KOTNE FUNKCIJE

1.) Veljajo samo v PRAVOKOTNEM TRIKOTNIKU:

sinus α → $\sin\alpha = \dfrac{nasprotna\ kateta}{hipotenuza}$

kosinus α → $kos\ \alpha = \dfrac{priležna\ kateta}{hipotenuza}$

tangens α → $tg\ \alpha = \dfrac{nasprotna\ kateta}{priležna\ kateta}$

kotangens α → $ctg\ \alpha = \dfrac{priležna\ kateta}{nasprotna\ kateta}$

2.) Osnovne zveze me kotnimi funkcijami:

- $tg\ \alpha = \dfrac{\sin\alpha}{\cos\alpha}$ → $\sin\alpha = tg\ \alpha \cdot \cos\alpha$ → $\cos\alpha = \dfrac{\sin\alpha}{tg\ \alpha}$
- $ctg\ \alpha = \dfrac{\cos\alpha}{\sin\alpha}$ → $\cos\alpha = \sin\alpha \cdot ctg\ \alpha$ → $\sin\alpha = \dfrac{\cos\alpha}{ctg\ \alpha}$
- $1 = tg\ \alpha \cdot ctg\ \alpha$ → $tg\ \alpha = \dfrac{1}{ctg\ \alpha}$ → $ctg\ \alpha = \dfrac{1}{tg\ \alpha}$
- $1 = \sin^2\alpha + \cos^2\alpha$ (najpomembnejša zveza) → $\sin^2\alpha = 1 - \cos^2\alpha$ → $\cos^2\alpha = 1 - \sin^2\alpha$
- $tg\ \alpha + 1 = \dfrac{1}{\cos\alpha}$ → $tg^2\ \alpha + 1 = \dfrac{1}{\cos^2\alpha}$
- $ctg\ \alpha + 1 = \dfrac{1}{\sin\alpha}$ → $ctg^2\ \alpha + 1 = \dfrac{1}{\sin^2\alpha}$

3.) Vrednosti kotnih funkcij kotov 30º, 45º, 60º

- **enakokraki trikotnik** → $v = \dfrac{a\sqrt{3}}{2}$
- **kvadrat** → $d = a\sqrt{2}$

α (º)	α (rd)	sin α	cos α	tg α	ctg α
0	0	0	1	0	∞
30º	$\frac{\Pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$
45º	$\frac{\Pi}{3}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1
60º	-	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$
90º	$\frac{\Pi}{2}$	1	0	∞	0

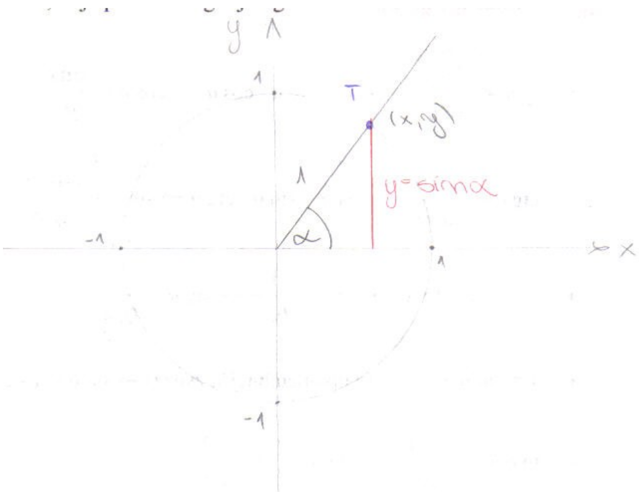
4.) Potek vrednosti kotnih funkcij

a. 1. kvadrant → KOTI MED 0° < α < 90°

- sin kota α je ordinata točke T, ki je presečišče gibljivega kraka in enotske krožnice

