

IX Dani matematike 2020

TRIGONOMETRIJSKE FUNKCIJE

MAPA UMA



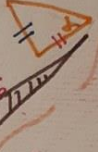
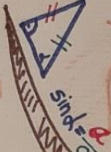
LEONARD EIJLER

TRIGONOMETRIA?

Lana B

12 Noris®

Buntstifte
Coloured pencils
Crayons de couleur
Lápices de colores



$$1 + \operatorname{tg}^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\sin \alpha = \frac{a}{c}$$

$$\cos \alpha = \frac{b}{c}$$

$$\operatorname{tg} \alpha = \frac{a}{b}$$

$$\operatorname{ctg} \alpha = \frac{b}{a}$$

$$\sin \alpha = \frac{a}{c}$$

$$\cos \alpha = \frac{b}{c}$$

$$\operatorname{tg} \alpha = \frac{a}{b}$$

$$\operatorname{ctg} \alpha = \frac{b}{a}$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$1 + \operatorname{tg}^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$1 + \operatorname{ctg}^2 \alpha = \frac{1}{\sin^2 \alpha}$$

$$\sin^2 \alpha + \operatorname{tg}^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$\cos^2 \alpha + \operatorname{ctg}^2 \alpha = \frac{1}{\sin^2 \alpha}$$

$$\sin^2 \alpha + \operatorname{ctg}^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$\cos^2 \alpha + \operatorname{tg}^2 \alpha = \frac{1}{\sin^2 \alpha}$$

