

Day 7 – Trig Ratios: Missing Angles

If you know the ratio or two side lengths of a trig function, you use **inverse** trig ratio operations to find the missing angle. You know inverse operations undo each other (addition undoes subtraction, squaring undoes square roots, etc...). There are three inverse trig ratio functions (\sin^{-1} , \cos^{-1} , and \tan^{-1}). Remember, any time you are working with trig ratios, your calculator must be in DEGREE mode. Inverse trig ratio functions can be written two ways:

$\sin^{-1}\theta$ OR $\arcsin\theta$

$\cos^{-1}\theta$ OR $\arccos\theta$

$\tan^{-1}\theta$ OR $\arctan\theta$

Solving for a Side Length	Solving for an Angle
Sin	\sin^{-1}
Cos	\cos^{-1}
Tan	\tan^{-1}

Practice: Using your calculator, find the following angles:

a. $\sin \theta = 0.31$

$\theta = 18.05^\circ$

b. $\tan \theta = 1$

$\theta = 45^\circ$

c. $\cos \theta = (0.8)$

$\theta = 36.87^\circ$

d. $\sin \theta = \left(\frac{9}{17}\right)$

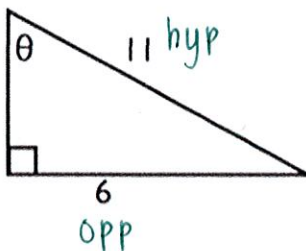
$\theta = 31.97^\circ$

e. $\tan \theta = 1.55$

$\theta = 57.17^\circ$

Example: Find the missing angle measures.

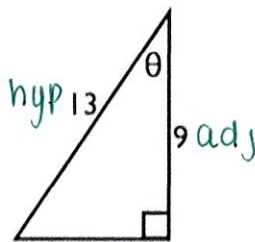
A. Theta



$\sin^{-1} \theta = \frac{6}{11}$

$\theta \approx 33.06^\circ$

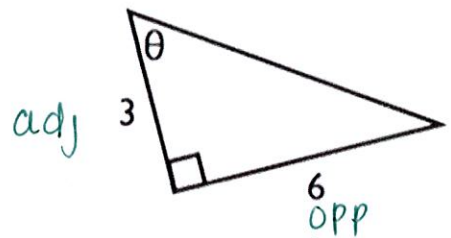
B. Theta



$\cos^{-1} \theta = \frac{9}{13}$

$\theta \approx 46.19^\circ$

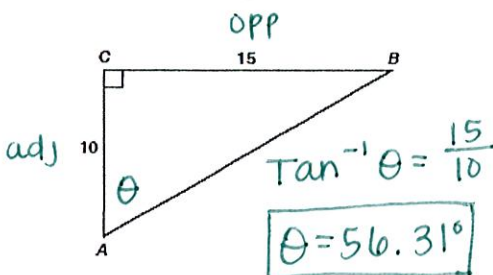
C. Theta



$\tan^{-1} \theta = \frac{6}{3}$

$\theta \approx 63.43^\circ$

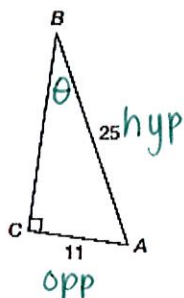
D. Angle A



$\tan^{-1} \theta = \frac{15}{10}$

$\theta = 56.31^\circ$

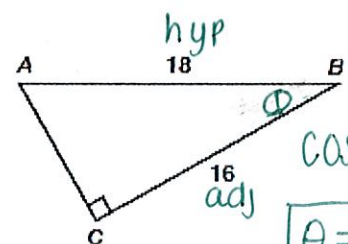
E. Angle B



$\sin^{-1} \theta = \frac{11}{25}$

$\theta = 26.10^\circ$

F. Angle B



$\cos^{-1} \theta = \frac{16}{18}$

$\theta = 27.27^\circ$