II KURS ALGEBRA. TRIGONOMETRIYA

1-DARS

MAVZU: Son argumentning sinusi, kosinusi, tangensi va kotangensi.

Burchak kattaliklari: Radian va gradus

$$1\ rad = \frac{180}{\pi} \quad (1)$$

$$\pi\ \text{rad} = 180^{\circ}$$

Bundan burchak kattaligini biridan ikkinchisiga o`tkazish mumkin

Masalan:

1) 90°, 45° va 27° larni radianga keltiring. (1) dan foydalanamiz:

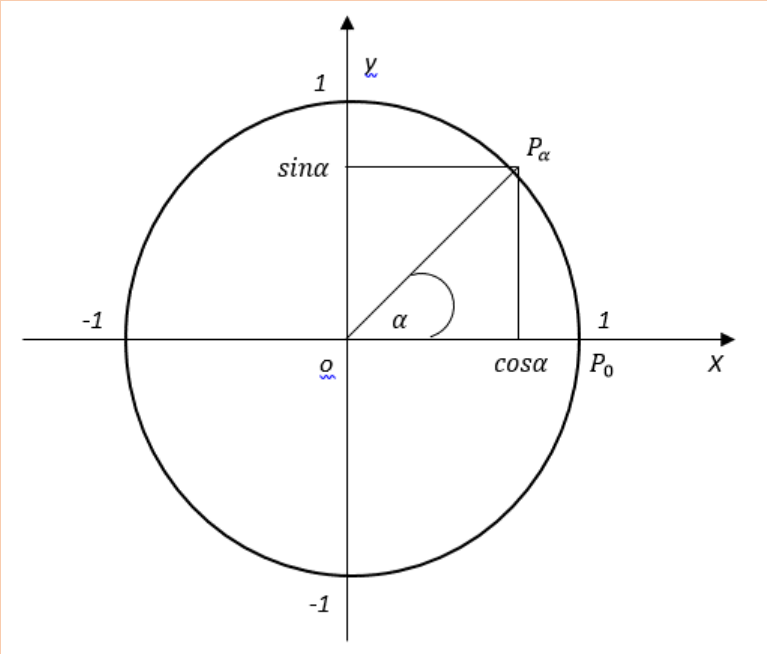
$$90° = \frac{\boldsymbol{\pi}}{2} \qquad 45° = \frac{\boldsymbol{\pi}}{4} \qquad 27° = \frac{3\boldsymbol{\pi}}{20}$$

2) $\frac{\boldsymbol{\pi}}{6}$; $\frac{3\boldsymbol{\pi}}{4}$; $\frac{2\boldsymbol{\pi}}{3}$ larni gradusda ifodalang.

$$\frac{\boldsymbol{\pi}}{6} = 60° \qquad \frac{\mathbf{3}\boldsymbol{\pi}}{4} = 135° \qquad \frac{\mathbf{2}\boldsymbol{\pi}}{3} = 120°$$

Sonli funksiyalar sinus va kosinusni ta`riflaymiz.

- Birlik aylana olamiz, har bir $\boldsymbol{\alpha}$ soniga birlik aylaning $\boldsymbol{P_{\alpha=}\ R^{\alpha}(P_{\alpha})}$ nuqtasi mos keladi.