$$\alpha + \beta = 90^\circ$$

$$\sin \alpha = \cos \beta$$

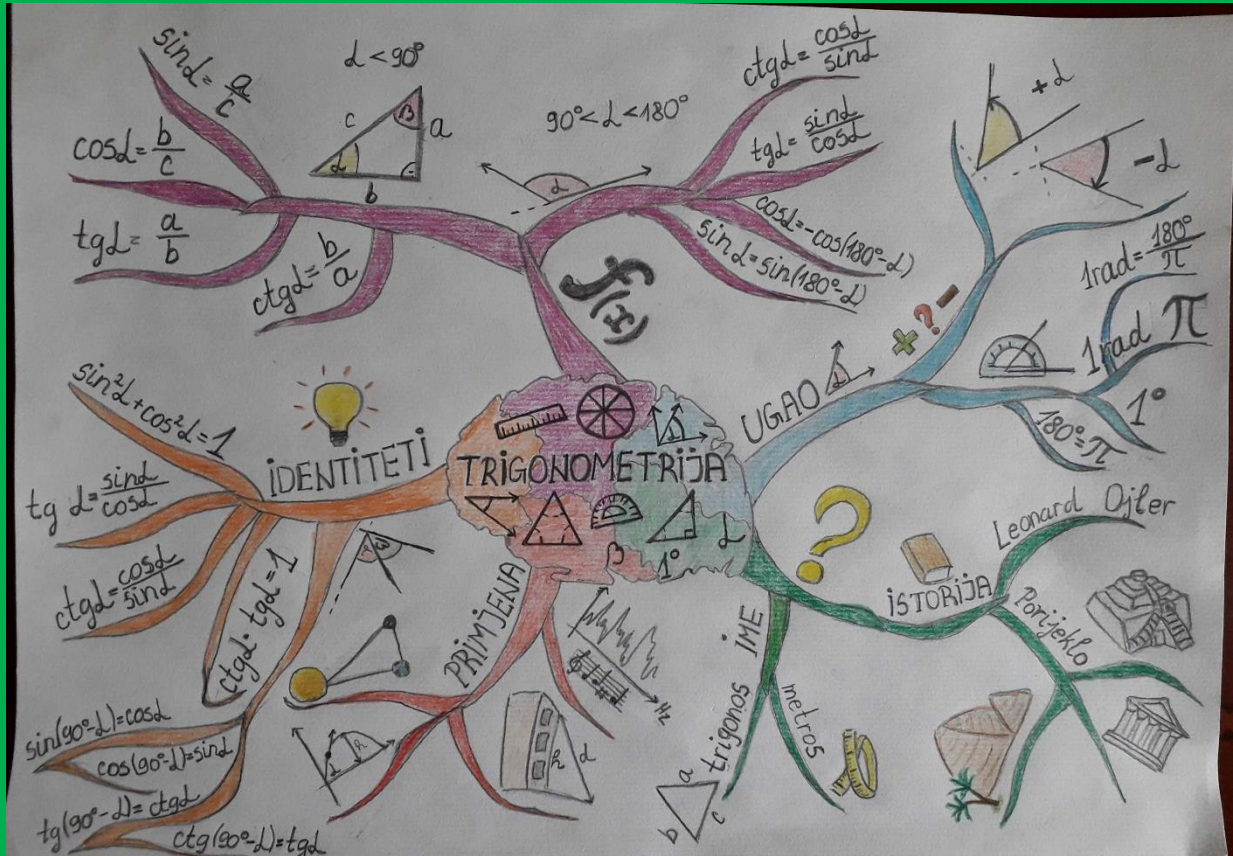
$$\cos \alpha = \sin \beta$$

$$\operatorname{tg} \alpha = \operatorname{ctg} \beta$$

$$\operatorname{ctg} \alpha = \operatorname{tg} \beta$$

$$\sin \alpha = \operatorname{ctg} \beta$$

$$\cos \alpha = \operatorname{tg} \beta$$



Ksenija Božović II - I

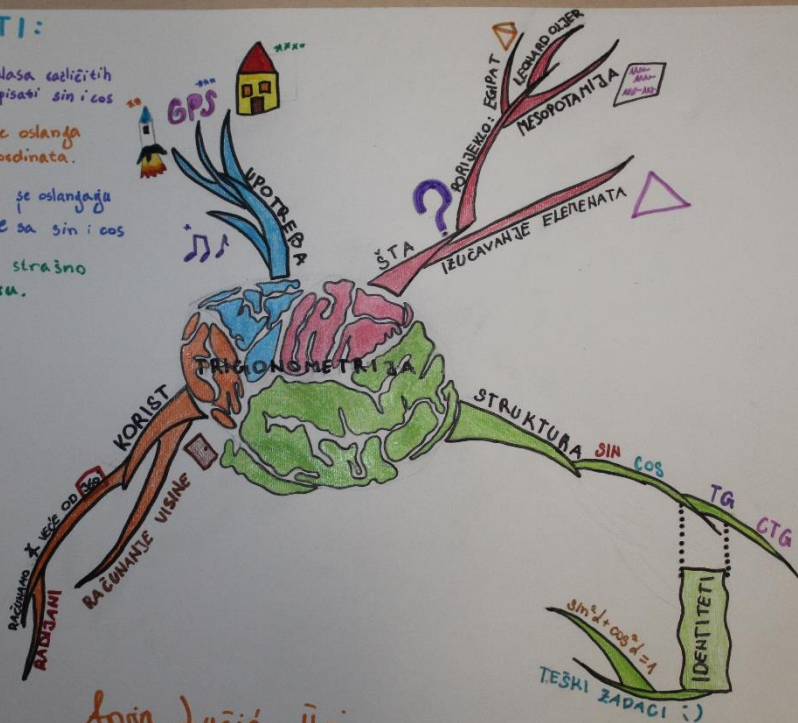
ZANIMLJIVOSTI:

*Muzika se sastoji od talasa različitih frekvencija i može se opisati \sin i \cos

**Putovanje kroz svemir se oslanja na precizne polarsne koordinate.

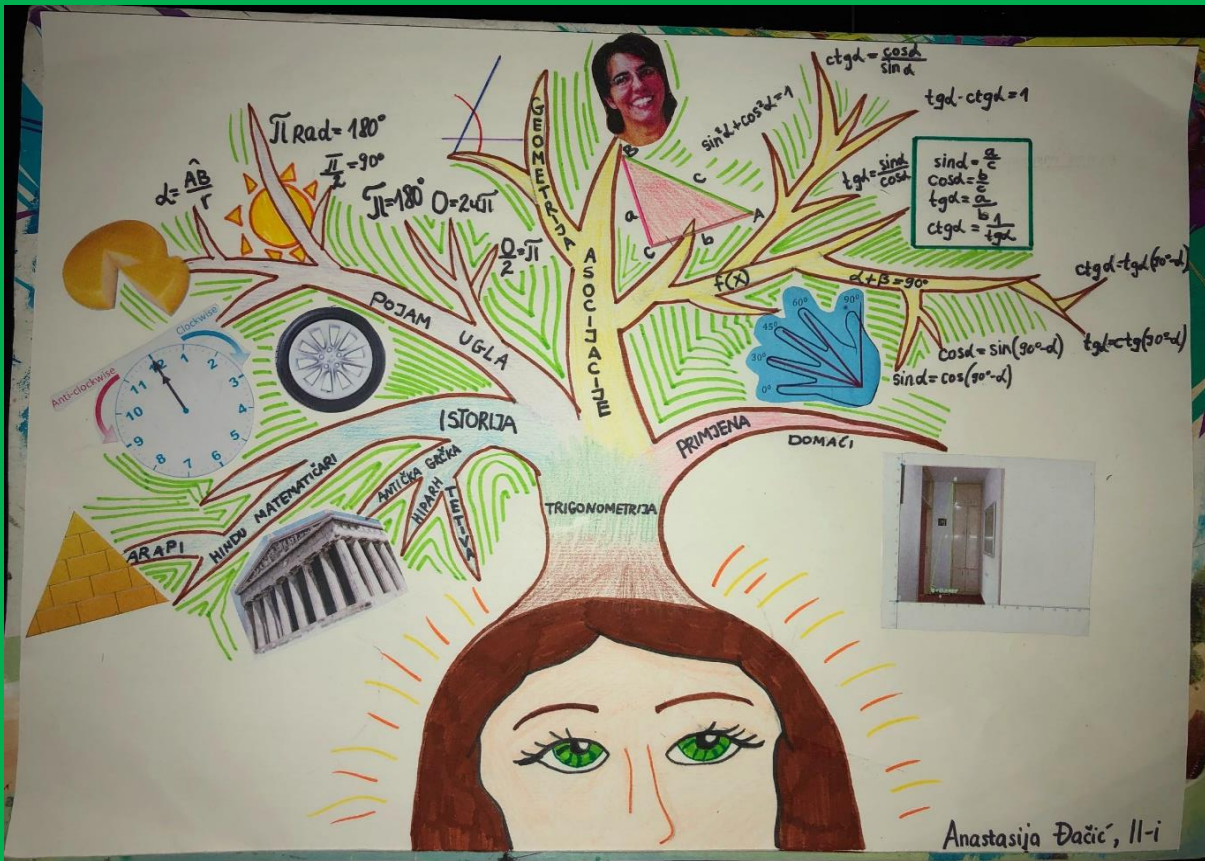
*** Gps i mobilni telefoni se oslanjaju na triangulacije i formale \sin i \cos

**** Trigonometrija je strašno važna za arhitekturu.



Anja Lučić, II-I

Anja Lučić II-I



Anastasija Đaćić, 11-i

$\text{ctg} \alpha = a \Rightarrow d = \text{arctg} a$
 $\cos \alpha = a \Rightarrow d = \text{arccos} a$
 $\sin \alpha = a \Rightarrow d = \text{arcsin} a$
 $\text{tg} \alpha = a \Rightarrow d = \text{arctg} a$

$\text{ctg} \alpha = \frac{\cos \alpha}{\sin \alpha}$
 $\text{tg} \alpha = \frac{\sin \alpha}{\cos \alpha}$
 $\text{tg} \alpha \cdot \text{ctg} \alpha = 1$

$\sin^2 \alpha + \cos^2 \alpha = 1$
 identitet

korisćenje kalkulatora

velizima uvala

	30°	45°	60°
sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
tg	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$
ctg	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$

TRIGONOMETRIJSKE F.

