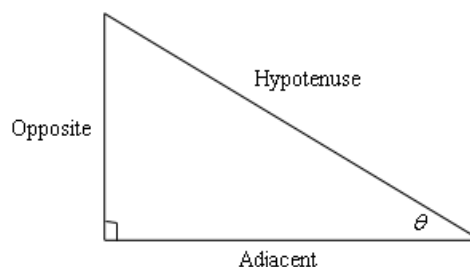# The arccosine function (F1: arccos(x))

The arccosine function is the **inverse** of the cosine function. It returns the angle whose cosine is a given number. Arccosine indicates the angle whose cosine is x. The arccosine of x is defined as the inverse cosine function of x when -1≤x≤1.

When the cosine of y is equal to x: cos y = x. Then the arccosine of x is equal to the inverse cosine function of x, which is equal to y: arccos x = cos^{-1} x = y
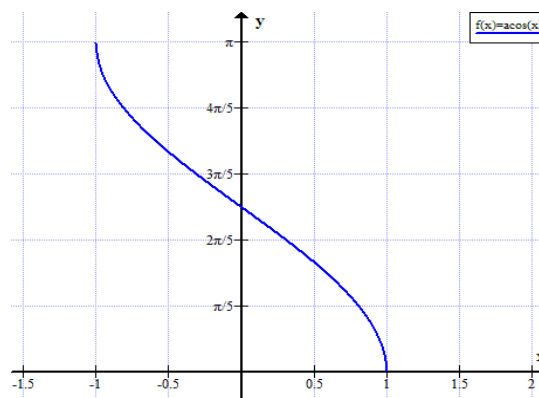
In Figure,

$$\cos(\theta) = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \rightarrow \quad \cos^{-1}\left(\frac{\text{adjacent}}{\text{hypotenuse}}\right) = \theta$$

Graph of arccosine

The curve in the graph is the arccosine function. Notice that for any x between −1 and +1 it returns a single value between 0 and +π radians.

Values of arccosine functions

x	−1	$-\sqrt{3}/2$	$-\sqrt{2}/2$	−1/2	0	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$	1
arcsin x	−90°	−60°	−45°	−30°	0°	30°	45°	60°	90°
arccos x	180°	150°	135°	120°	90°	60°	45°	30°	0°

Domain and Range

Name	Usual notation	Definition	Domain of x for real result	Range of usual principal value (radians)	Range of usual principal value (degrees)
arccosine	y = arccos(x)	x = cos(y)	−1 ≤ x ≤ 1	0 ≤ y ≤ π	0° ≤ y ≤ 180°

Application of the function

Arccosine function are unique function and useful when trying to determine the remaining two angles of right triangle.