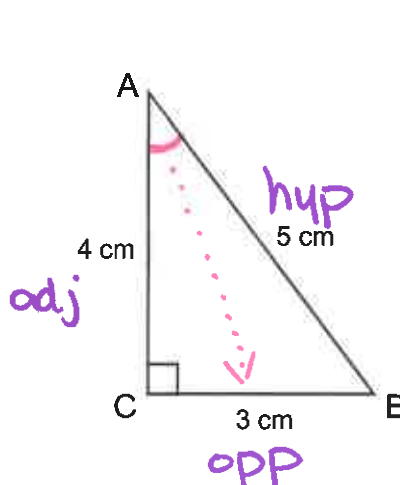


# NOTES: Trigonometric Ratios Review

Date: Nov. 29

Given  $\triangle ABC$ , what are the primary trigonometric ratios?



$$\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{3}{5} \quad (3 \div 5 = \text{or } 0.6)$$
$$\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{4}{5} \quad (\text{or } 0.8)$$
$$\tan A = \frac{\text{opp}}{\text{adj}} = \frac{3}{4} \quad (\text{or } 0.75)$$

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Remember:

- we're working with RIGHT triangles
- your calculator must be set to DEGREES
- the hypotenuse is always the hypotenuse, but... opposite and adjacent depend on the angle you are working with!



## Examples: Angles to ratios and ratios to angles

Determine each trigonometric ratio. Express your answer to four decimal places.

- a)  $\sin 37^\circ = 0.6018$
- b)  $\cos 63^\circ = 0.4540$
- c)  $\tan 78^\circ = 4.7046$
- d)  $\cos 8^\circ = 0.9903$
- e)  $\tan 40^\circ = 0.8391$
- f)  $\sin 62^\circ = 0.8829$

Determine each angle to the nearest degree.

- a)  $\sin X = 0.6018$   $\angle X = 37^\circ$
- b)  $\tan W = 0.3057$   $\angle W = 17^\circ$
- c)  $\cos B = 0.9511$   $\angle B = 18^\circ$
- d)  $\sin V = 0.9781$   $\angle V = 78^\circ$
- e)  $\tan A = 2.2460$   $\angle A = 66^\circ$
- f)  $\cos P = 0.4384$   $\angle P = 64^\circ$

to find an ANGLE  
use INVERSE trig  
functions

$\sin^{-1}$   
 $\cos^{-1}$   
 $\tan^{-1}$

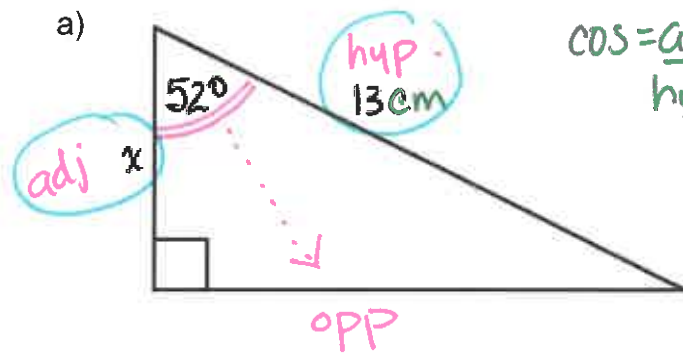
$$\begin{aligned}\sin A &= 0.8090 \\ \angle A &= \sin^{-1}(0.8090) \\ &= 54^\circ\end{aligned}$$

$$\begin{aligned}\cos H &= 0.9781 \\ \angle H &= 12^\circ\end{aligned}$$

## Examples: Finding side lengths

- you need to know one angle and one side length
- pick the appropriate trig. function (e.g. sin, cos or tan)

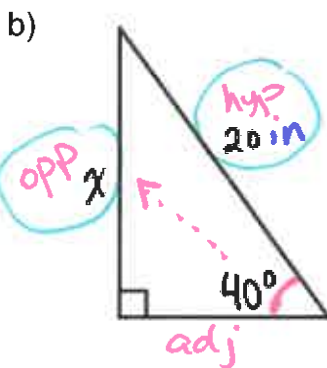
SOH CAH TOA.



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

$$\cos 52^\circ = \frac{x}{13}$$

$$x = \frac{\cos 52^\circ \times 13}{1}$$
$$= \boxed{8.0 \text{ cm}}$$

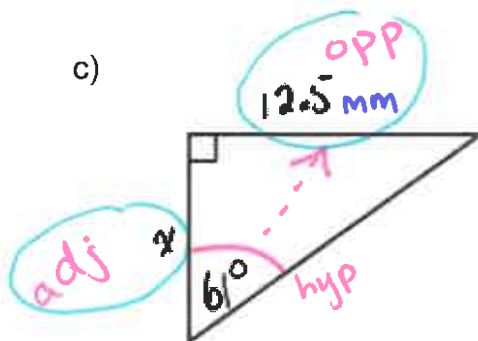


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$$\sin = \frac{\text{opp}}{\text{hyp.}}$$

$$\sin 40^\circ = \frac{x}{20}$$

$$x = \frac{\sin 40^\circ \times 20}{1}$$
$$= \boxed{12.9 \text{ in}}$$



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

$$\tan 61^\circ = \frac{12.5}{x}$$

$$x = \frac{1 \times 12.5}{\tan 61^\circ}$$
$$= \boxed{6.9 \text{ mm}}$$

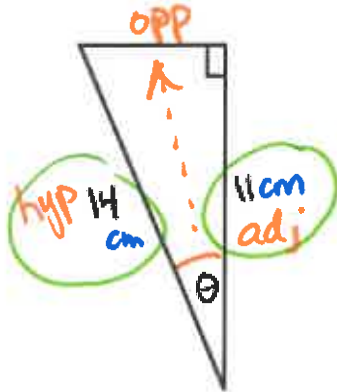
## Examples: Finding angles

$\theta = \text{theta}$

- you need to know two side lengths
- pick the appropriate inverse trig. function (e.g.  $\sin^{-1}$ ,  $\cos^{-1}$  or  $\tan^{-1}$ )

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a)

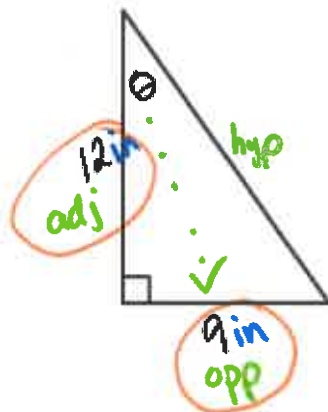


$$\cos = \frac{\text{adj}}{\text{hyp}}$$

$$\cos \theta = \frac{11}{14}$$

$$\theta = \cos^{-1}\left(\frac{11}{14}\right)$$
$$= \boxed{38^\circ}$$

b)



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

$$\tan \theta = \frac{9}{12}$$

$$\theta = \tan^{-1}\left(\frac{9}{12}\right)$$
$$= \boxed{37^\circ}$$

c)



SOH CAH TOA

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

$$\sin \theta = \frac{4}{7}$$

$$\theta = \sin^{-1}\left(\frac{4}{7}\right)$$
$$= \boxed{35^\circ}$$