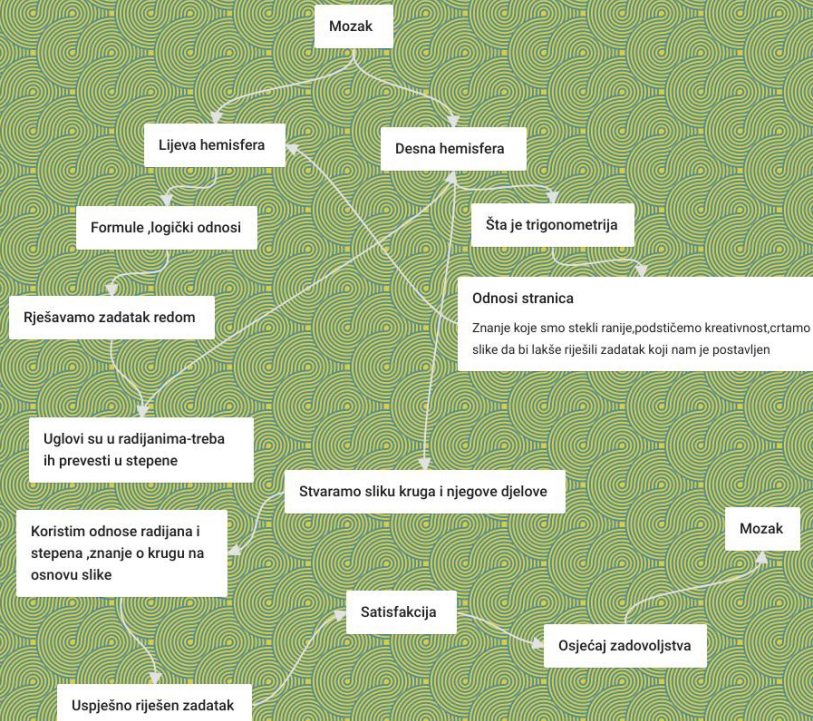
$1^\circ = \frac{\sqrt{3}}{180} \text{ rad}$
 $360^\circ = 2\pi \text{ rad}$
 $1 \text{ rad} = \frac{180^\circ}{\pi}$

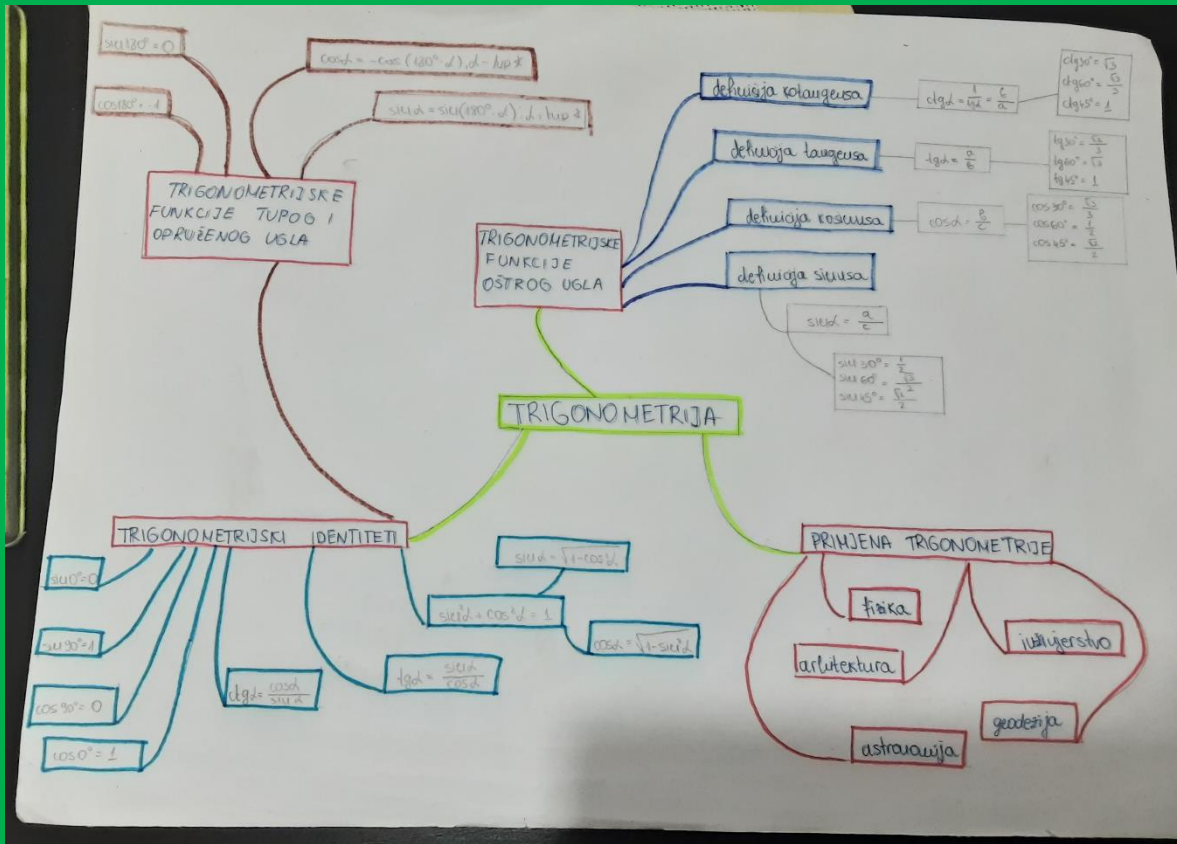
pozitivan ugao
 negativan ugao

$\cos \alpha = \frac{b}{a}$
 $\text{tg} \alpha = \frac{a}{b}$
 $\sin \alpha = \frac{a}{c}$
 $\text{ctg} \alpha = \frac{b}{a}$