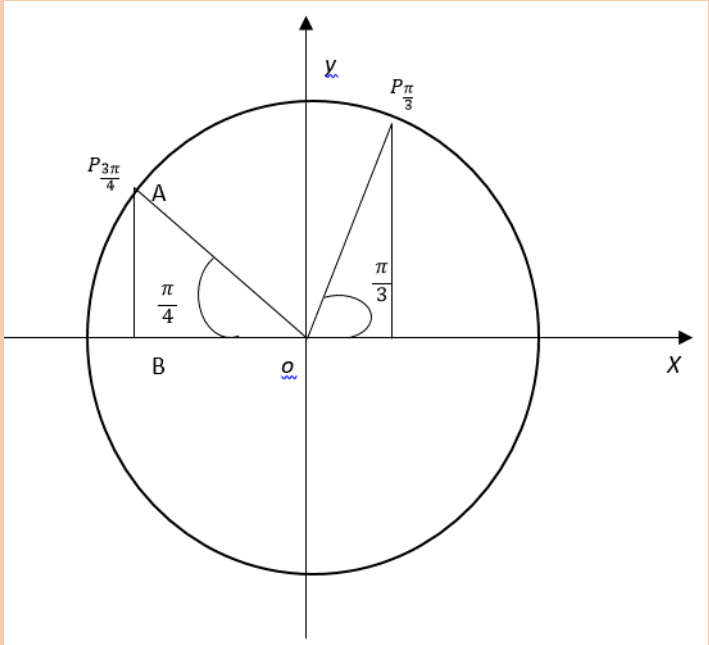


Ta`rif:

- $\boldsymbol{P_\alpha = M(1;0)}$ nuqtani koordinatalar boshi atrofida $\boldsymbol{\alpha}$ burchakka burganda hosil bo`lgan. $\boldsymbol{P_\alpha}$ nuqtaning ordinatasi $\boldsymbol{\alpha}$ sonining sinusi deyiladi (sin $\boldsymbol{\alpha}$), bu nuqtaning abstsissasi esa $\boldsymbol{\alpha}$ ning kosinusi deyiladi (cos $\boldsymbol{\alpha}$)

Misol:

- $\boldsymbol{cos\frac{3\pi}{4}}$ va $\boldsymbol{sin\frac{3\pi}{4}}$, $\boldsymbol{cos\frac{\pi}{4}}$ va $\boldsymbol{sin\frac{\pi}{4}}$ ning qiymatini topamiz. $P_{\frac{3\pi}{4}}$ va $P_{\frac{\pi}{4}}$ ning koordinatalarini topamiz.



Uchburchak ABO da

$$|AB| = \sin\alpha = \sin\frac{3\pi}{4}$$

$$|BO| = \cos\alpha = \cos\frac{3\pi}{4}$$

$$|AO| = 1$$

$$< BOA = \frac{\pi}{4}$$

U holda $|AB| = |BO| = \frac{\sqrt{2}}{2}$ $\quad P_{\frac{3\pi}{4}}\left(-\frac{\sqrt{2}}{2};\frac{\sqrt{2}}{2}\right)$ $\quad P_{\frac{\pi}{3}}\left(\frac{1}{2};\frac{\sqrt{3}}{2}\right)$ dan

$$\cos\frac{3\pi}{4} = -\frac{\sqrt{2}}{2};\ \sin\frac{3\pi}{4} = \frac{\sqrt{2}}{2} \qquad \cos\frac{\pi}{3} = \frac{1}{2};\ \sin\frac{\pi}{3} = \frac{\sqrt{3}}{3}$$

Ba’zi burchaklarning qiymatlari.

α	0	$30°$	45^0	60^0	90^0	180^0	270^0
$\sin\alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1
$\cos\alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0

Ta`rif:

$\boldsymbol{\alpha}$ soning tangensi deb shu son sinusining kosinusiga nisbatiga aytiladi:

$$\mathbf{tg}\ \boldsymbol{\alpha} = \frac{\boldsymbol{sin\alpha}}{\boldsymbol{cos\alpha}}$$

$\boldsymbol{\alpha}$ soning kotangensi deb shu son kosinusining sinusiga nisbatiga aytiladi:

$$\mathbf{ctg}\ \boldsymbol{\alpha} = \frac{\boldsymbol{cos\alpha}}{\boldsymbol{sin\alpha}}$$

Ba’zi burchaklarning qiymatlari:

α	0	30°	45^0	60^0	90^0	120^0	180^0	270^0	360^0
tgα	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	-	$-\sqrt{3}$	0	-	0
ctgα	-	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	$-\frac{1}{\sqrt{3}}$	-	0	-