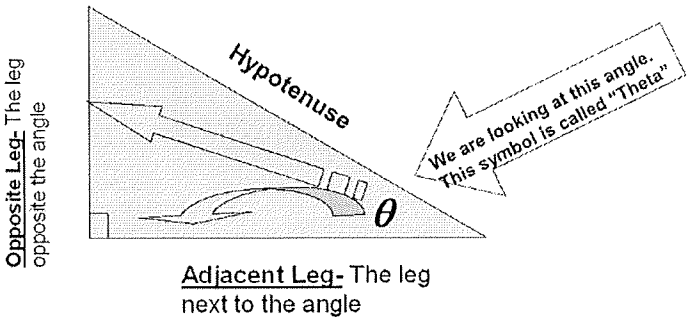
Name: Key Hour: Unit 10 Trig- Day 1

INTRODUCTION INTO TRIGONOMETRY RATIOS AND SOLVING FOR ANGLES

TRIGONOMETRY IS THE STUDY OF THE RELATIONSHIPS BETWEEN THE SIDES AND ANGLES OF TRIANGLES.

Trig ratios work for RIGHT TRIAGNLES only (for right now)



USING TRIG RATIOS

$\sin\theta = \frac{\text{Length of leg opposite } \angle\theta}{\text{Length of hypotenuse}} = \frac{\text{Opposite}}{\text{Hypotenuse}}$

$\cos\theta = \frac{\text{Length of leg adjacent } \angle\theta}{\text{Length of hypotenuse}} = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

$\tan\theta = \frac{\text{Length of leg opposite } \angle\theta}{\text{Length of leg adjacent } \angle\theta} = \frac{\text{Opposite}}{\text{Adjacent}}$

WAYS TO REMEMBER THE TRIGONOMETRIC RATIOS:

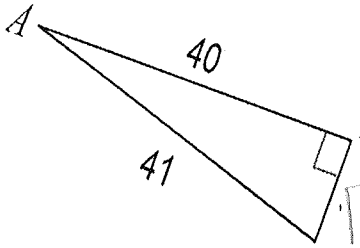
Soh-Cah-Toa

- $S = \frac{O}{H}$
- $C = \frac{A}{H}$
- $T = \frac{O}{A}$

Some Old Hags
O H

Can't Always Handle
A H

Their Old Age
O H



Example 1: Everything goes back to your trig ratios!

$41^2 = 40^2 + x^2$

$81 = x^2$

$9 = x$

$\sin\angle A = \frac{9}{41}$ $\cos\angle A = \frac{40}{41}$ $\tan\angle A = \frac{9}{40}$

$\sin\angle C = \frac{40}{41}$ $\cos\angle C = \frac{9}{41}$ $\tan\angle C = \frac{40}{9}$

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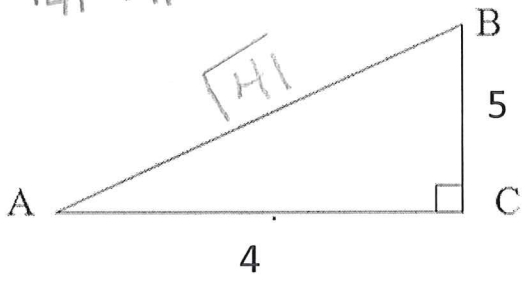
EXAMPLE 2: FINDING TRIGONOMETRIC RATIOS

Consider the triangle ABC, shown below.

Sin A = $\frac{5}{\sqrt{41}} \cdot \frac{\sqrt{41}}{\sqrt{41}} = \frac{5\sqrt{41}}{41}$



$\sin\angle A = \frac{5\sqrt{41}}{41}$ $\cos\angle A = \frac{4\sqrt{41}}{41}$

$\tan\angle A = \frac{5}{4}$

$\sin\angle B = \frac{4\sqrt{41}}{41}$ $\cos\angle B = \frac{5\sqrt{41}}{41}$

$\tan\angle B = \frac{4}{5}$

USING TRIGONOMETRY TO FIND ANGLES

Remember θ represents an angle so we use the inverse button

$\sin^{-1}\left(\frac{op}{hy}\right)$

Using Your Calculator: Find the measure of θ.

1. $\sin\theta = \frac{40}{41}$

$\theta = \sin^{-1}\left(\frac{40}{41}\right)$

$\theta \approx 77.32°$

2. $\cos\theta = 5/7$

$\theta = \cos^{-1}\left(\frac{5}{7}\right)$

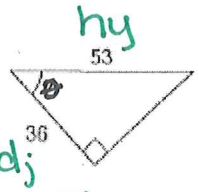
$\theta \approx 44.42°$

3. $\tan\theta = 21/32$

$\theta = \tan^{-1}\left(\frac{21}{32}\right)$

$\theta \approx 33.27°$

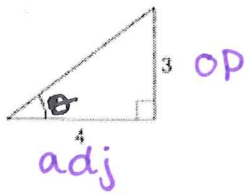
Find the measure of θ.

4. 

$\cos\theta = \frac{36}{53}$

$\theta = \cos^{-1}\left(\frac{36}{53}\right)$

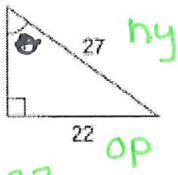
$\theta \approx 47.22°$

5. 

$\tan\theta = \frac{3}{4}$

$\theta = \tan^{-1}\left(\frac{3}{4}\right)$

$\theta \approx 36.87°$

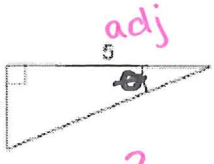
6. 

$\sin\theta = \frac{22}{27}$

$\theta = \sin^{-1}\left(\frac{22}{27}\right)$

$\theta \approx 54.57°$

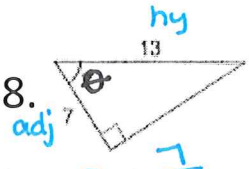
You try!

7. 

$\tan\theta = \frac{2}{5}$

$\theta = \tan^{-1}(2/5)$

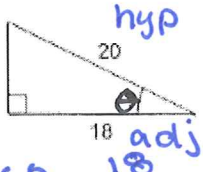
$\theta \approx 21.80°$

8. 

$\cos\theta = \frac{7}{13}$

$\theta = \cos^{-1}\left(\frac{7}{13}\right)$

$\theta \approx 57.42°$

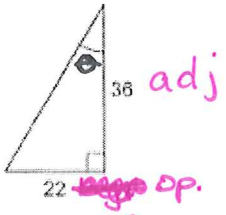
9. 

$\cos\theta = \frac{18}{20}$

$\theta = \cos^{-1}\left(\frac{18}{20}\right)$

$\theta \approx 25.84°$

25. 84.

10. 

$\tan\theta = \frac{22}{36}$

$\theta = \tan^{-1}\left(\frac{22}{36}\right)$

$\theta \approx 31.43°$