

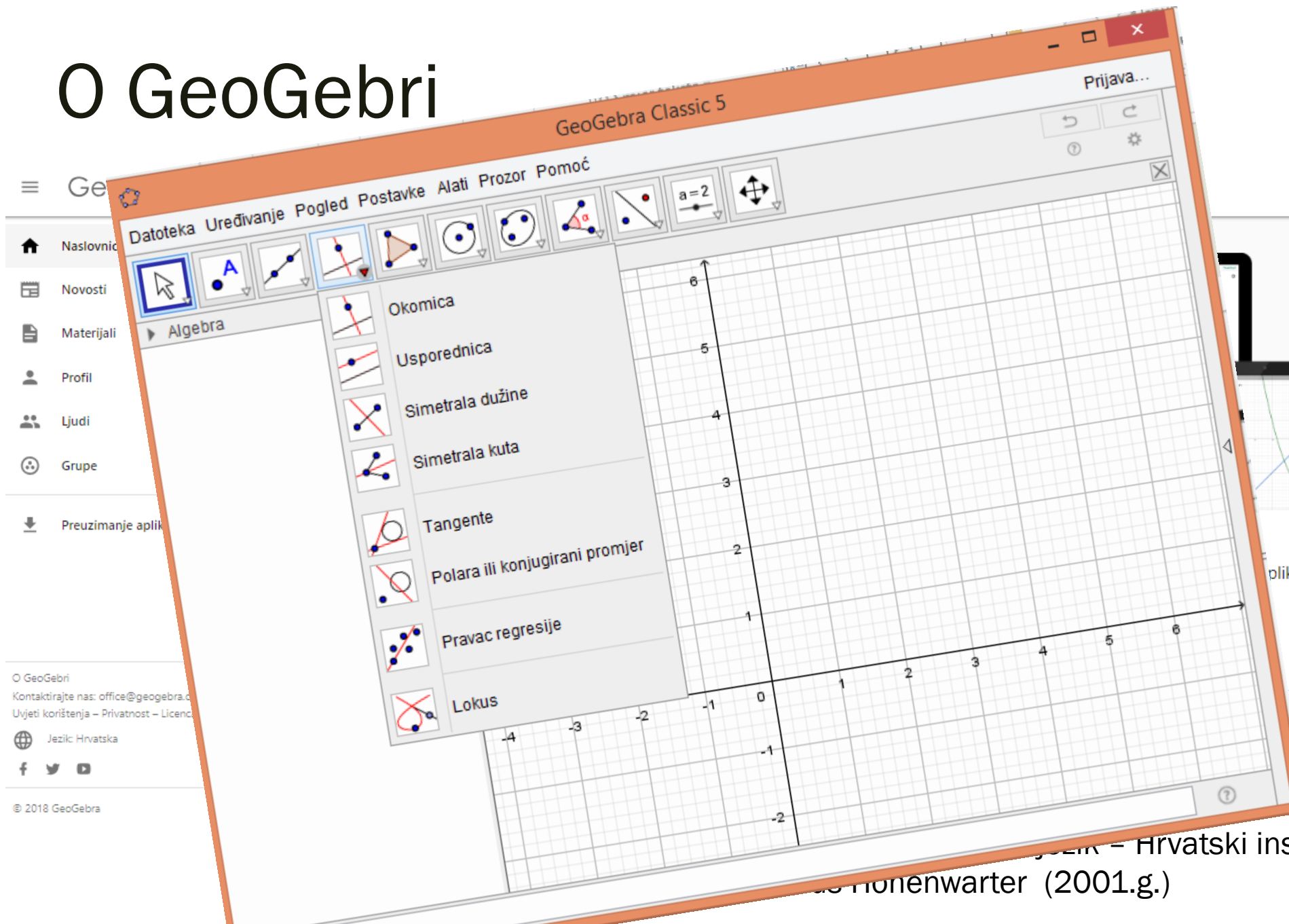
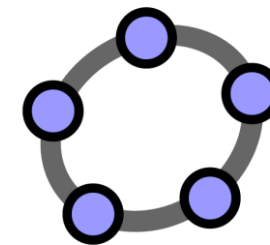


GeoGebra

U NASTAVI SREDNJE ŠKOLE

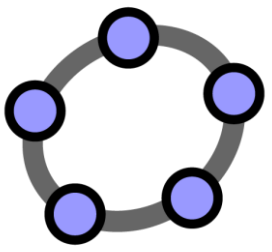
Marina Njerš, prof. savjetnica
Gimnazija „Fran Galović” Koprivnica

O GeoGebri



O GeoGebri
Kontaktirajte nas: office@geogebra.org
Uvjeti korištenja – Privatnost – Licenciranje
Jezik: Hrvatska
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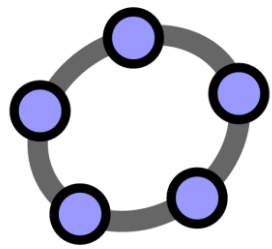


O predavanju

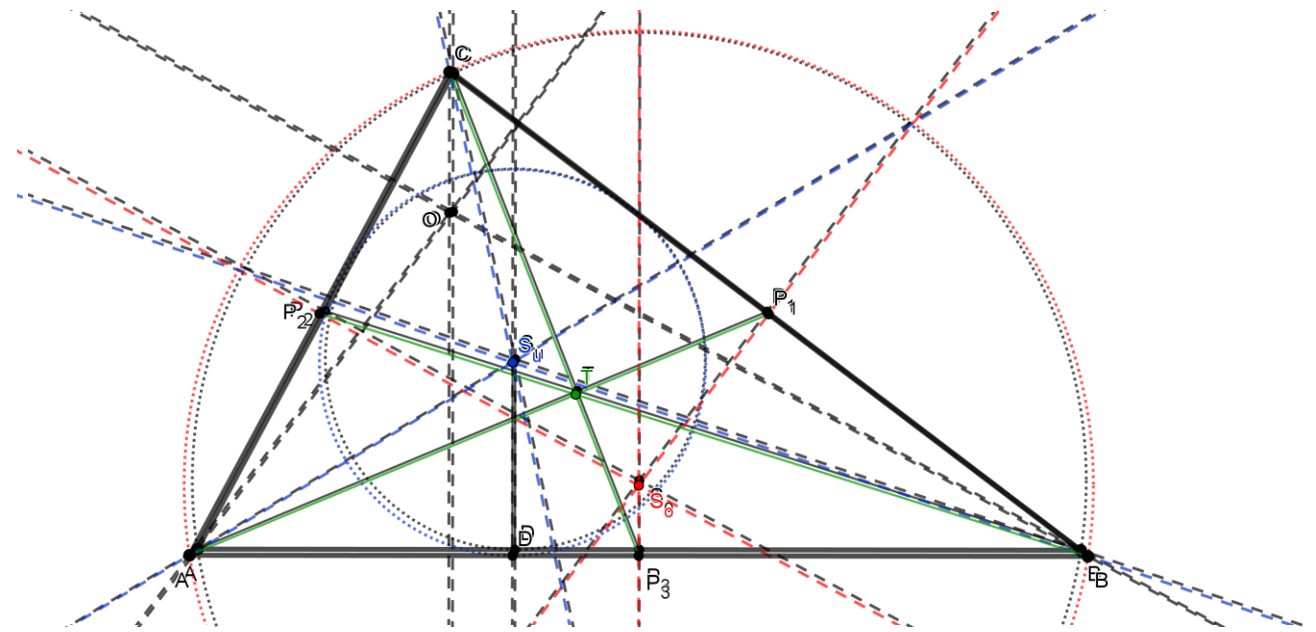
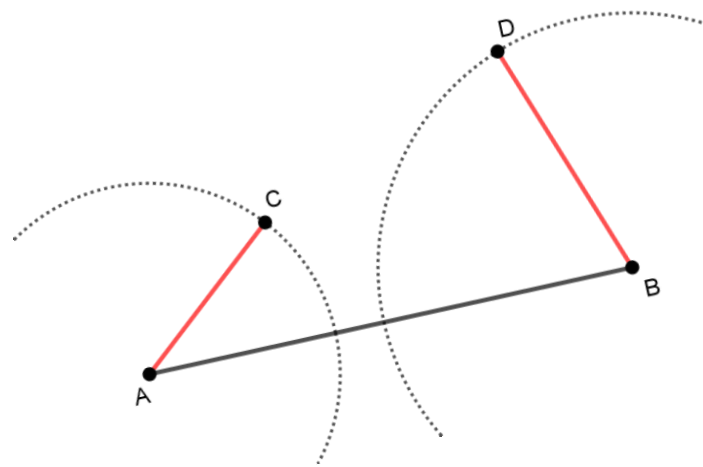
Gdje, kada i kako koristiti GeoGebru?