$\sin \alpha = \frac{y}{1}$

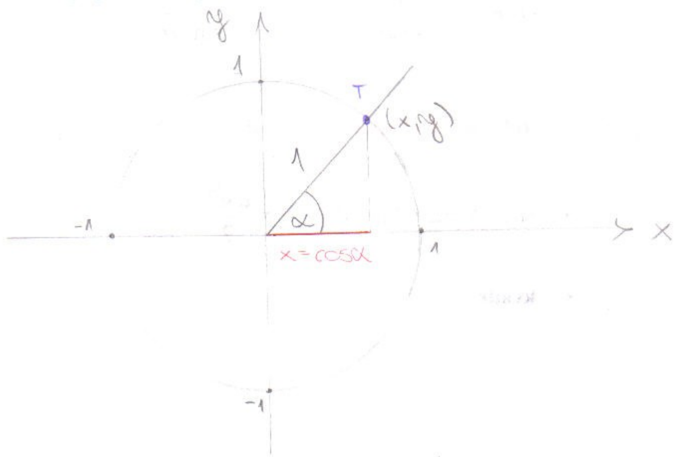
$\sin \alpha = \cos (90° - \alpha)$



- cos kota α je abscisa točke T, ki je presečišče gibljivega kraka in enotske krožnice

$\cos \alpha = \frac{x}{1}$

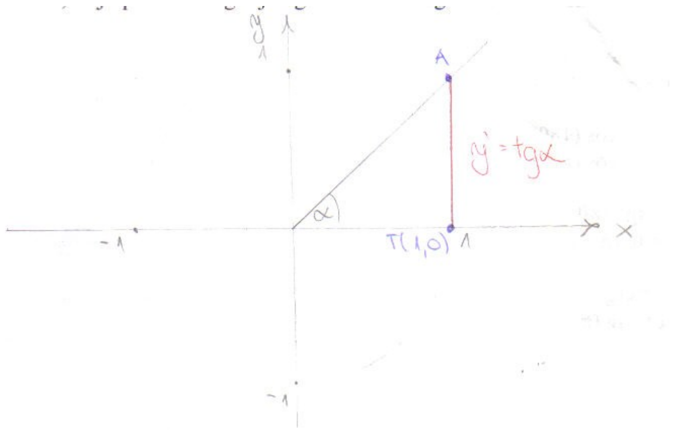
$\cos \alpha = \sin (90° - \alpha)$



- tg kota α je ordinata točke A, ki je presečišče gibljivega kraka in tangente na krožnico v točki 1 (1,0)

A (1, tg α)

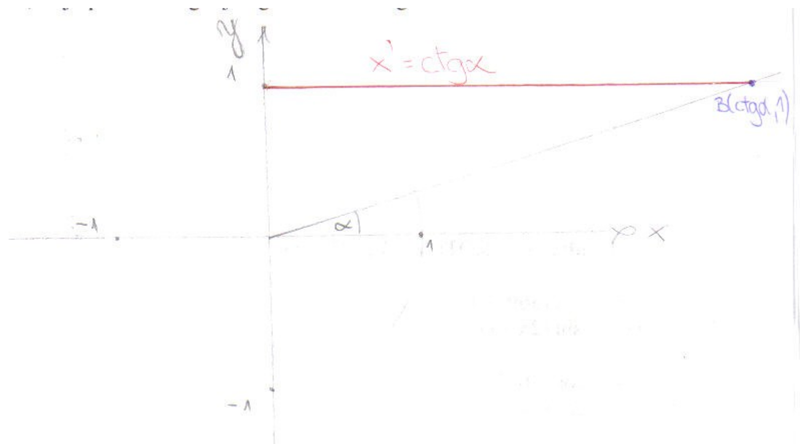
$\text{tg}\,\alpha = \frac{y'}{1}$ → y' = tg α



- ctg kota α je abscisa točke B, ki je presečišče gibljivega kraka in tangente na krožnico v točki 2 (0,1)

B (ctg α, 1)

