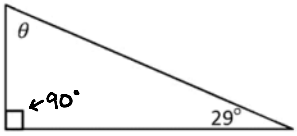
MCF3M Unit 4, Lesson 2

Finding Angles in Right Triangles

Given 2 angles in any triangle it is always possible to find the 3rd angle.

Example:



$90 + 29 + \theta = 180$

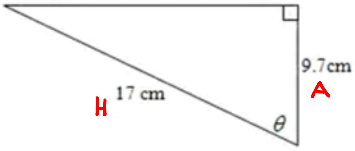
$119 + \theta = 180$

$-119 \quad -119$

$\theta = 61°$

Given 2 sides it is also possible to solve for an angle using SOH CAH TOA.

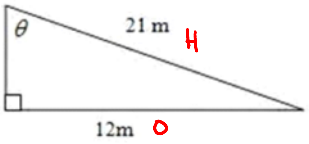
Examples



$\cos\theta = \frac{9.7}{17}$

$\theta = \cos^{-1}\left(\frac{9.7}{17}\right)$

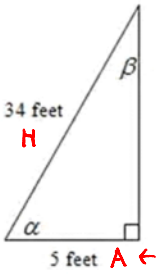
$\theta \doteq 55.2°$



$\sin\theta = \frac{12}{21}$

$\theta = \sin^{-1}\left(\frac{12}{21}\right)$

$\theta \doteq 34.8°$



$\cos\alpha = \frac{5}{34}$

$\alpha = \cos^{-1}\left(\frac{5}{34}\right)$

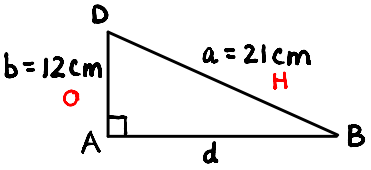
$\alpha \doteq 81.5°$

$\sin\beta = \frac{5}{34}$

$\beta = \sin^{-1}\left(\frac{5}{34}\right)$

$\doteq 8.5°$

In triangle ABD, angle A = 90°, b = 12 cm, and a = 21 cm. Solve the triangle.



$12^2 + d^2 = 21^2$

$144 + d^2 = 441$

$-144 \quad -144$

$d^2 = 297$

$d = \sqrt{297}$

$d \doteq 17.2\text{ cm}$

$\sin B = \frac{12}{21}$

$B = \sin^{-1}\left(\frac{12}{21}\right)$

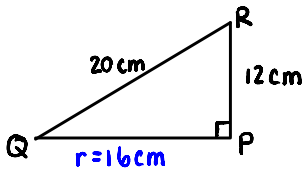
$\doteq 34.8°$

$\cos D = \frac{12}{21}$

$D = \cos^{-1}\left(\frac{12}{21}\right)$

$D \doteq 55.2°$

In triangle *PQR*, angle $P = 90°$, $q = 12$ cm, and $p = 20$ cm. Solve the triangle.



$12^2 + r^2 = 20^2$

$144 + r^2 = 400$

$-144 \quad -144$

$r^2 = 256$

$r = \sqrt{256}$

$r = 16$

$\sin Q = \frac{12}{20}$

$Q = \sin^{-1}\left(\frac{12}{20}\right)$

$\doteq 36.9°$

$\cos R = \frac{12}{20}$

$R = \cos^{-1}\left(\frac{12}{20}\right)$

$\doteq 53.1°$