

# Solving Using Trig Ratios

Determining which ratio to use:

Circle the angle

Label the sides that are marked in reference to that angle

- 3 possible pairings:
  - opp and hyp
  - adj and hyp
  - opp and adj

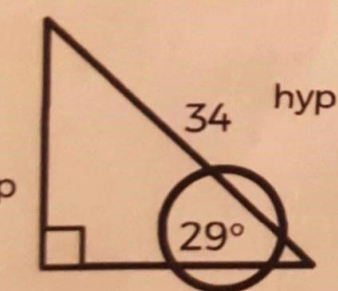
Choose the correct function based on the pairing

$$\sin = \frac{\text{opp}}{\text{hyp}} \quad \cos = \frac{\text{adj}}{\text{hyp}} \quad \tan = \frac{\text{opp}}{\text{adj}}$$

Set-up and solve your equation for the missing side or angle

$$\text{trig ratio (angle)} = \frac{\text{side}}{\text{side}}$$

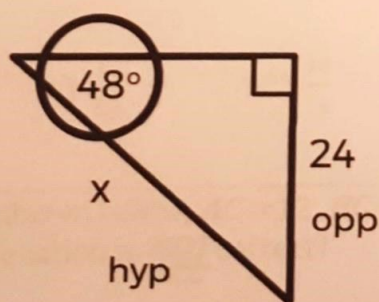
## Using Sin:



