Name:_____ Period:_____ Date: _____

10-6 Extend TRIGONOMETRIC RATIOS Day 1

Trigonometry: the study of the angles (acute) of a right triangle.

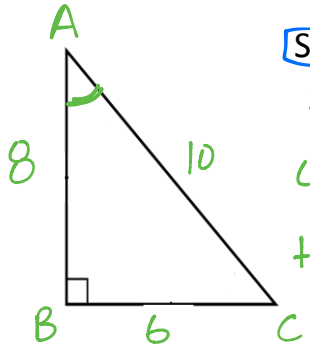
*Note: The sum of the interior angles add up to 180°

If A is an acute angle of a triangle:

$$\sin A = \frac{\text{measure of leg opposite } \angle A}{\text{measure of hypotenuse}}$$

$$\cos A = \frac{\text{measure of leg adjacent } \angle A}{\text{measure of hypotenuse}}$$

$$\tan A = \frac{\text{measure of leg opposite } \angle A}{\text{measure of leg adjacent } \angle A}$$



SOH – CAH - TOA ← ratio of side lengths

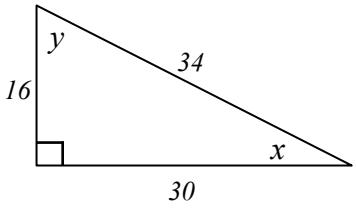
Sine $\sin \angle A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{6}{10} = \frac{3}{5} = 0.6$

Cosine $\cos \angle A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{8}{10} = \frac{4}{5} = 0.8$

tangent $\tan \angle A = \frac{\text{opposite}}{\text{adjacent}} = \frac{6}{8} = \frac{3}{4} = 0.75$

*In order to find the missing side, we can use the trig ratios. Calculator MUST be set in "degree mode".

Ex. 1: Give each ratio as a decimal rounded to the nearest hundredth.



A. $\sin y = \frac{30}{34} = \frac{15}{17} = \boxed{0.88}$ ($\frac{O}{H}$)

B. $\cos y = \frac{16}{34} = \boxed{0.47}$ ($\frac{A}{H}$)

C. $\tan y = \frac{30}{16} = \boxed{1.88}$ ($\frac{O}{A}$)

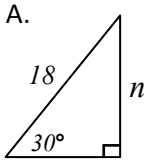
D. $\sin x = \frac{16}{34} = \boxed{0.47}$ ($\frac{O}{H}$)

E. $\cos x = \frac{30}{34} = \boxed{0.88}$ ($\frac{A}{H}$)

F. $\tan x = \frac{16}{30} = \boxed{0.53}$ ($\frac{O}{A}$)

Ex. 2: Find n rounded to the nearest tenth of an inch.

A.

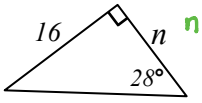


Given opp. & hyp. (with respect to 30°)

$18 \cdot \sin 30 = \frac{n}{\cancel{18}} \cdot \cancel{18}$

$18(\sin 30) = n$ $\quad n = 18(0.5) = \boxed{9 \text{ in}}$

B.

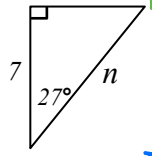


Given opp. & adj. (with respect to 28°)

$n \cdot \tan 28° = \frac{16}{\cancel{n}} \cdot \cancel{n}$

$\frac{n(\cancel{\tan 28})}{\cancel{\tan 28}} = \frac{16}{\tan 28}$ → $n = \frac{16}{.5317}$ $\quad \boxed{n = 30.1 \text{ in}}$

C.

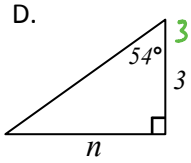


Given the adj. & hyp. (with respect to 27°)

$n \cdot \cos 27 = \frac{7}{\cancel{n}} \cdot \cancel{n}$

$\frac{n(\cos 27)}{\cos 27} = \frac{7}{\cos 27}$ → $n = \frac{7}{.8910}$ $\quad \boxed{n = 7.9 \text{ in}}$

D.



Given opp. & adj. (with respect to 54°)

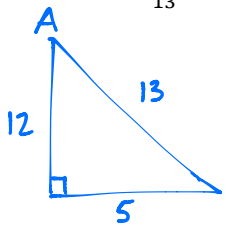
$3 \cdot \tan 54 = \frac{n}{\cancel{3}} \cdot \cancel{3}$

$3(\tan 54) = n$ $\quad \boxed{n = 4.1 \text{ in}}$

$3(1.3763) = n$

Ex. 3: First make a drawing. Then answer the question.

A. If $\sin \angle A = \frac{5}{13}$ and $\tan \angle A = \frac{5}{12}$. What is the $\cos \angle A$?



$\sin \angle A = \frac{5}{13}$ ($\frac{O}{H}$)

$\tan \angle A = \frac{5}{12}$ ($\frac{O}{A}$)

$\boxed{\cos \angle A = \frac{12}{13}}$

HW: Trig Worksheet 403 & 407