Treba li znati programirati?

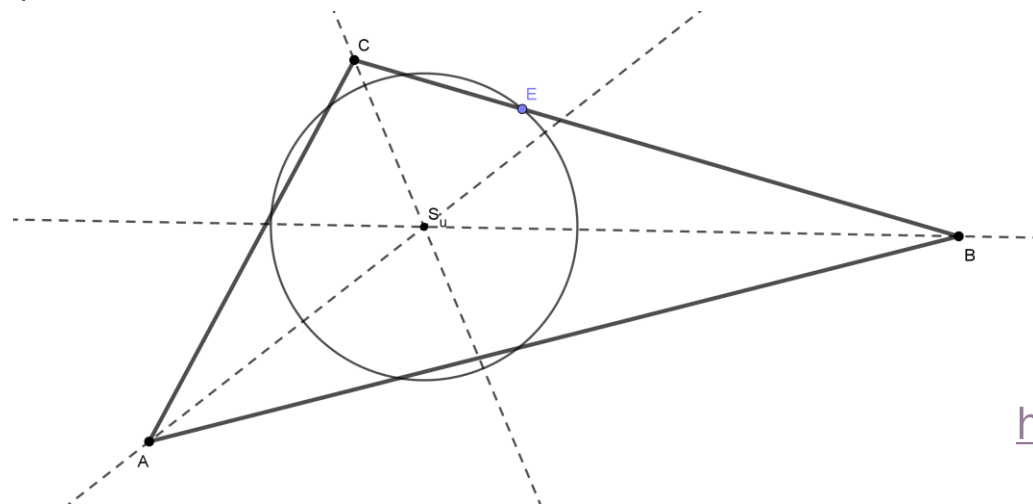
Krenimo s primjerima...



1. razred

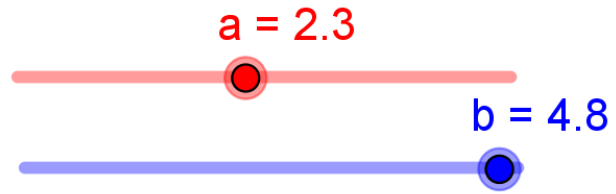


<https://ggbm.at/nNCDRYA8>

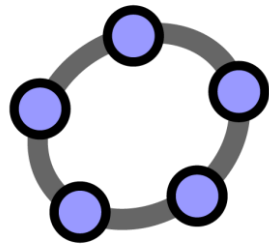


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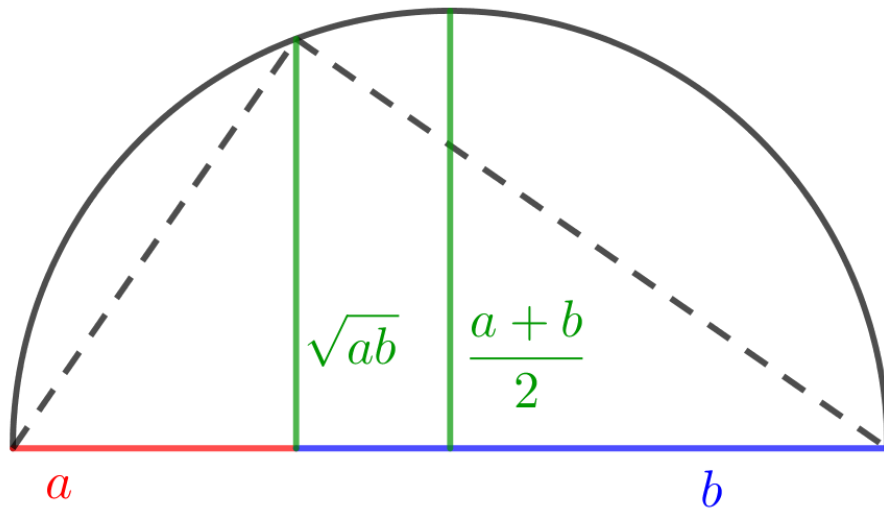
1. razred



AG nejednakost



<https://www.geogebra.org/m/zcabjrgz>



Aritmetička sredina brojeva a i b

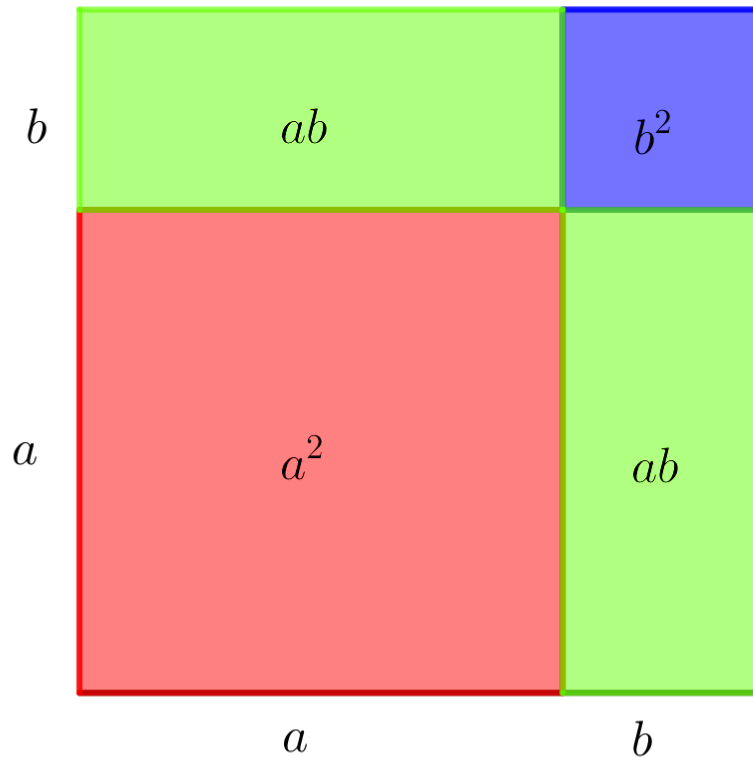
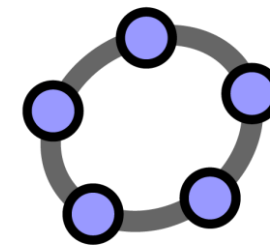
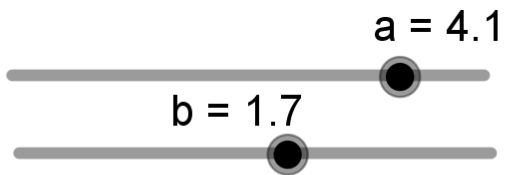
Geometrijska sredina brojeva a i b

$$\sqrt{ab} \leq \frac{a+b}{2}$$

$$\sqrt{2.3 \cdot 4.8} \leq \frac{2.3 + 4.8}{2}$$

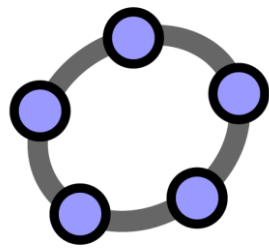
$$3.32 \leq 3.55$$

1. razred



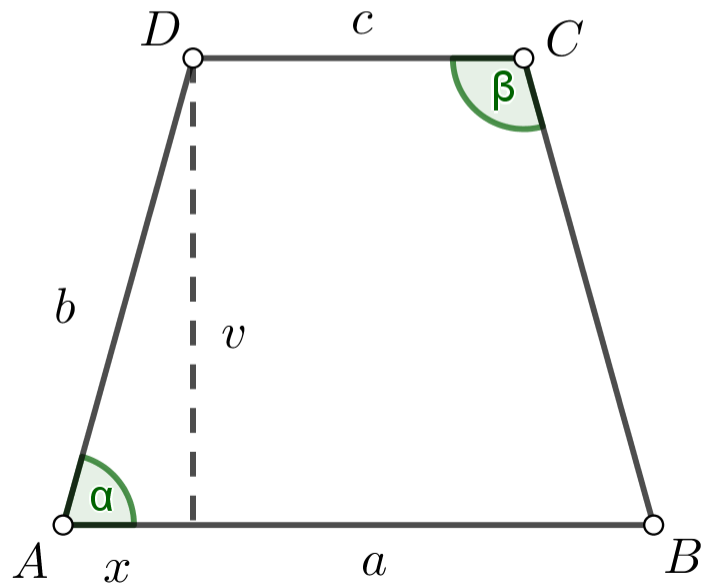
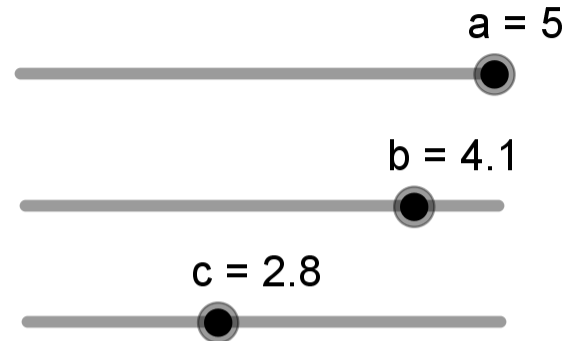
<https://www.geogebra.org/m/bapdxgfr>

$$(a + b)^2 = a^2 + 2ab + b^2$$



2. razred

Osnovice jednakokravnog trapeza jednake su 5 cm i 2.8 cm, a duljina kraka je 4.1 cm.
Koliki su kutovi trapeza?