$$\sin 29 = \frac{x}{34}$$

$$x = 34(\sin 29)$$

$$x = 16.5$$

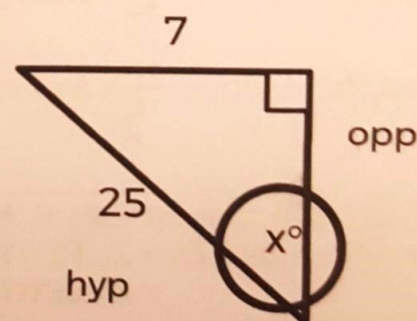


$$\sin 48 = \frac{24}{x}$$

$$x = \frac{24}{\sin 48}$$

$$x = 32.3$$

## S-O-H



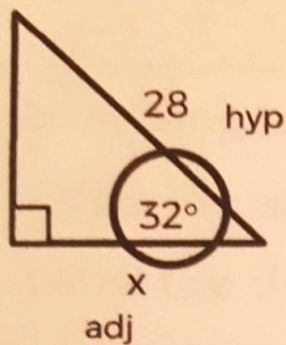
$$\sin x = \frac{7}{25}$$

$$\sin^{-1}\left(\frac{7}{25}\right)$$

$$x = 16.3^\circ$$

# Using Cos:

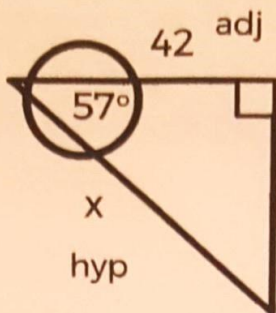
C-A-H



$$\cos 32 = \frac{x}{28}$$

$$x = 28(\cos 32)$$

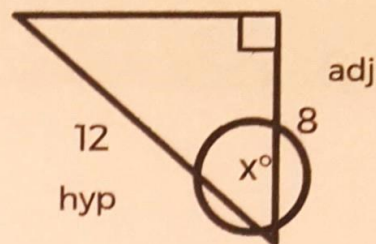
$$x = 23.7$$



$$\cos 57 = \frac{42}{x}$$

$$x = \frac{42}{\cos 57}$$

$$x = 77.1$$



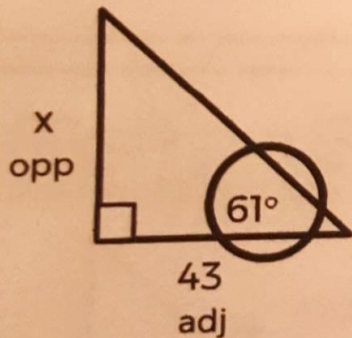
$$\cos x = \frac{8}{12}$$

$$\cos^{-1}\left(\frac{8}{12}\right)$$

$$x = 48.2^\circ$$

# Using Tan:

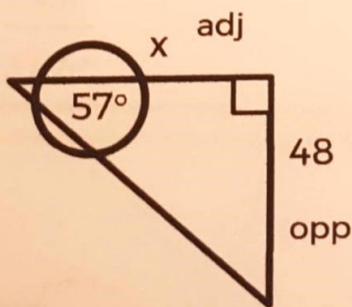
T-O-A



$$\tan 61 = \frac{x}{43}$$

$$x = 43(\tan 61)$$

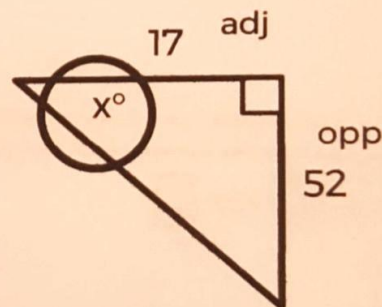
$$x = 77.6$$



$$\tan 57 = \frac{48}{x}$$

$$x = \frac{48}{\tan 57}$$

$$x = 31.2$$



$$\tan x = \frac{52}{17}$$

$$\tan^{-1}\left(\frac{52}{17}\right)$$

$$x = 71.9^\circ$$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# SOHCAHTOA – FINDING SIDES

TRIGONOMETRIC RATIOS				
sine	cosine	tangent		
$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$	$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$		
SOH – CAH – TOA				

For #1-12, write the process to solve for  $x$  to the nearest 100<sup>th</sup>.

①  $\tan 37 = \frac{6}{x}$   
 $x \tan 37 = \frac{6}{\tan 37}$   
 $x \approx \frac{6}{0.7536}$

②  $\cos 23 = \frac{x}{34}$   
 $x = 34 \cos 23$   
 $x \approx 31.30$

③  $\tan 36 = \frac{x}{4}$   
 $x = 4 \tan 36$   
 $x \approx 2.91$

④  $\sin 65 = \frac{x}{8}$   
 $x = 8 \sin 65$   
 $x \approx 7.25$

⑤  $\sin 70 = \frac{9}{x}$   
 $x \sin 70 = \frac{9}{\sin 70}$   
 $x \approx 9.58$

⑥  $\cos 22 = \frac{15}{x}$   
 $x \cos 22 = \frac{15}{\cos 22}$   
 $x \approx 16.18$

⑦  $\sin 53 = \frac{8}{x}$   
 $x \sin 53 = \frac{8}{\sin 53}$   
 $x \approx 10.02$

⑧  $\cos 67 = \frac{x}{34}$   
 $x = 34 \cos 67$   
 $x \approx 13.28$

⑨  $\tan 54 = \frac{4}{x}$   
 $x \tan 54 = \frac{4}{\tan 54}$   
 $x \approx 2.91$

⑩  $\sin 25 = \frac{x}{8}$   
 $x = 8 \sin 25$   
 $x \approx 3.38$

11  $\tan 20 = \frac{x}{9}$   
 $x = 9 \tan 20$   
 $x \approx 3.28$

12  $\cos 68 = \frac{6}{x}$   
 $x \cos 68 = \frac{6}{\cos 68}$   
 $x \approx 16.02$

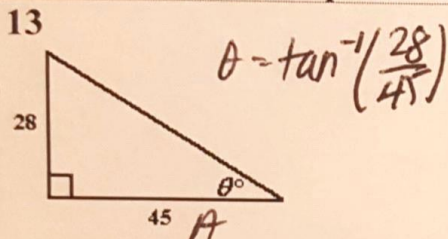
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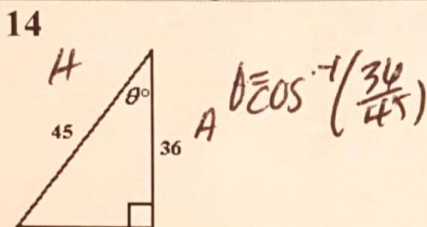
# SOHCAHTOA – FINDING ANGLES

TRIGONOMETRIC RATIOS				
inverse sine	inverse cosine	inverse tangent		
$\theta = \sin^{-1}\left(\frac{\text{opposite}}{\text{hypotenuse}}\right)$	$\theta = \cos^{-1}\left(\frac{\text{adjacent}}{\text{hypotenuse}}\right)$	$\theta = \tan^{-1}\left(\frac{\text{opposite}}{\text{adjacent}}\right)$		
SOH – CAH – TOA				

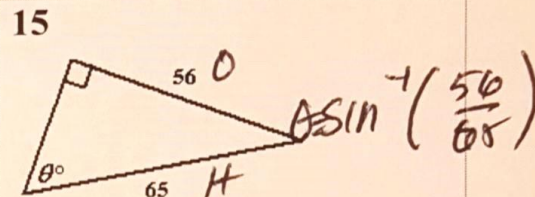
For #13-24, write the process to solve for the angle  $\theta$  and its complement  $90-\theta$  to the nearest  $100^{\text{th}}$ .