My distinguished padlet

Made with the strength to succeed





TRIGONOMETRIJA

FUNKCIJE

$$\operatorname{tg} \alpha = \frac{\text{naspramna } k.}{\text{nalegla } k.}$$

$$\operatorname{ctg} \alpha = \frac{\text{nalegla } k.}{\text{naspramna } k.}$$

$$\cos \alpha = \frac{\text{nalegla } k.}{\text{hipotenuza}}$$

$$\sin \alpha = \frac{\text{naspramna } k.}{\text{hipotenuza}}$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

IDENTITETI

$$1 + \operatorname{tg}^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$1 + \operatorname{ctg}^2 \alpha = \frac{1}{\sin^2 \alpha}$$

PRAKSA



30°

45°

60°

$\frac{1}{2}$

$\frac{\sqrt{2}}{2}$

$\frac{\sqrt{3}}{2}$

$\sin \alpha$

$\frac{\sqrt{3}}{2}$

$\frac{\sqrt{2}}{2}$

$\frac{1}{2}$

$\cos \alpha$

$\frac{1}{3}$

1

$\frac{\sqrt{3}}{3}$

$\operatorname{tg} \alpha$

$\sqrt{3}$

1

$\frac{\sqrt{3}}{3}$

$\operatorname{ctg} \alpha$

Leonard Euler Σ

$$\sin^2 d + \cos^2 d = 1$$

$$\operatorname{tg} d \cdot \operatorname{ctg} d = 1$$

$$\operatorname{ctg} d = \operatorname{tg}(90^\circ - d)$$

$$\cos d = \sin(90^\circ - d)$$

$$\sin d = \cos(90^\circ - d) \quad \operatorname{tg} d = \operatorname{ctg}(90^\circ - d)$$

IDENTITETI

$$\operatorname{tg} d = \frac{a}{b}$$

$$\operatorname{ctg} d = \frac{b}{a}$$



f(x)

$$\cos d = -\cos(180^\circ - d)$$

$$\operatorname{tg} d = \frac{\sin d}{\cos d}$$

$$\operatorname{ctg} d = \frac{\cos d}{\sin d}$$

$$\sin d = \sin(180^\circ - d)$$

$$\sin d = \frac{a}{c}$$

$$\cos d = \frac{b}{c}$$



PRIMJENA

metros

nomen



$\hat{\Gamma} \text{rad} = 180^\circ$

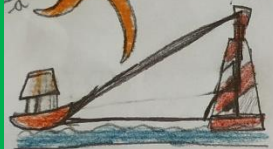
ASOCIJACIJE

?