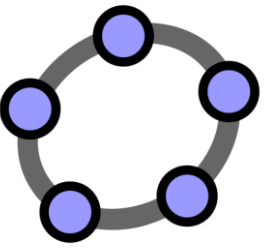
$$x = \frac{a - c}{2} = \frac{5 - 2.8}{2} = 1.1$$

$$\cos \alpha = \frac{x}{b} = \frac{1.1}{4.1} = 0.27$$

<https://www.geogebra.org/m/arvj5fpb>

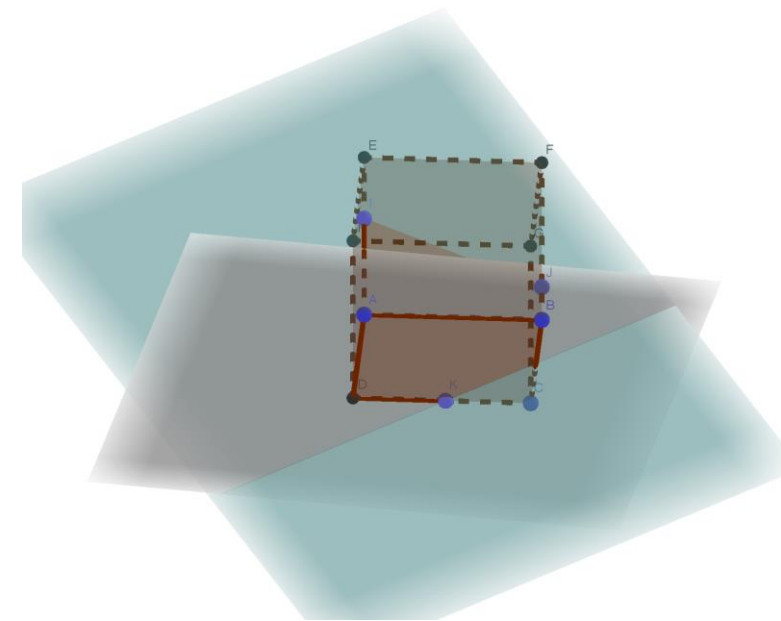
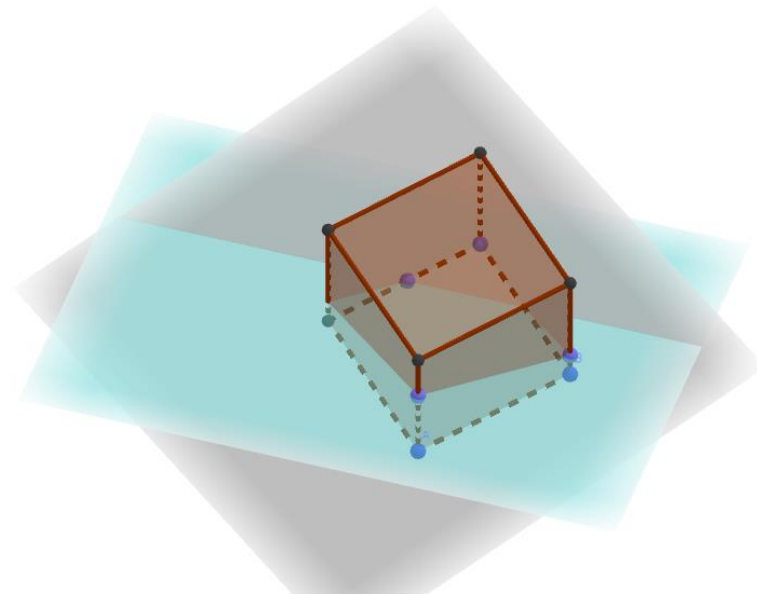
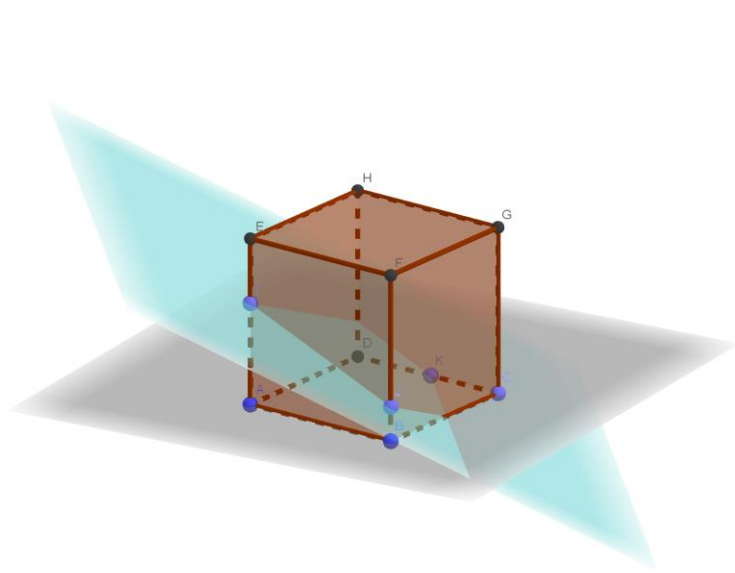
$$\alpha = 74.44^\circ$$

$$\beta = 180^\circ - \alpha = 180^\circ - 74.44^\circ = 105.56^\circ$$

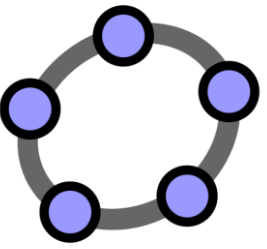


2. razred

Presjek kocke ravninom

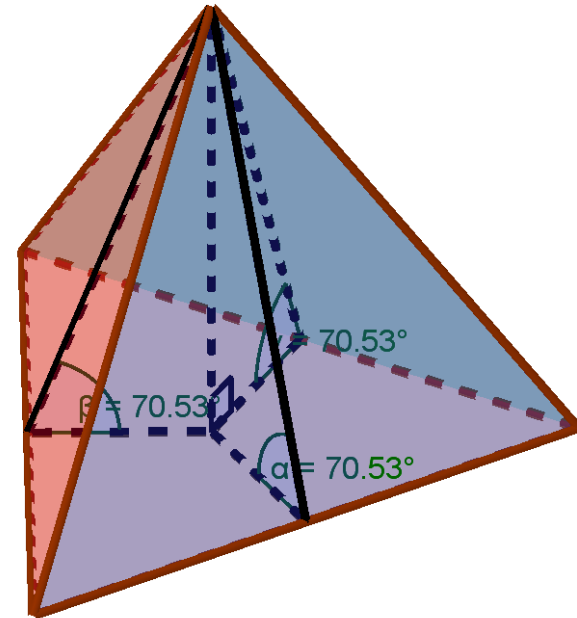
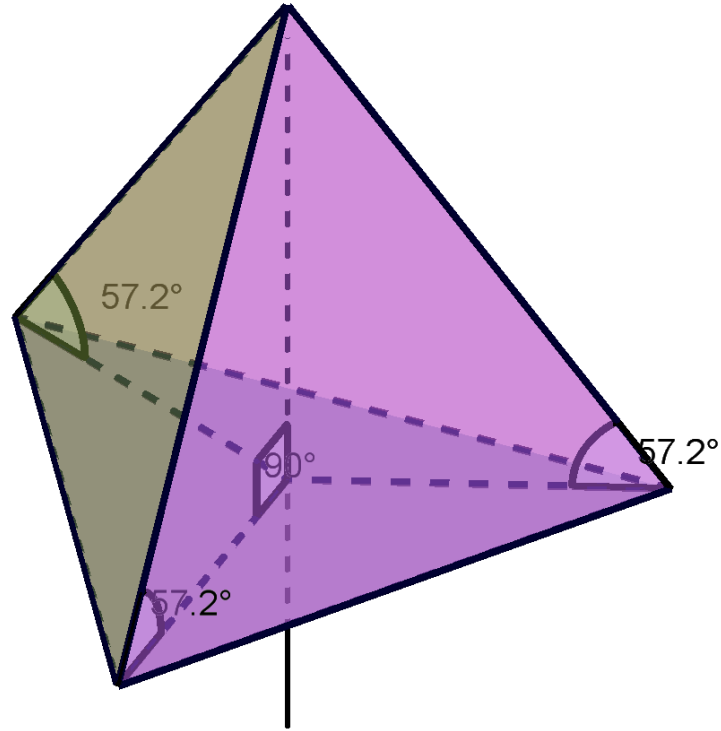


