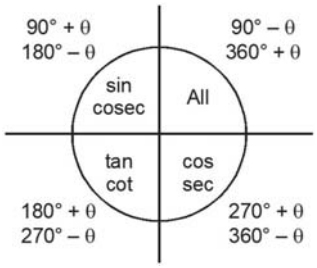
TRIGONOMETRIC RATIOS OF ALLIED ANGLES

Allied Angle

For any angle $\theta, -\theta, 90° \pm \theta, 180° \pm \theta, 270° \pm \theta, 360° \pm \theta$ and so on, are referred to as the allied angles of θ.

1. To determine the sign (+ or –):
   Apply the original ratio and determine the appropriate '+' or '–' sign based on the quadrant rule. In this way, ratios presented within the circle are positive in the corresponding quadrant, while other ratios are negative in that quadrant.
2. To find the final ratio
   (a) If there are values like $\pi, 2\pi$ and so on, there is no alteration; that is sin remains sin; cos remains cos etc.
   (b) If $\frac{\pi}{2}, \frac{3\pi}{2}$ is present, then there is a modification as indicated below:

$$\sin \rightleftharpoons \text{costan} \rightleftharpoons \text{cotcosec} \rightleftharpoons \sec$$



	Sin θ	Cos θ	Tan θ
$-\theta$	$-$ Sin θ	Cos θ	$-$Tan θ
$90° - \theta$	Cos θ	Sin θ	Cot θ
$90° + \theta$	Cos θ	$-$ Sin θ	$-$ Cot θ
$180° - \theta$	Sin θ	$-$ cos θ	$-$Tan θ
$180° + \theta$	$-$ Sin θ	$-$ cos θ	Tan θ
$270° - \theta$	$-$ cos θ	$-$ Sin θ	Cot θ
$270° + \theta$	$-$ cos θ	Sin θ	$-$ Cot θ
$360° - \theta$	$-$ Sin θ	Cos θ	$-$Tan θ
$360° + \theta$	Sin θ	Cos θ	Tan θ

Ex. Find the values of the cos (–1710°)

Sol. cos (–1710°) = cos1710° [cos(–θ) = cos θ]
= cos (5 × 360° – 90°)
= cos (–90°)
= cos90° = 0