

Calculating Inverse Trig Functions

Example (Find θ if $\sin \theta = \frac{1}{2}$)

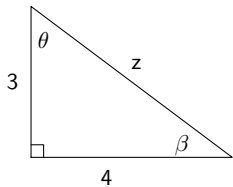
$$\begin{aligned}\sin \theta &= \frac{1}{2} \\ \sin^{-1}(\sin \theta) &= \sin^{-1}\left(\frac{1}{2}\right) \\ \theta &= \sin^{-1}\left(\frac{1}{2}\right) = 30^\circ\end{aligned}$$

Find θ for each of the following expressions:

- $\sin \theta = \frac{2}{3}$
- $\cos \theta = \frac{3}{8}$
- $\tan \theta = \frac{12}{17}$

Notes

Using Inverse Trig Functions to Calculate Angles



To find z : $3^2 + 4^2 = z^2$
or $z = 5$

To find θ :

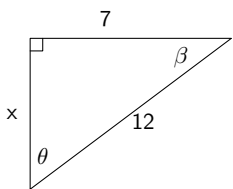
$$\begin{aligned}\tan \theta &= \frac{4}{3} \\ \theta &= \tan^{-1}\left(\frac{4}{3}\right) \\ \theta &= 53.130^\circ\end{aligned}$$

To find β :

$$\begin{aligned}\tan \beta &= \frac{3}{4} \\ \beta &= \tan^{-1}\left(\frac{3}{4}\right) \\ \beta &= 36.870^\circ\end{aligned}$$

Notes

Solving the Triangle Given Two Sides



To find θ :

$$\begin{aligned}\sin \theta &= \frac{7}{12} \\ \theta &= \sin^{-1}\left(\frac{7}{12}\right) \\ \theta &= 35.685^\circ\end{aligned}$$

To find β :

$$\begin{aligned}\cos \beta &= \frac{7}{12} \\ \beta &= \cos^{-1}\left(\frac{7}{12}\right) \\ \beta &= 54.315^\circ\end{aligned}$$

To find x :

$$\begin{aligned}x^2 + 7^2 &= 12^2 \text{ or} \\ x &= \sqrt{144 - 49} = \sqrt{95}\end{aligned}$$

Notes