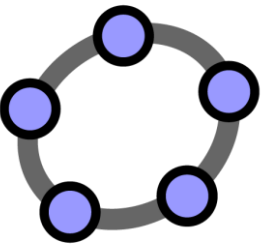
<https://ggbm.at/GknRXDYX>



2. razred

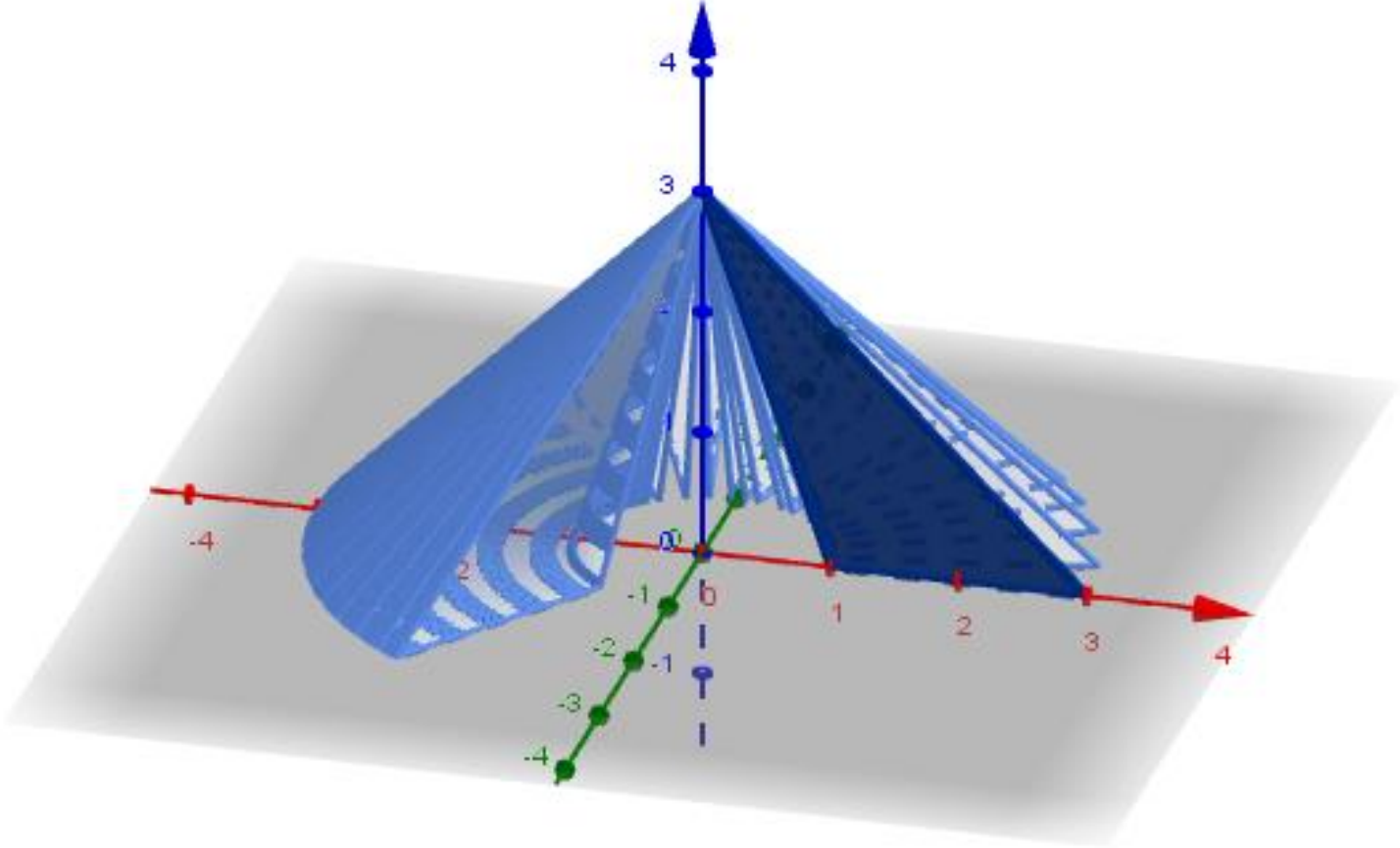
Kut između bočnog brida i osnovke; Kut između bočne strane i osnovke

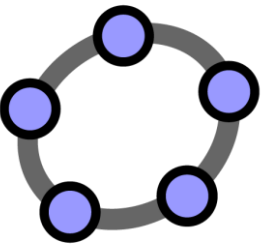




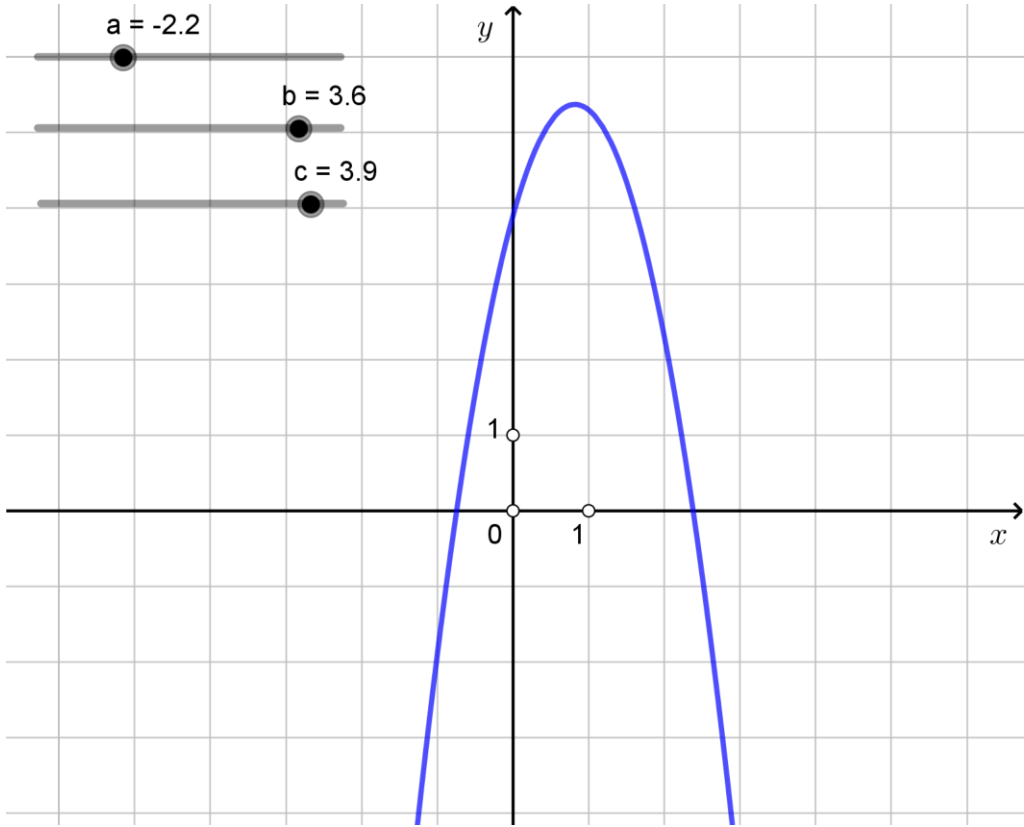
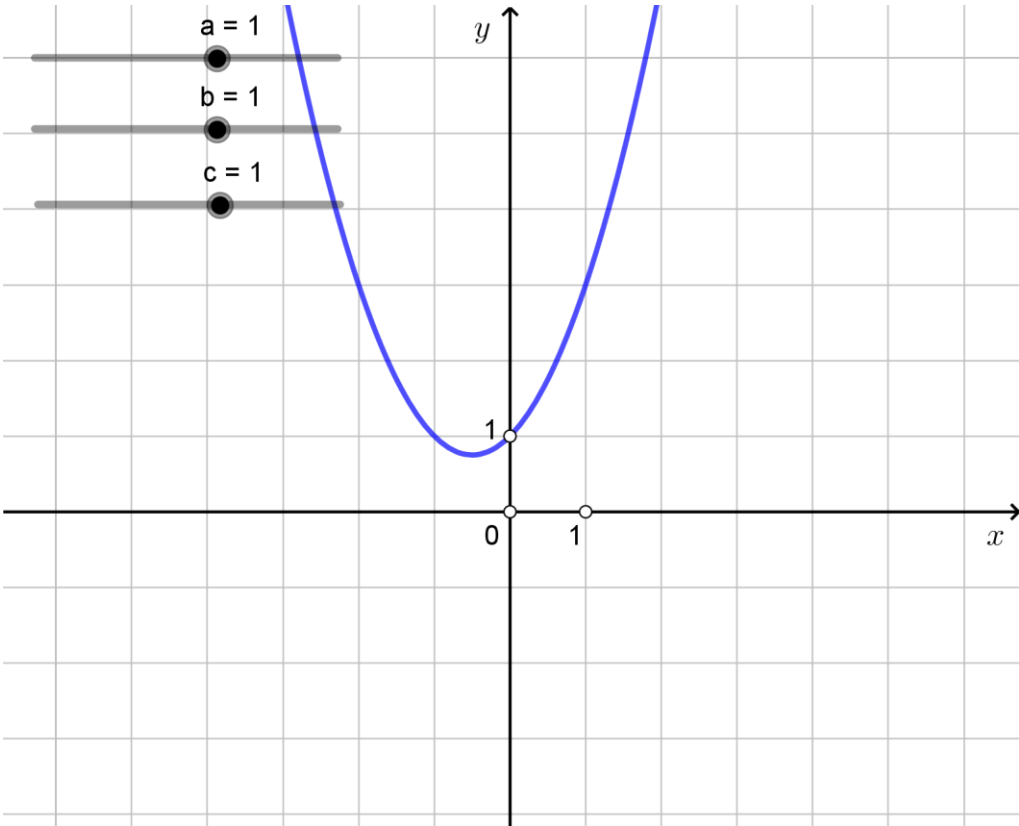
Rotacijska tijela