$\text{ctg}\,\alpha = \frac{x'}{1}$ → x' = ctg α



5.) **Razširitev pojma kotnih funkcij do kota 360°**

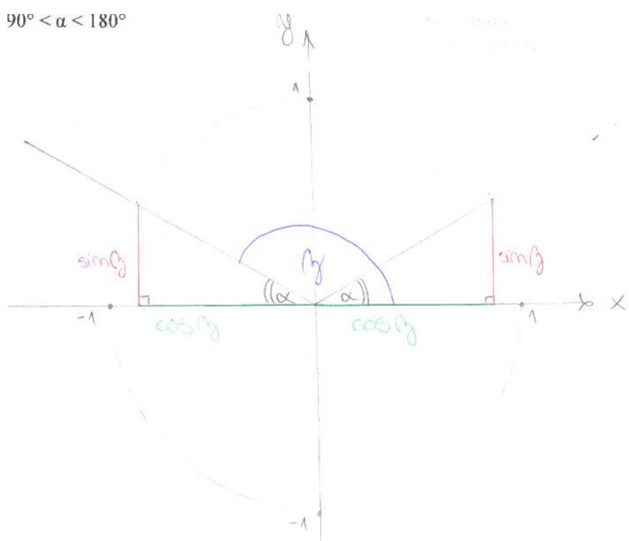
b. 2. kvadrant → KOTI MED 90° < α < 180°

sin α = sin (180° – α)
sin α = sin (π - α)

cos α = - cos (180° – α)
cos α = - cos (π - α)

tg α = - tg (180° – α)
tg α = - tg (π - α)

ctg α = - ctg (180° – α)
ctg α = - ctg (π - α)



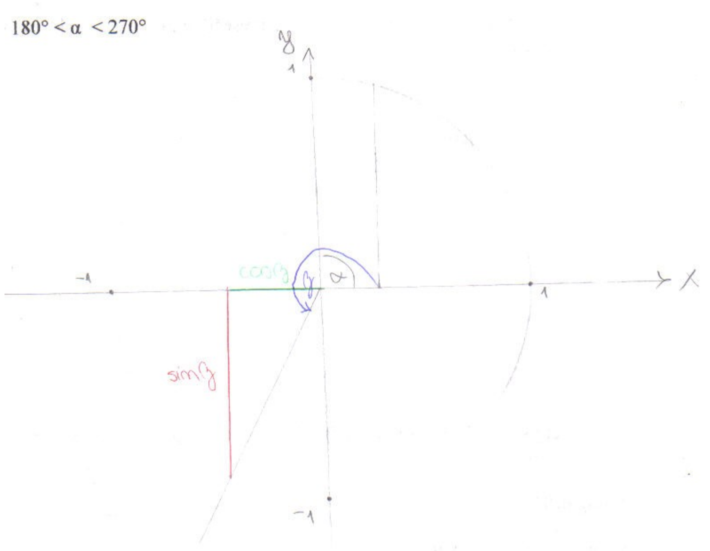
c. 3. kvadrant → KOTI MED 180° < α < 270°

$\sin \alpha = -\sin (180° + \alpha)$
$\sin \alpha = -\sin (\pi + \alpha)$

$\cos \alpha = -\cos (180° + \alpha)$
$\cos \alpha = -\cos (\pi + \alpha)$

$\text{tg}\, \alpha = \text{tg}\, (180° + \alpha)$
$\text{tg}\, \alpha = \text{tg}\, (\pi + \alpha)$

$\text{ctg}\, \alpha = \text{ctg}\, (180° + \alpha)$
$\text{ctg}\, \alpha = \text{ctg}\, (\pi + \alpha)$



d. 4. kvadrant → KOTI MED 270° < α < 360°

$\sin \alpha = -\sin (360° - \alpha)$
$\sin \alpha = -\sin (2\pi - \alpha)$

$\cos \alpha = \cos (360° - \alpha)$
$\cos \alpha = \cos (2\pi - \alpha)$

$\text{tg}\, \alpha = -\text{tg}\, (360° - \alpha)$
$\text{tg}\, \alpha = -\text{tg}\, (2\pi - \alpha)$

$\text{ctg}\, \alpha = -\text{ctg}\, (360° - \alpha)$
$\text{ctg}\, \alpha = -\text{ctg}\, (2\pi - \alpha)$