

Unit 6 overview Notes

Trigonometry & Special Δs

I. SOH CAH TOA

* 3 trig fractions (ratios)

Sine is Cosine is Tangent is

$$\frac{\text{OPP}}{\text{hyp}}$$

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

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

SOH CAH TOA

$$\sin(\angle A) = \frac{\text{oppA}}{\text{hyp}}$$

$$\sin(\angle B) = \frac{\text{oppB}}{\text{hyp}}$$

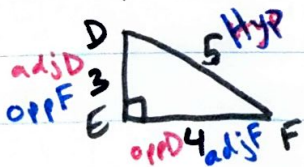
$$\cos(\angle A) = \frac{\text{adjA}}{\text{hyp}}$$

$$\cos(\angle B) = \frac{\text{adjB}}{\text{hyp}}$$

$$\tan(\angle A) = \frac{\text{oppA}}{\text{adjA}}$$

$$\tan(\angle B) = \frac{\text{oppB}}{\text{adjB}}$$

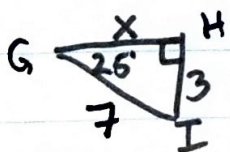
Example 1:



$$\begin{aligned} \sin(\angle D) &= \frac{4}{5} & \sin(\angle F) &= \frac{3}{5} \\ \cos(\angle D) &= \frac{3}{5} & \cos(\angle F) &= \frac{4}{5} \\ \tan(\angle D) &= \frac{4}{3} & \tan(\angle F) &= \frac{3}{4} \end{aligned}$$

No trig for $\angle E$

Example 2:



$\angle G$ ↓ $\angle I: 90-25$

$$\begin{aligned} \sin(25^\circ) &= \frac{3}{7} & \sin(65^\circ) &= \frac{x}{7} \\ \cos(25^\circ) &= \frac{x}{7} & \cos(65^\circ) &= \frac{3}{7} \\ \tan(25^\circ) &= \frac{3}{x} & \tan(65^\circ) &= \frac{x}{3} \end{aligned}$$

II. Solve Trig for SIDE length

A. Have: $90^\circ + 1$ other known & 1 known side

Want: 1 unknown side

B. Use SOHCAHTOA

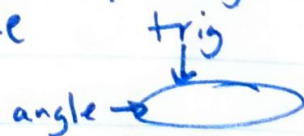
C. Step 1: Pick angle & set up fractions

Step 2: Pick trig that is ONLY missing what I want

Step 3: Cross multiply to solve for "x" (get wanted part alone)

DO NOT +, -, \cdot , \div by the number inside $\sin(\angle)$, $\cos(\angle)$ or $\tan(\angle)$

step 4: look up trig value in table



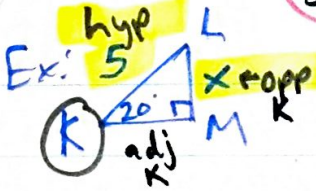
step 5: replace $\sin(\angle)$ with that decimal

step 6: multiply (when x started) or use long division (when x on bottom)

step 7: Round to 1 decimal

↑ 1 Forward
• stay 4 or less

SOH CAH TOA



$\sin(\angle K) = \frac{\text{opp}}{\text{hyp}}$

$\sin(20^\circ) = \frac{x}{5}$

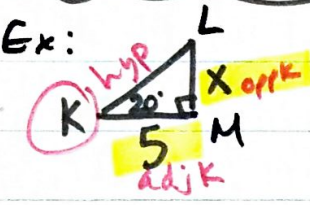
0.3420
5

~~$5 \sin(20^\circ) = x$~~

$5(0.3420) = x$

$1.7 = x$

1.7100
less than 5
stay



SOH CAH TOA
 $\tan(\angle K) = \frac{\text{opp}}{\text{adj}}$

$\tan(20^\circ) = \frac{x}{5}$

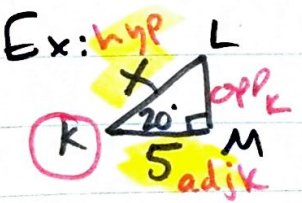
0.3640
5

~~$5 \tan(20^\circ) = x$~~

$5(0.3640) = x$

$1.8 = x$

1.8200
less
stay



SOH CAH TOA
 $\cos(\angle K) = \frac{\text{adj}}{\text{hyp}}$

$\cos(20^\circ) = \frac{5}{x}$

5.3255
5.0000
-46985
23191
-28191
19590

~~$\cos 20 = \frac{5}{x}$~~
 ~~$\cos 20$~~ ~~$\cos 20$~~

$x = \frac{5}{\cos(20^\circ)}$

$x = \frac{5}{0.9397}$

$x = 5.3$

43
9397
5
46985
122
9397
3
28191

III. Solving Trig for angles

A. Have: 90

& 2 known sides

want: 1 unknown angle

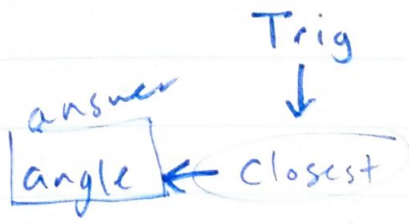
B. use **SOH CAH TOA**

C. Step 1: set up fractions
use **WANTED** <

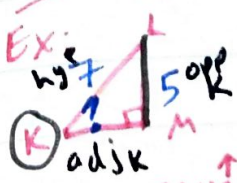
Step 2: pick trig that has both top & bottom

Step 3: use long division to turn fraction into decimal w/ 4 places

Step 4: Find closest 4-decimal match



(If not obvious which is closer, subtract them to find smaller difference)



SOH CAH TOA

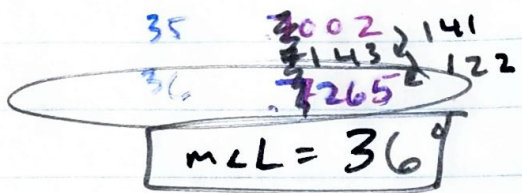
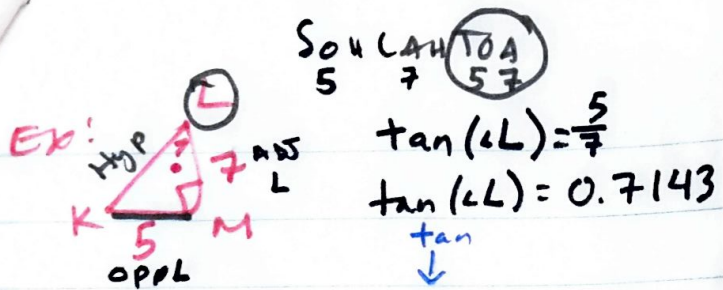
$\sin(\angle K) = \frac{5}{7}$

$\sin(\angle K) = 0.7143$

0.71428
7 5.0000
-496
10
-70
30
-28
20

45° .7071272
143272

46° .7193250
46° closer
 $m\angle K = 46^\circ$



D. On a calculator,
 for sides: $\sin(\text{angle}) = \frac{\text{Sides}}{\text{Hyp}}$
 for angles: Use inverse
 $\sin^{-1}\left(\frac{\text{Sides}}{\text{Hyp}}\right) = \text{angle}$

ex:

$2 \sin 50 = x$

$2 \times (\sin 50) =$

ex:

$\sin(x) = \frac{5}{7}$

inverse →

$\sin^{-1}\left(\frac{5}{7}\right) = x$

$2\text{nd} \sin (5 \div 7) =$