<https://www.geogebra.org/m/cvzmDxz8>



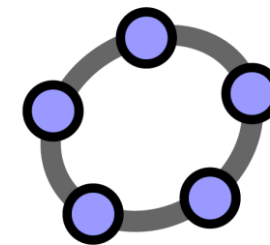
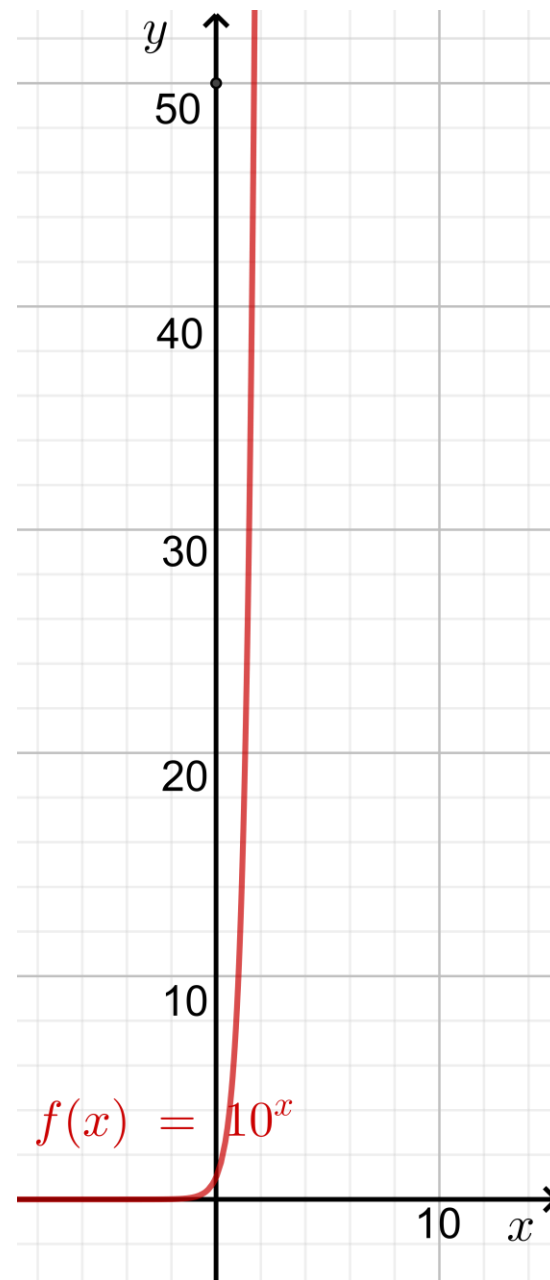
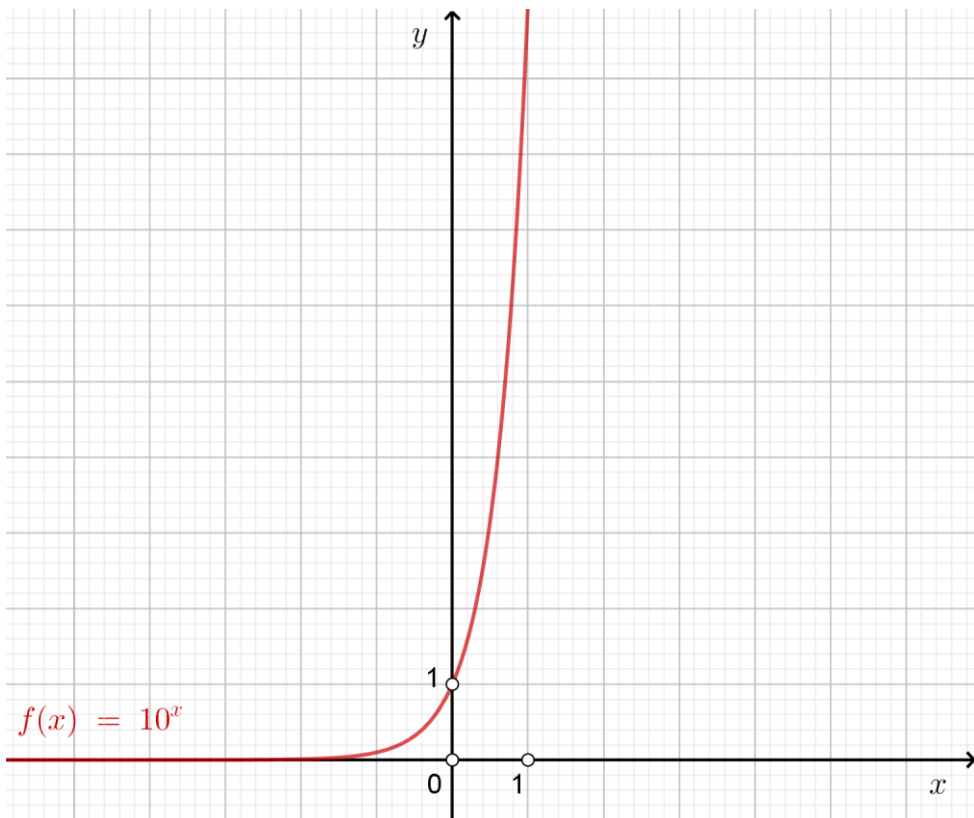


