqrt{85}}{255} = \frac{6\sqrt{85}}{85}$$



New:

	Words	Symbol	Definition
$\frac{1}{\sin \theta} \rightarrow$	cosecant θ	$\csc \theta$	$\csc \theta = \frac{1}{\sin \theta}$ or $\frac{\text{hypotenuse}}{\text{side opposite}}$
$\frac{1}{\cos \theta} \rightarrow$	secant θ	$\sec \theta$	$\sec \theta = \frac{1}{\cos \theta}$ or $\frac{\text{hypotenuse}}{\text{side adjacent}}$
$\frac{1}{\tan \theta} \rightarrow$	cotangent θ	$\cot \theta$	$\cot \theta = \frac{1}{\tan \theta}$ or $\frac{\text{side adjacent}}{\text{side opposite}}$



These definitions are called the reciprocal identities.

$\sin \rightarrow \csc$
 $\cos \rightarrow \sec$
 $\tan \rightarrow \cot$

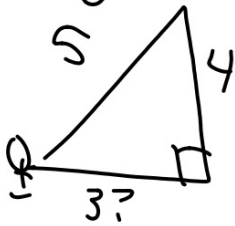
6. If $\sin \theta = \frac{2}{5}$, find $\csc \theta$.

$$\frac{5}{2}$$

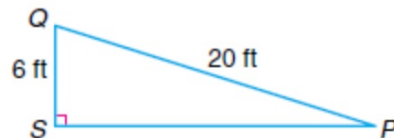
7. If $\cot \theta = 1.5$, find $\tan \theta$.

$$\frac{1}{1.5} \cdot \frac{2}{2} = \frac{2}{3}$$

$$\sin \theta = \frac{4}{5} \quad \cot \theta = ? \quad \frac{a}{b} = \frac{3}{4}$$



8. Find the values of the six trigonometric ratios for $\angle P$.



364
4^91
(2^2)^7^13

$$\sin P = \frac{6}{20} = \frac{3}{10}$$

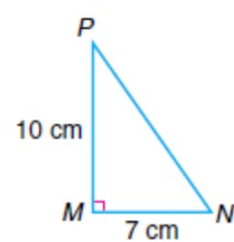
$$\csc P = \frac{10}{3}$$

$$\cos P = \frac{2\sqrt{91}}{20} = \frac{\sqrt{91}}{10} \quad \sec P = \frac{10}{\sqrt{91}} \cdot \frac{\sqrt{91}}{\sqrt{91}} = \frac{10\sqrt{91}}{91}$$

$$\tan P = \frac{6}{2\sqrt{91}} = \frac{3\sqrt{91}}{\sqrt{91}\sqrt{91}} \quad \cot P = \frac{\sqrt{91}}{3}$$

$\frac{3\sqrt{91}}{91} \quad \frac{91}{3\sqrt{91}}$

- 4 Find the values of the six trigonometric ratios for $\angle P$.

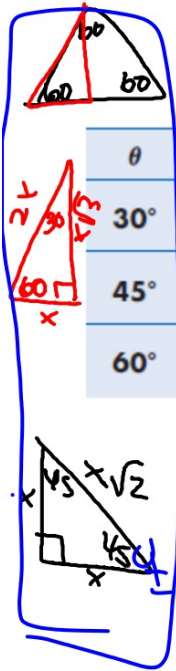


3 a. If $\cos \theta = \frac{3}{4}$, find $\sec \theta$. $\frac{4}{3}$

b. If $\csc \theta = 1.345$, find $\sin \theta$. $\frac{1}{1.345} = \frac{1000}{1345}$

$$= \frac{200}{269}$$

p. 287



θ	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$

Must know these, will talk strategies tomorrow.

$$\frac{x}{x\sqrt{2}} = \frac{1}{\sqrt{2}} \quad \frac{x}{x}$$