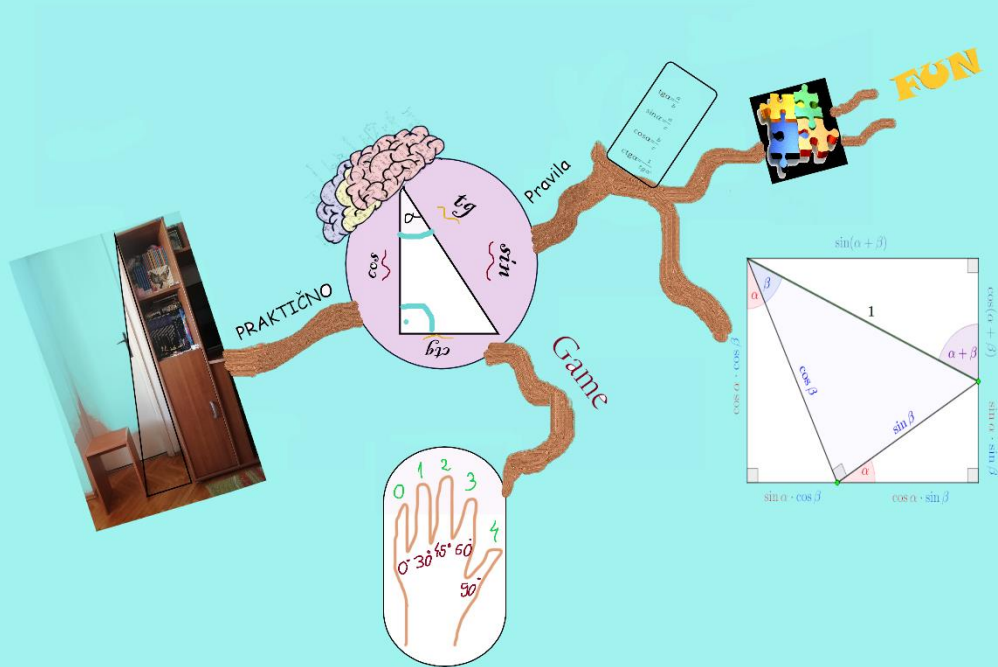
α, β, γ

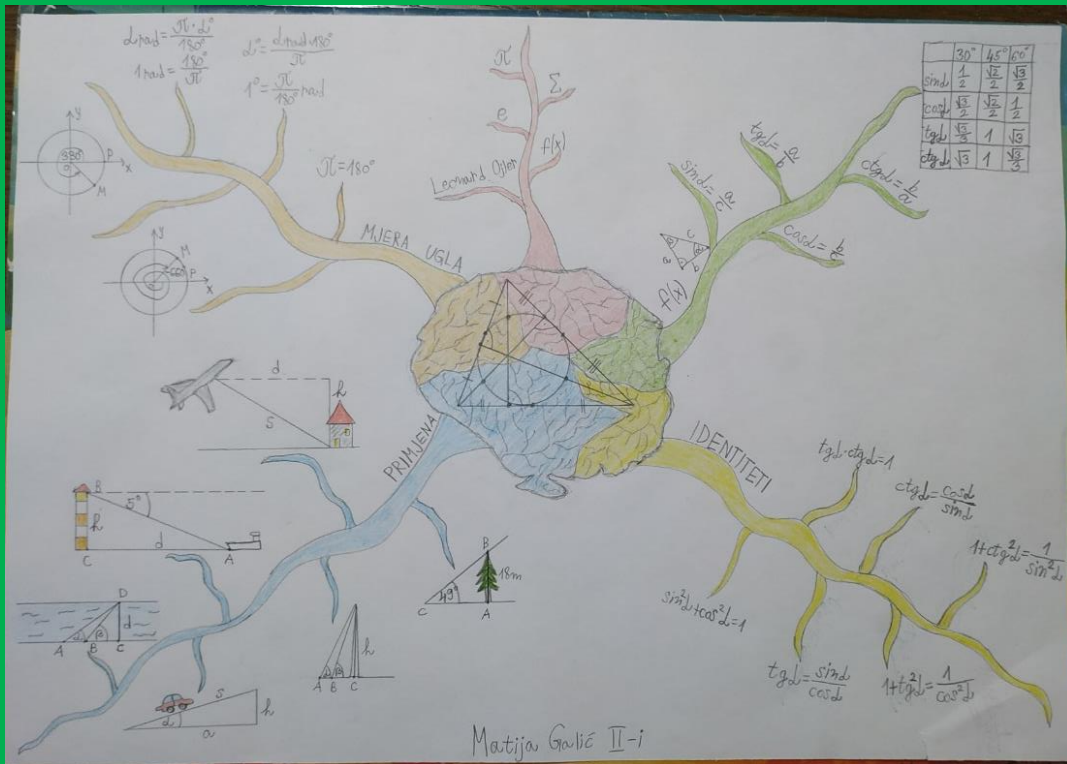
visina

$90^\circ, 180^\circ$

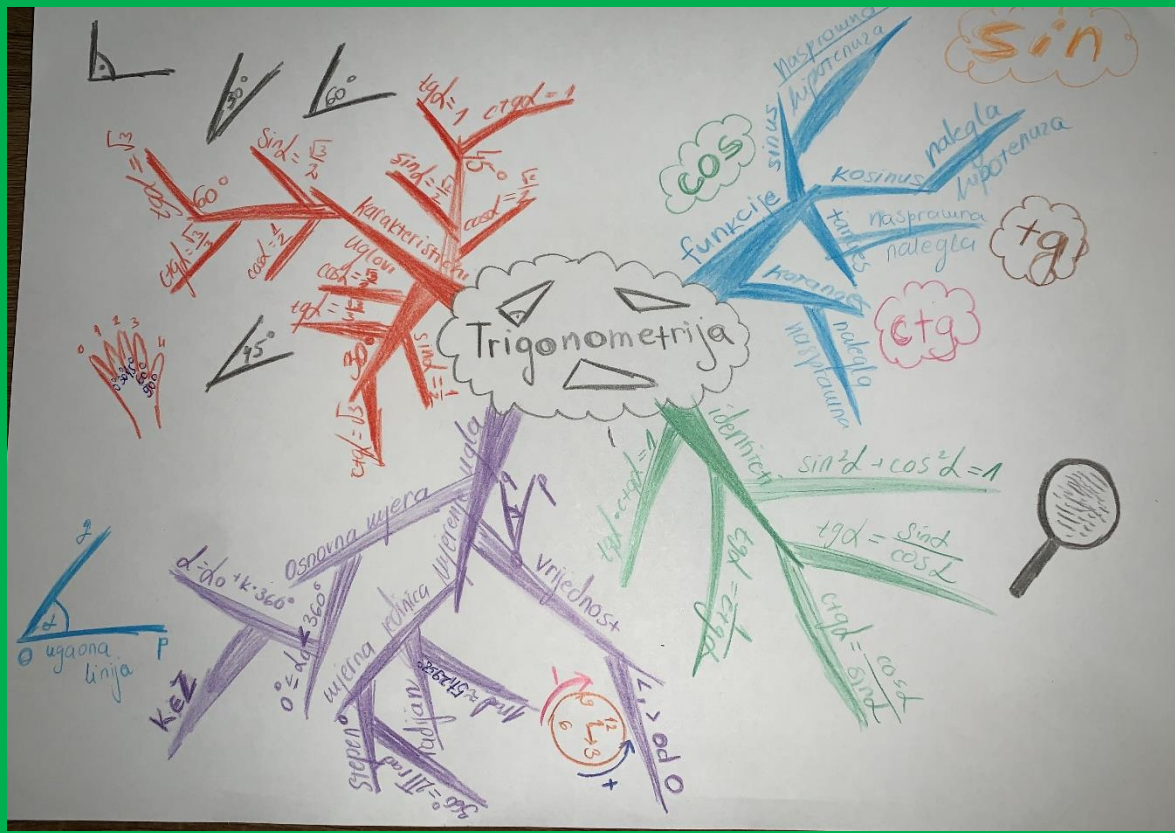


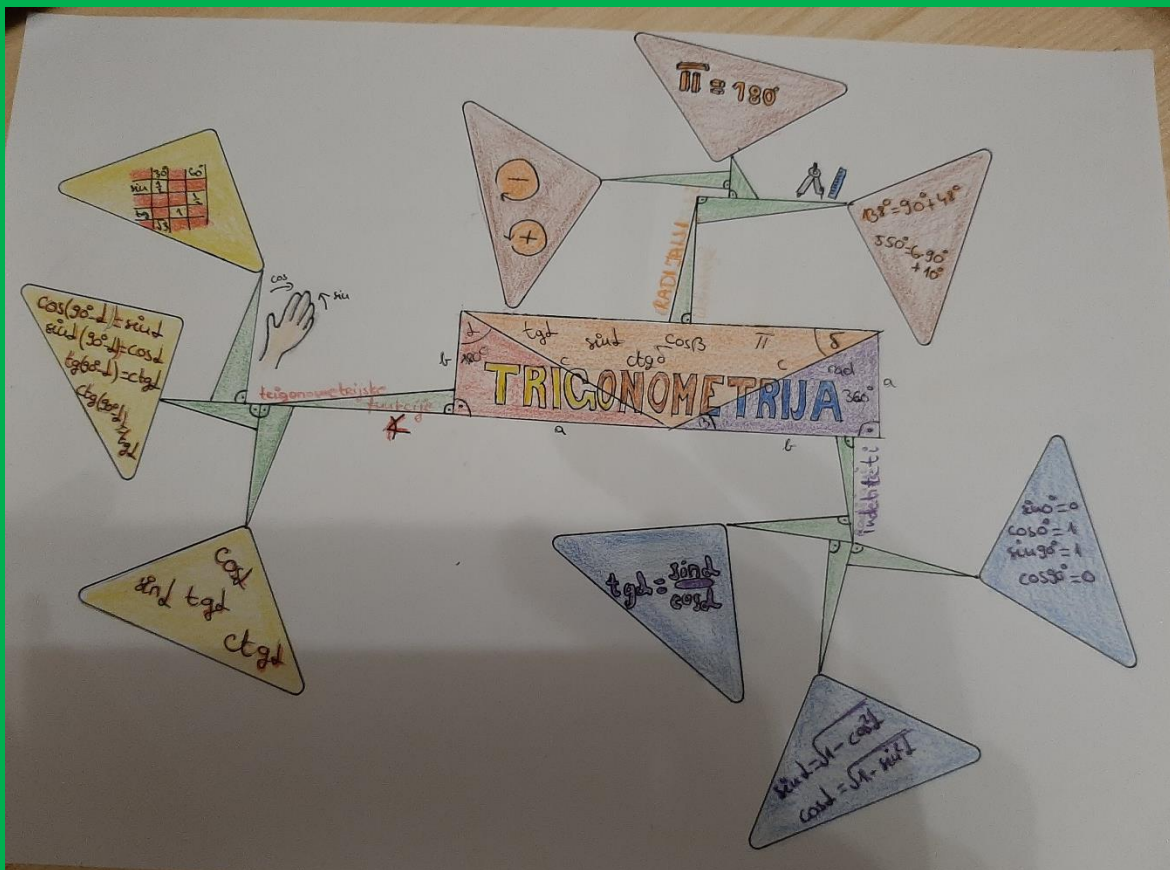
b

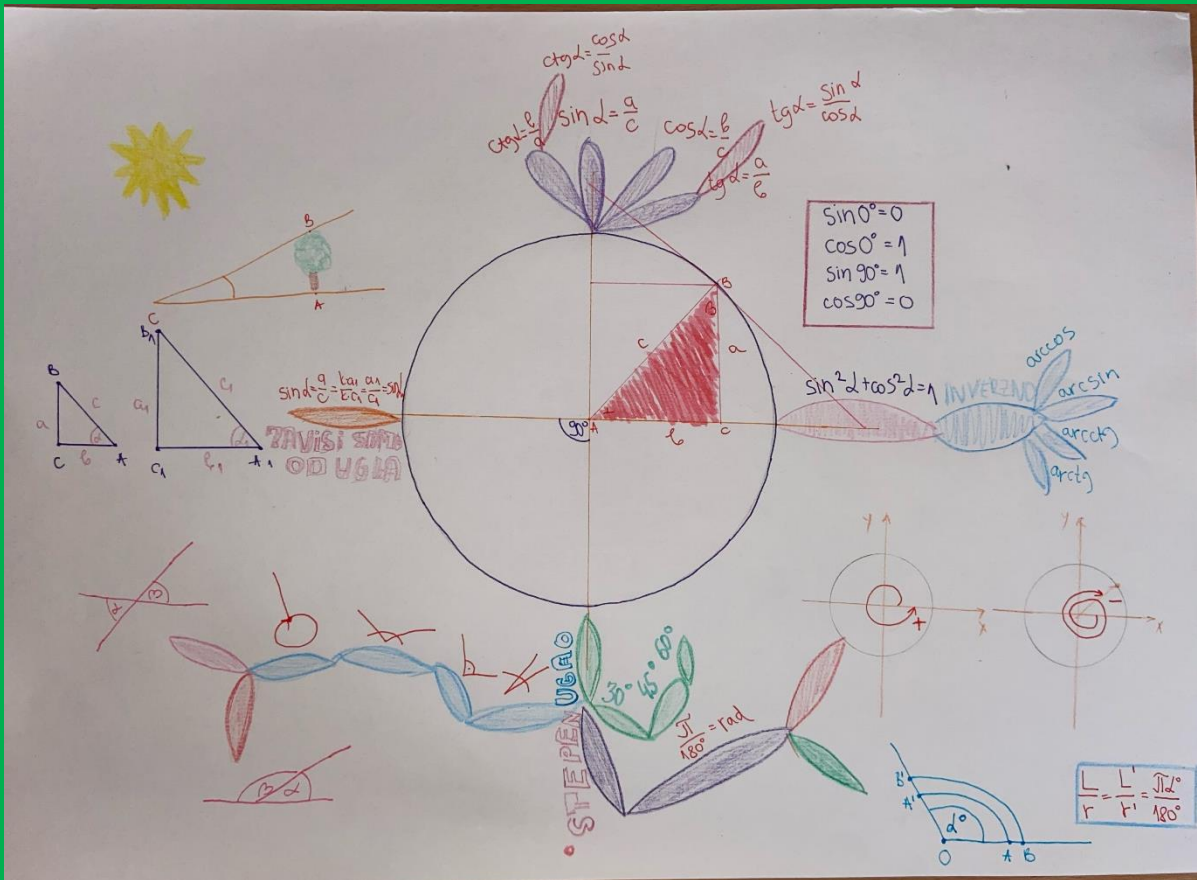


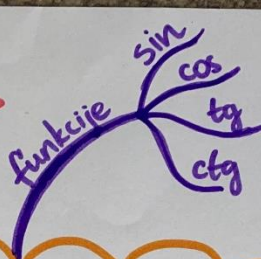
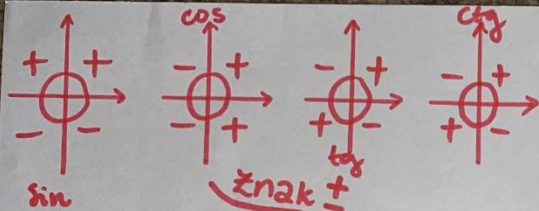


Matija Galić II-I









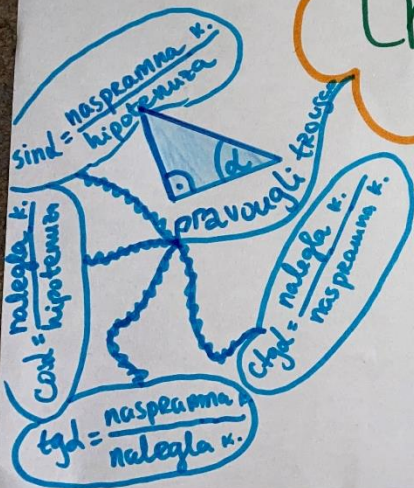
mjerenje ugla