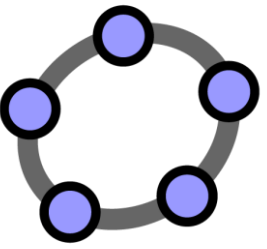
Kvadratna funkcija



<https://www.geogebra.org/m/kdBzVjdH>

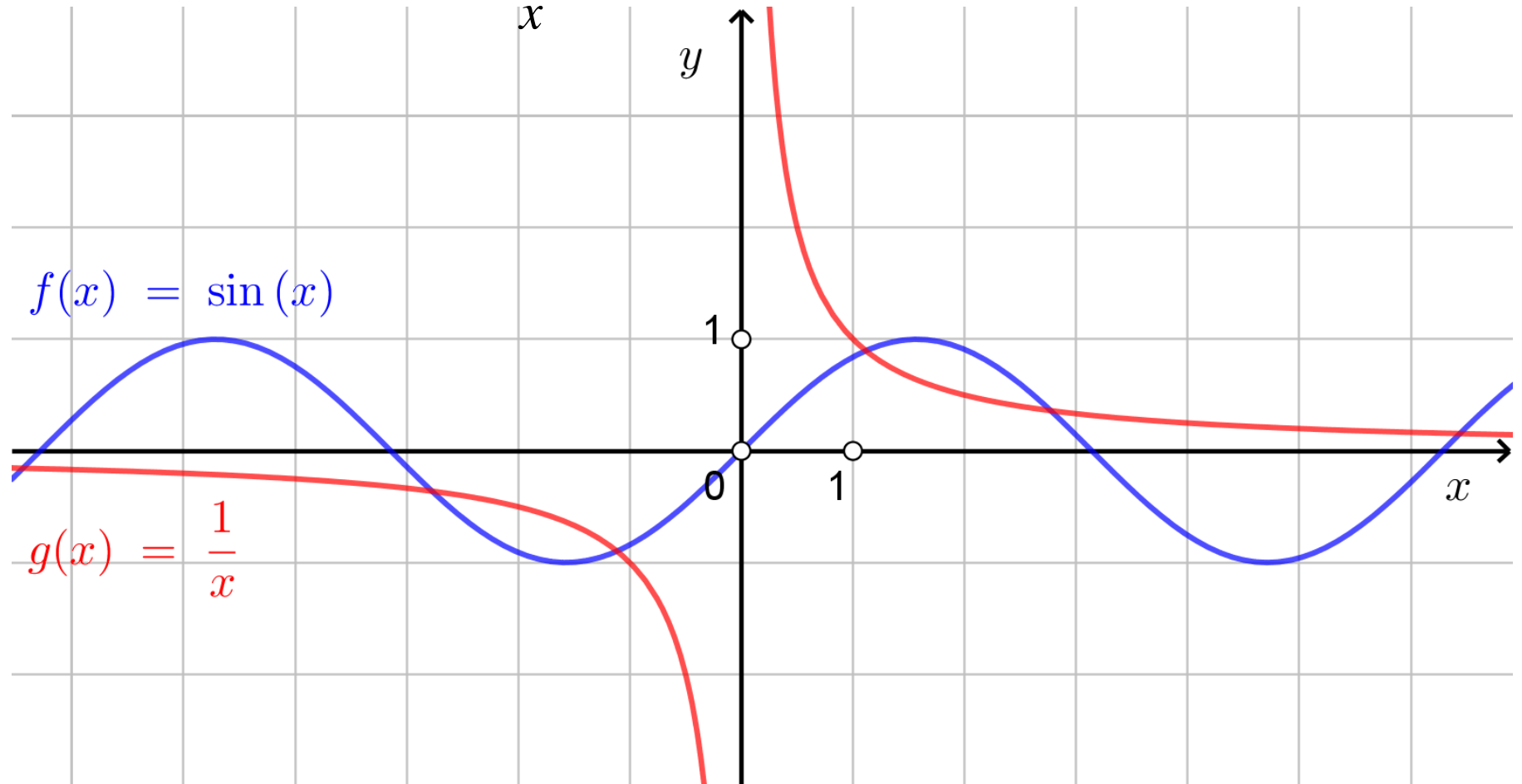
Eksponeñcijalna funkcija

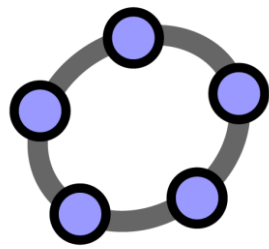




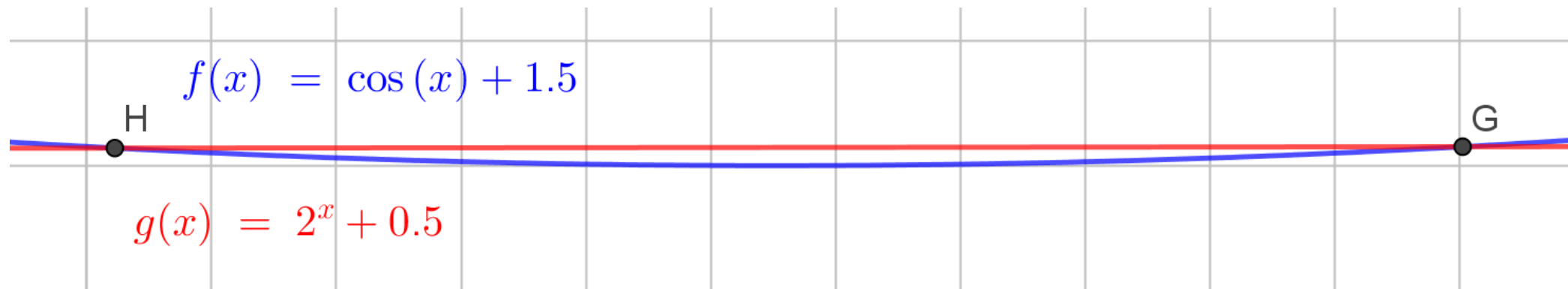
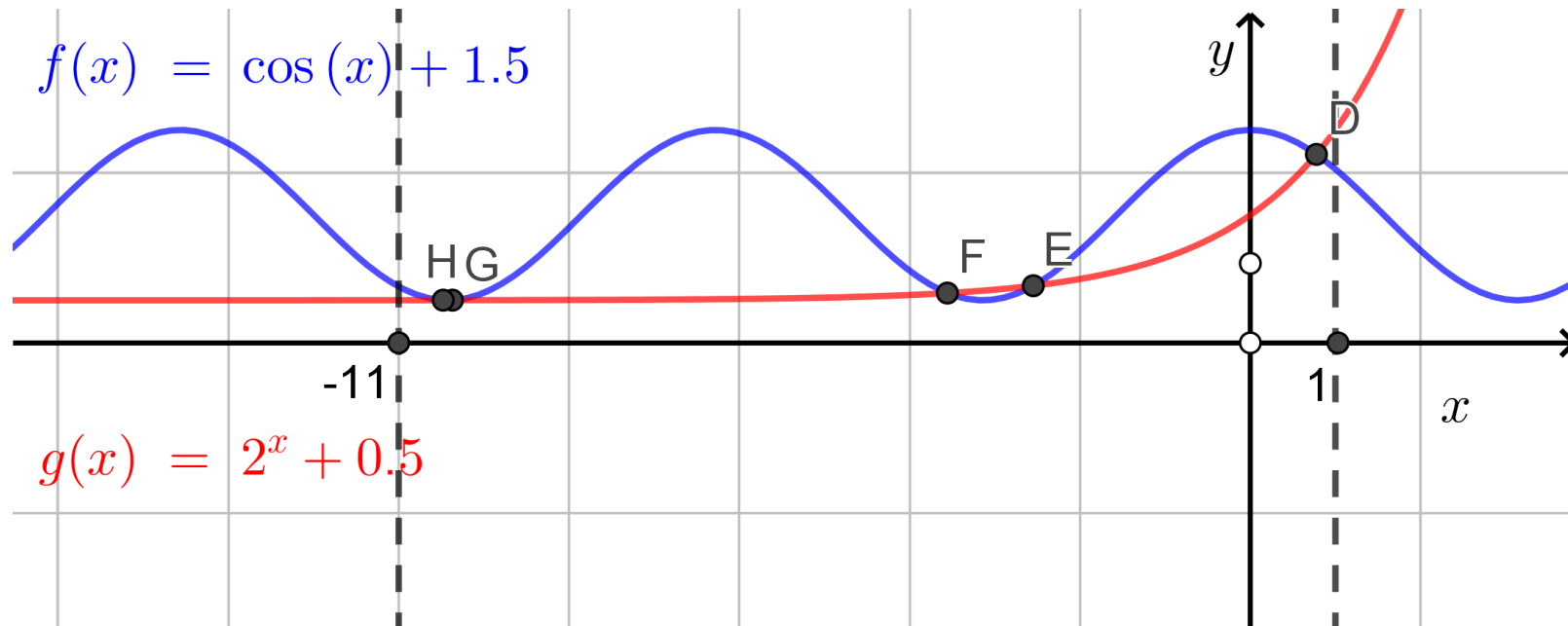
3. razred

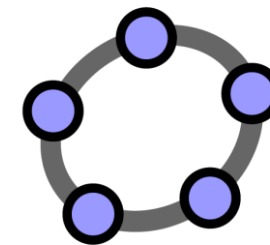
Koliko rješenja ima jednačina $\sin x = \frac{1}{x}$?