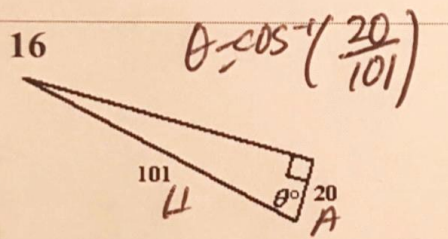
$\theta \approx 31.89$      $90 - \theta \approx 58.11$



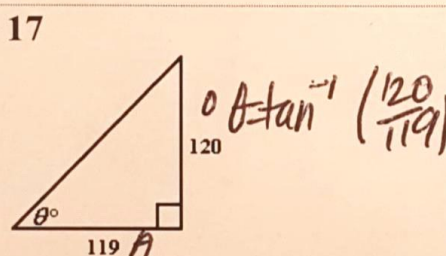
$\theta \approx 36.87$      $90 - \theta \approx 53.13$



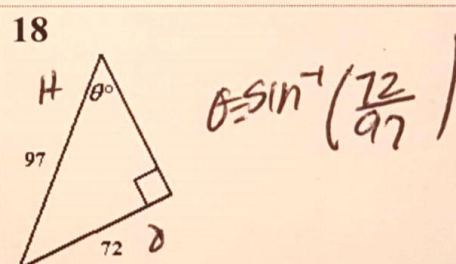
$\theta \approx 59.49$      $90 - \theta \approx 30.51$



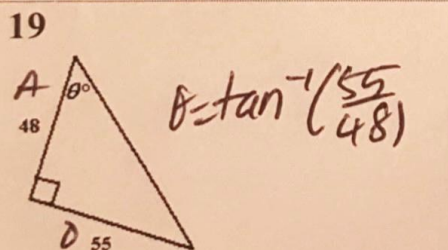
$\theta \approx 78.58$      $90 - \theta \approx 11.42$



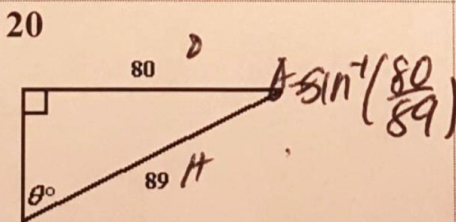
$\theta \approx 45.24$      $90 - \theta \approx 44.76$



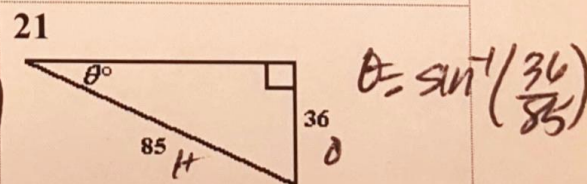
$\theta \approx 25.06$      $90 - \theta \approx 64.94$



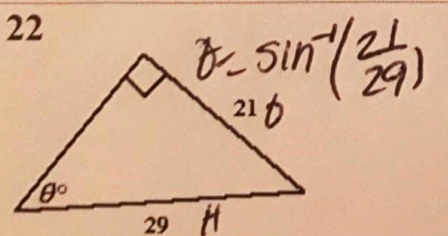
$\theta \approx 48.89$      $90 - \theta \approx 41.11$



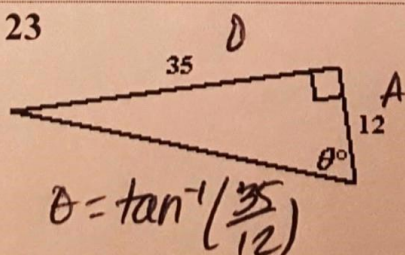
$\theta \approx 64.01$      $90 - \theta \approx 25.99$



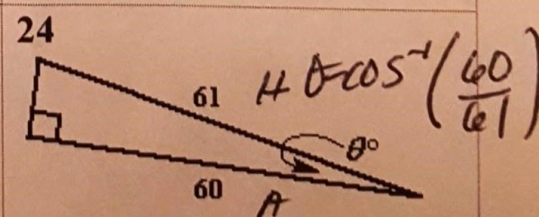
$\theta \approx 25.06$      $90 - \theta \approx 64.94$



$\theta \approx 46.43$      $90 - \theta \approx 43.60$



$\theta \approx 71.08$      $90 - \theta \approx 18.92$



$\theta \approx 10.39$      $90 - \theta \approx 29.61$