ANGLES OF TRIGONOMETRY

Angle exceeding 360°

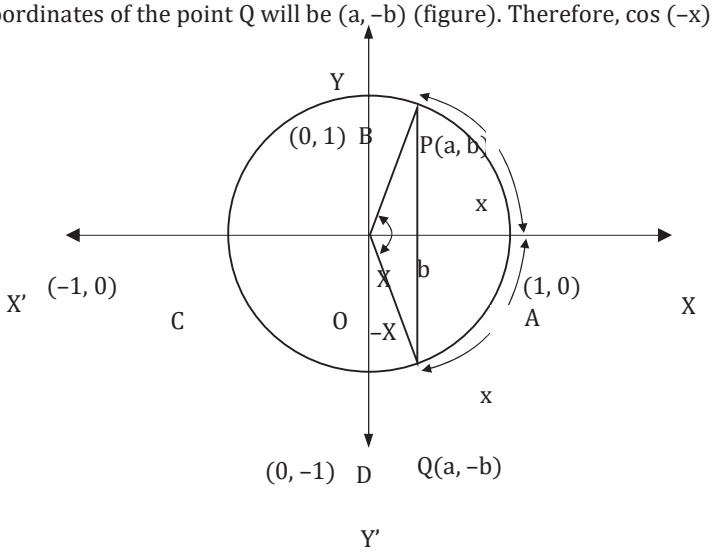
Values of Trigonometric Functions for Some Specific Angles

(θ) in degrees	0°	30°	45°	60°	90°	120°	135°	150°	180°	270°	360°
(θ) in radians		$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{3\pi}{2}$	2π
sign θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	−1	0
cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{1}{\sqrt{2}}$	$-\frac{\sqrt{3}}{2}$	−1	0	1
tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined	$-\sqrt{3}$	− 1	$-\frac{1}{\sqrt{3}}$	0	Not defined	0

The values of cosecx, secx and cotx can be obtained by taking the reciprocal of the values of sin x, cos x and tan x respectively.

Sign of The Trigonometric Functions

Let P (a, b) be a point on the unit circle with centre at the origin such that ∠AOP = x. If ∠AOQ = −x , then the coordinates of the point Q will be (a, –b) (figure). Therefore, cos (–x) = cos x and sin (–x) = –sin x



Since for every point P(a, b) on the unit circle, –1 ≤ a ≤ 1 and –1 ≤ b ≤ 1 we have –1 ≤ cos x ≤ 1 and –1 ≤ sin x ≤ 1 for all x.

In the first quadrant ($0 < x < \frac{\pi}{2}$) both a and b are positive. Thus, the value of each of the trigonometric ratios is positive in the first quadrant. In the second quadrant ($\frac{\pi}{2}<x<\pi$) a is negative and b is positive. Thus, sin θ and cosec θ will be positive whereas all other trigonometric ratios will be negative in second quadrant.

In the third quadrant ($\pi < x < \frac{3\pi}{2}$), both a and b are negative. Thus, tan θ and cot θ will be positive and all other trigonometric ratios will be negative in third quadrant.

In the fourth quadrant ($\frac{3\pi}{2} < x < 2\pi$) a is positive and b is negative. Thus, cos θ and sec θ will be positive while all other trigonometric ratios will be negative in fourth quadrant.

This can be summarized in the table as follows

	sinθ	cosθ	tanθ	cotθ	secθ	cosecθ
Ist Quadrant	+	+	+	+	+	+
IInd Quadrant	+	–	–	–	–	+
IIIrd Quadrant	–	–	+	+	–	–
IVth Quadrant	–	+	–	–	+	–