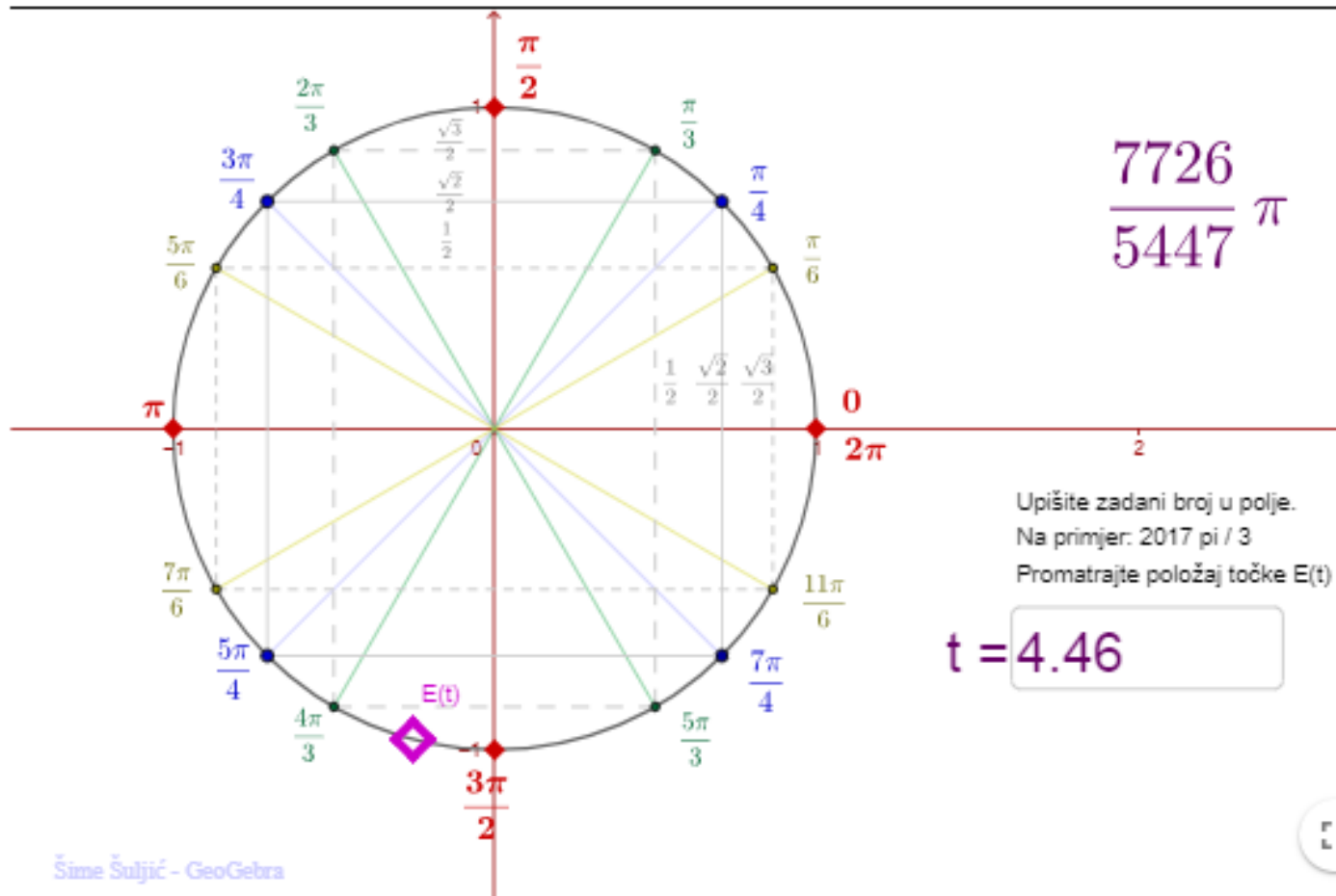


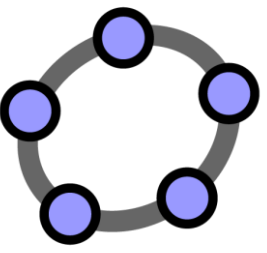
Koliko rješenja ima jednačina $\cos x + 1.5 = 0.5 + 2^x$ na intervalu $\langle -11, 1 \rangle$?