$1 \text{ rad} = \frac{180^\circ}{\pi}$

$1^\circ = \frac{\pi}{180} \text{ rad}$

α°	30°	45°	60°	90°
$\sqrt{\alpha} \text{ rad}$	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$

trigonometrija



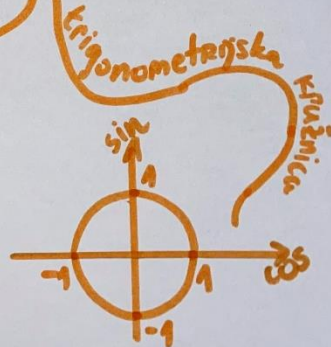
trigonom. identitete

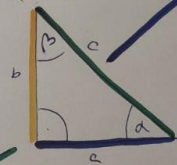
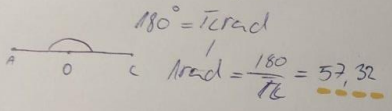
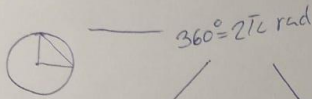
① $\sin^2 d + \cos^2 d = 1$

$\text{tg} d = \frac{\sin d}{\cos d}$

$\text{ctg} d = \frac{\cos d}{\sin d}$

$\text{tg} d \cdot \text{ctg} d = 1$

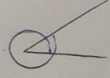




Trigonometrija

Definicije:

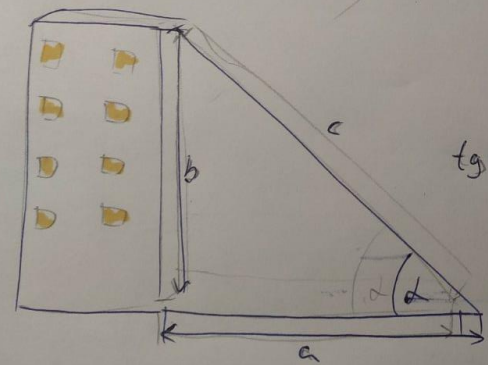
- $\sin \alpha$: naspramna kateta / hipotenuza
- $\cos \alpha$: nalegla kateta / hipotenuza
- $\text{tg} \alpha$: naspramna kateta / nalegla kateta
- $\text{ctg} \alpha$: nalegla kateta / naspramna kateta



