

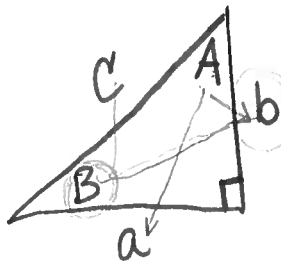
TUTORING → walk in (for now)

Soon: schedule via video

1

SOH/CAH/TOA

Right  $\Delta$  trig



$$\sin(A) = \frac{a}{c}$$

$$\cos(A) = \frac{b}{c}$$

$$\tan(A) = a/b$$

$$\csc(A) = c/a$$

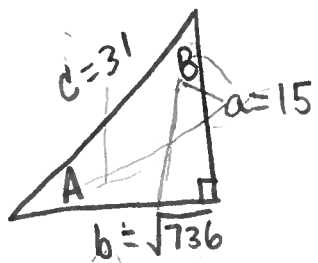
$$\sec(A) = c/b$$

$$\cot(A) = b/a$$

EX: Spz  $a=15$  and  $c=31$ .

- Find  $b$ .
- $\sin(A)$
- $\cos(B)$
- $\tan(B)$

Soln:



Find b

Pyth thm

$$b^2 + 15^2 = 31^2$$

$$b^2 = 31^2 - 15^2 = 736$$

$$b = \pm\sqrt{736} \rightarrow b = \sqrt{736}$$

$$\sin(A) = \frac{15}{31}$$

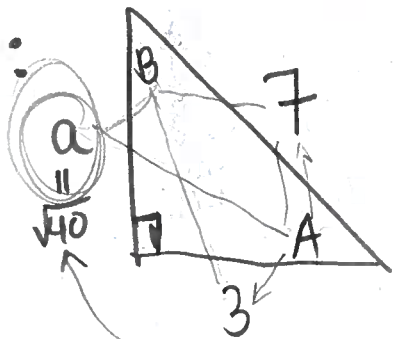
$$\cos(B) = \frac{15}{31}$$

$$\tan(B) = \frac{\sqrt{736}}{15}$$

SOHCAHTOA

Find a and

Ex:



Find a

Pyth thm

$$a^2 + 3^2 = 7^2$$

$$a^2 = 49 - 9 = 40$$

$$a = \pm\sqrt{40} \rightarrow a = \sqrt{40}$$

$$\sin A = \frac{\sqrt{40}}{7}$$

$$\sin B = \frac{3}{7}$$

$$\cos A = \frac{3}{7}$$

$$\cos B = \frac{\sqrt{40}}{7}$$

$$\tan A = \frac{\sqrt{40}}{3}$$

$$\tan B = \frac{3}{\sqrt{40}}$$

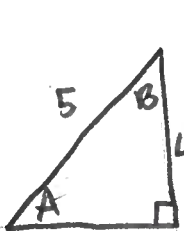
$$\sin 1^\circ = \text{---}$$

$$\sin 2^\circ = \text{---}$$

$$\sin 3^\circ = \text{---}$$

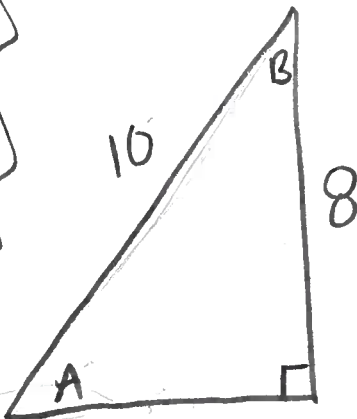
FAVOR Scaled triangle multiply by a number

FACT: if I scale all sides of a  $\Delta$  by some amount, then the angle don't change



$$\sin(A) = \frac{4}{5}$$

$$\tan(A) = \frac{4}{3}$$



$$\sin(A) = \frac{8}{10} = \frac{4}{5}$$

$$\tan(A) = \frac{8}{6} = \frac{4}{3}$$

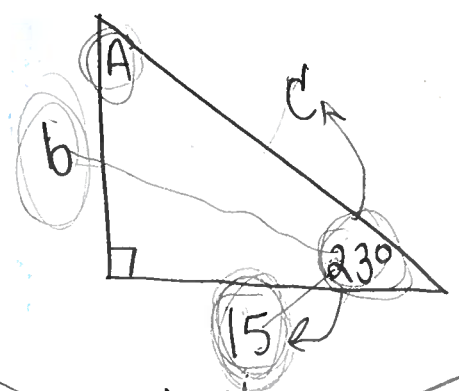
Conclusion

Scaling a  $\Delta$  does not affect values of trig functions.

Meaning

We are able to calculate trig functs dependent ONLY on the angle.

Ex:



$$\theta = \frac{b}{15}$$

can NOT Pyth thm:

Why:  $15^2 + b^2 = c^2$   
 ↑ ↑  
 two variables

Find b

We know

$$\tan(23^\circ) = \frac{b}{15} \leftarrow \text{linear eqn!}$$

↑  
some number

$$b = 15 \tan(23^\circ) \approx 6.367$$

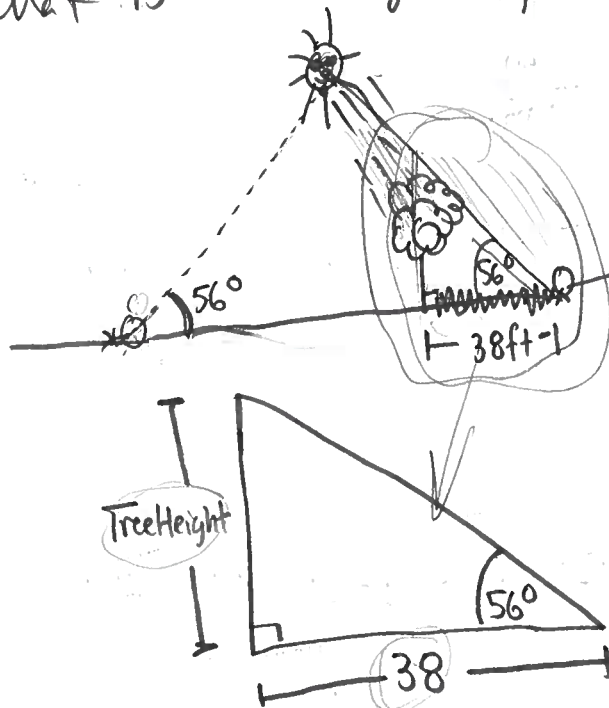
Find c (2 ways)

Way 1: Pyth thm:  $15^2 + (15 \tan(23^\circ))^2 = c^2$   
 $c = \sqrt{15^2 + (15 \cdot \tan(23^\circ))^2}$

Way 2:  $\cos(23^\circ) = \frac{15}{c}$   
 $\frac{1}{\cos(23^\circ)} = \frac{c}{15} \rightarrow c = \frac{15}{\cos(23^\circ)}$

Ex: You are on a level ground.  
The sun is at elevation of  $56^\circ$ . A tree  
casts a shadow that is 38 ft long.  
What is the height of the tree?

4



$$\tan(56^\circ) = \frac{\text{Tree Height}}{38} \rightarrow \text{Tree Height} = 38 \cdot \tan(56^\circ) \approx 56.34 \text{ ft}$$