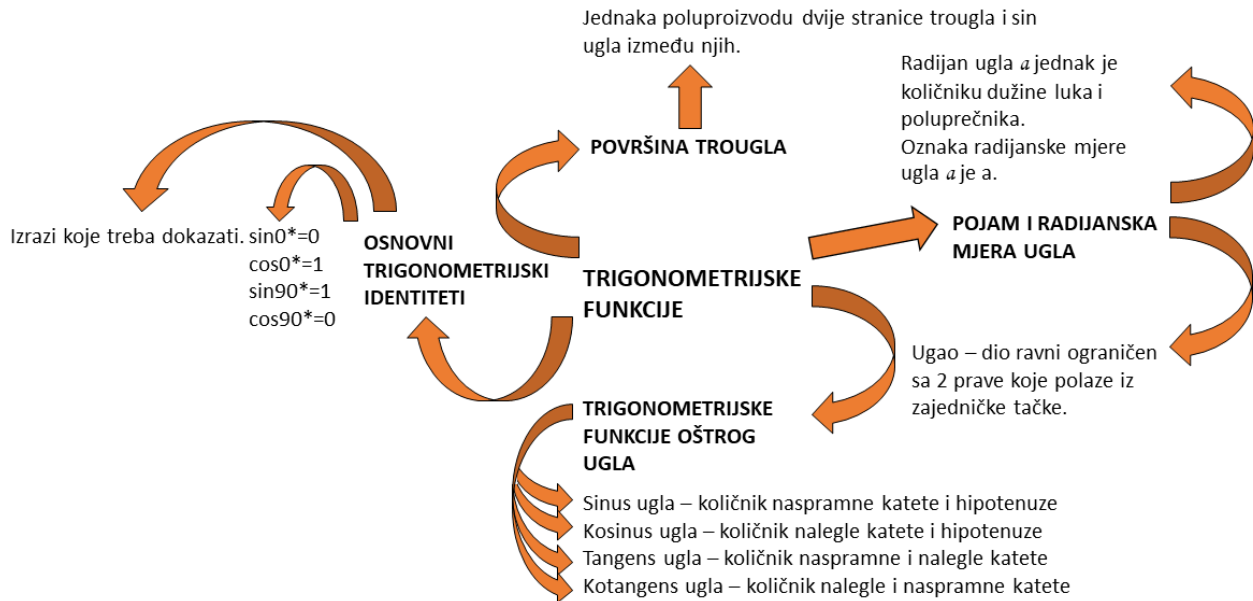
- $\alpha = 30^\circ$ $\sin 30^\circ = \frac{1}{2}$
- $\alpha = 45^\circ$ $\sin 45^\circ = \frac{\sqrt{2}}{2}$
- $\alpha = 60^\circ$ $\sin 60^\circ = \frac{\sqrt{3}}{2}$

$\sin^2 \alpha + \cos^2 \alpha = 1$
 $\text{tg} \alpha = \frac{\sin \alpha}{\cos \alpha}$
 $\text{ctg} \alpha = \frac{\cos \alpha}{\sin \alpha}$
 $\text{tg} \alpha \cdot \text{ctg} \alpha = 1$

$\text{tg} \alpha = \frac{b}{a}$ * Ugao je poznat*
 $b = \text{tg} \alpha \cdot a$



Primjena



$$180^\circ = \pi$$

$$\frac{\pi}{r}$$

УГАО

-d

+d

$$tg = \frac{\sin}{\cos}$$

$$ctg = \frac{\cos}{\sin}$$

$$\sin^2 + \cos^2 = 1 = tg \cdot ctg$$

ИДЕНТИТЕТИ

TG НАСТРАМНА
НАМЕТЛА

НАЛЕГЛА
НАСТРАМНА CTG

COS НАЛЕГЛА
ХИПOTЕНУЗА

НАСТРАМНА
ХИПOTЕНУЗА SIN

f(x)

ОБАКО

Ilija Bošković II-I

КАКО?

КЕДНСОБА ПИРАМИДА
Cтyаm, yгa

TRIGONOMETRIJA

RAZLIČNA MIERA
stepen & radijan $\pi = 180^\circ$

$1 = \frac{180}{\pi}$
 $1 = \frac{\pi}{180}$

Trigonometrijske f-ije
sind
cos d
tg d
ctg d

OSNOVNI TRIGONOMETRIJSKI IDENTITETI
 $\sin^2 \alpha + \cos^2 \alpha = 1$
 $\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$
 $\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$
 $\tan \alpha \cdot \cot \alpha = 1$

$\sin 0^\circ = 0$
$\cos 0^\circ = 1$
$\sin 90^\circ = 1$
$\cos 90^\circ = 0$
$\sin 180^\circ = 0$
$\cos 180^\circ = -1$



POVRŠINA

ostri & tupo

KARAKTERISTIČNI

	30°	45°	60°	90°
sind	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos d	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tg d	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	-
ctg d	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	-

sind = $\frac{\text{naspramna k.}}{\text{hipotenuza}}$
cos d = $\frac{\text{kateta k.}}{\text{hipotenuza}}$
tg d = $\frac{\text{naspramna k.}}{\text{kateta k.}}$
ctg d = $\frac{\text{kateta k.}}{\text{naspramna k.}}$

$\sin d = \sin(180^\circ - d)$
 $\cos d = -\cos(180^\circ - d)$
 $\tan d = \frac{\sin d}{\cos d}$
 $\cot d = \frac{\cos d}{\sin d}$

KARAKTERISTIČNI

	15°	30°	45°	60°	75°
sind	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{3}{4}$
cos d	$\frac{\sqrt{3}}{4}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$\frac{1}{4}$
tg d	$\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$\sqrt{3}$
ctg d	$\sqrt{3}$	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$

$d + \alpha = 90^\circ$
sind = cosa
cos d = sind
tg d = ctg alpha
ctg d = tg alpha

0 < sind < 1
0 < cos d < 1
 $\sin(90^\circ - d) = \cos d$
 $\cos(90^\circ - d) = \sin d$
 $\tan(90^\circ - d) = \cot d$
 $\cot(90^\circ - d) = \tan d$

$P_{\Delta} = \frac{b \cdot c \cdot \sin d}{2}$

$\frac{\text{stranica} \cdot \text{stranica} \cdot \sin \text{ izmedu njih}}{2}$

Arijana Lika 2H