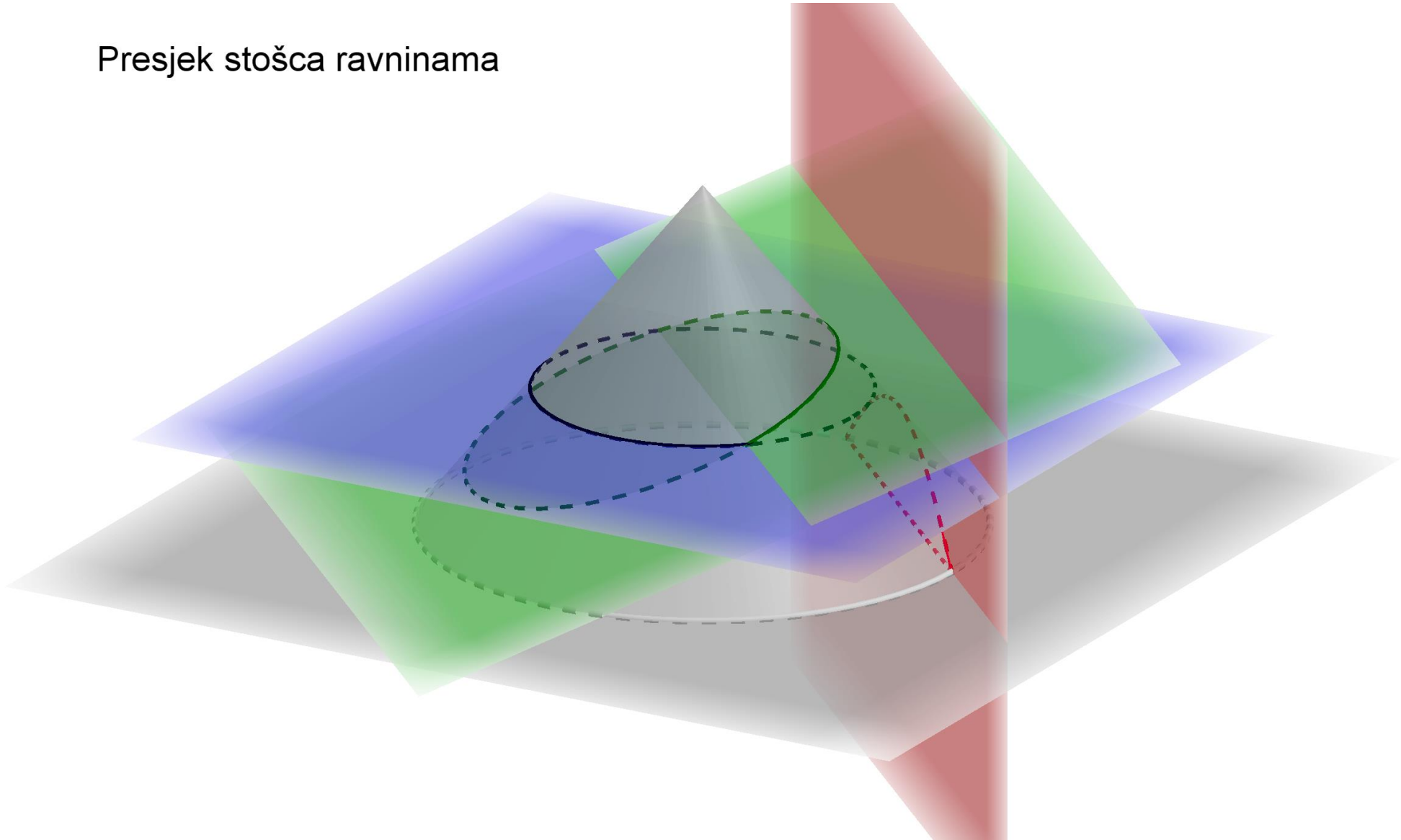


Brojeva kružnica - određivanje glavne mjere kuta

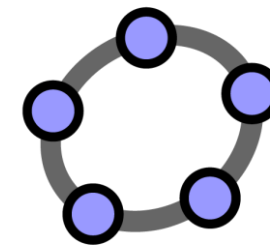




Presjek stošca ravninama



<https://www.geogebra.org/m/ehbr7tzv>



4. razred

<https://www.geogebra.org/m/tegvJrq6>

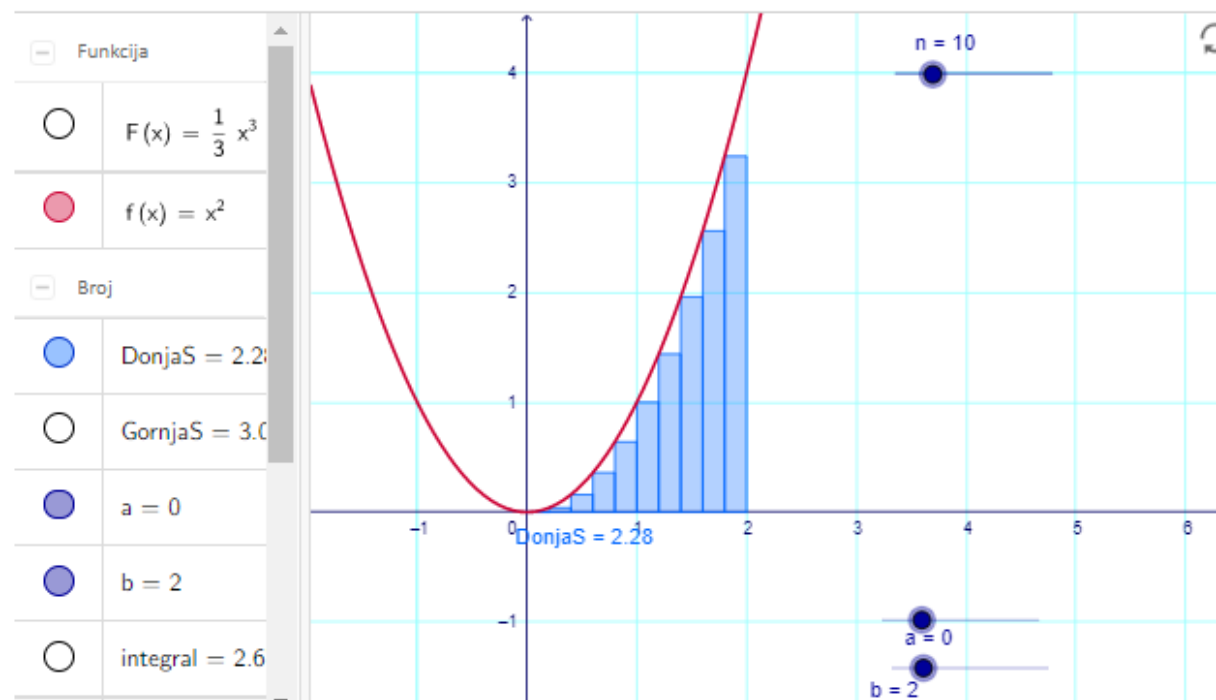
GeoGebra

Površina ispod luka parabole - integralne sume

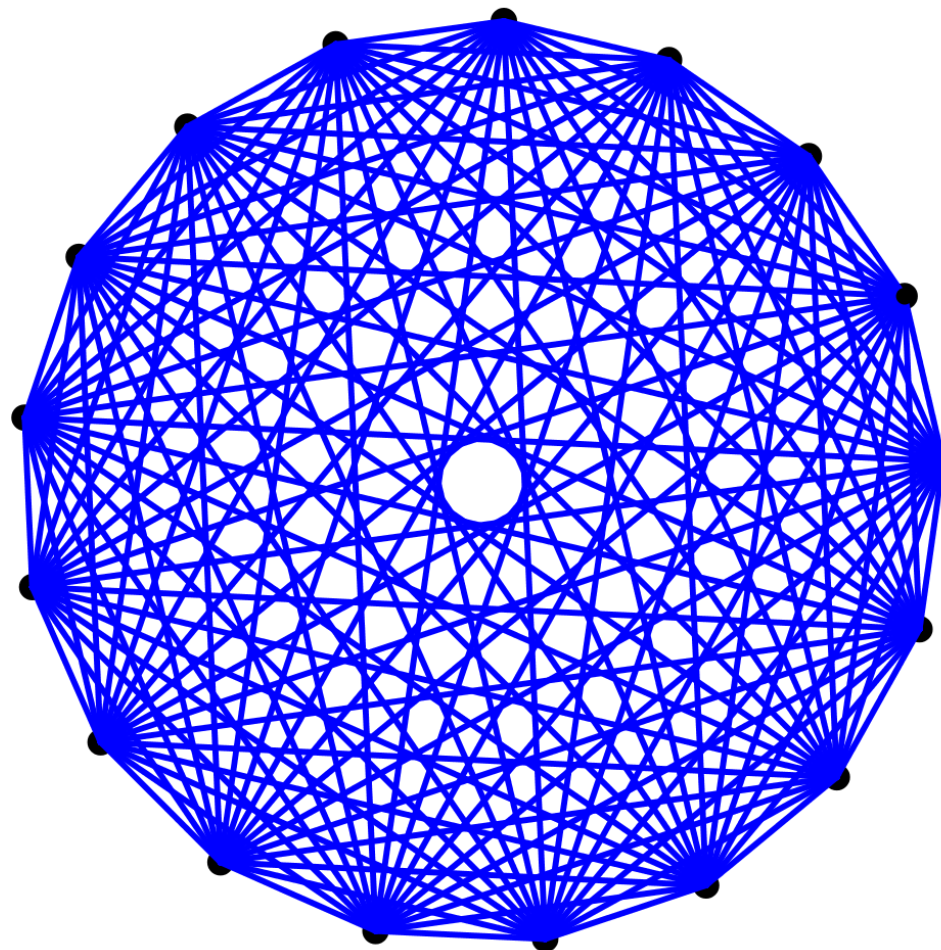
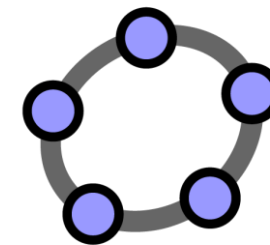
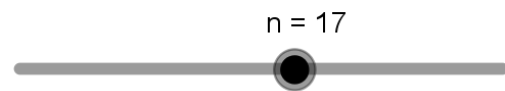
Autor: Šime Šuljić

Površina ispod luka parabole pomoću pravokutnika upisanih ispod luka i opisanih iznad luka.

Broj pravokutnika povećava se klizačem n , a granice intervala određuju se klizačima a i b . Prikaz ostalih elemenata uključuje se u lijevom prozoru.

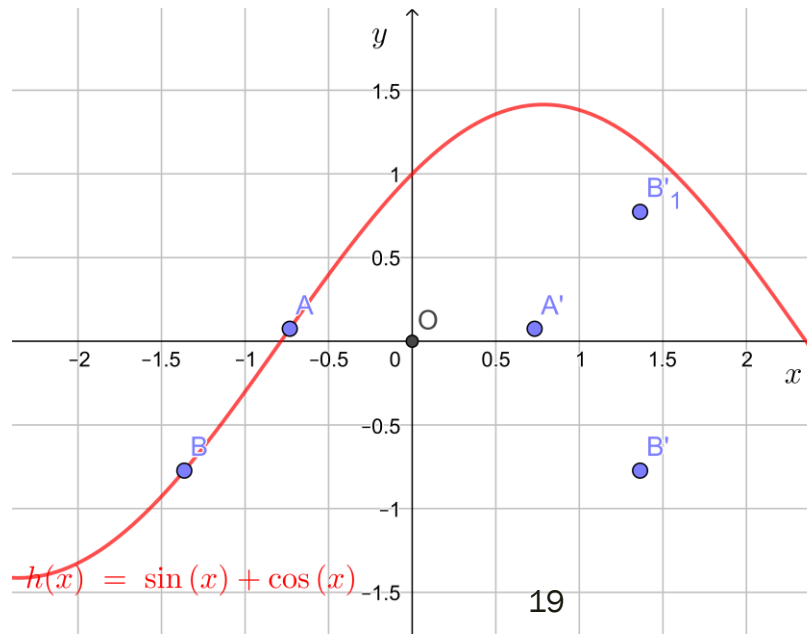
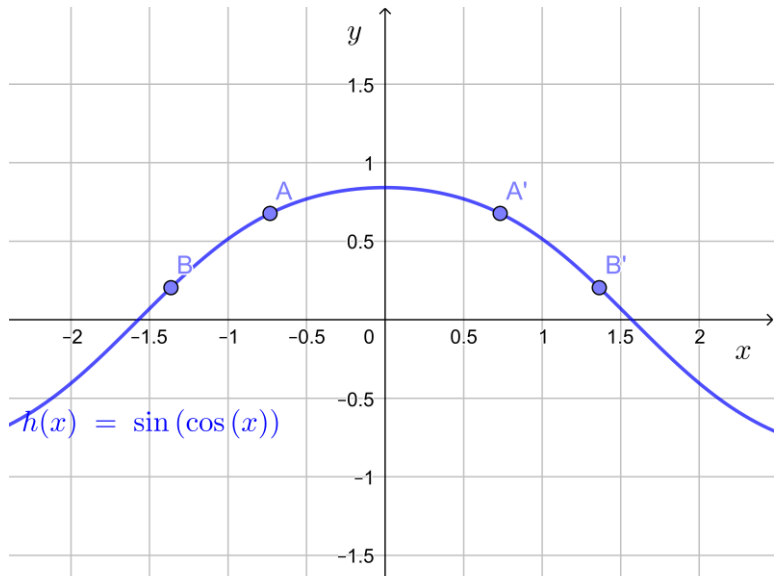
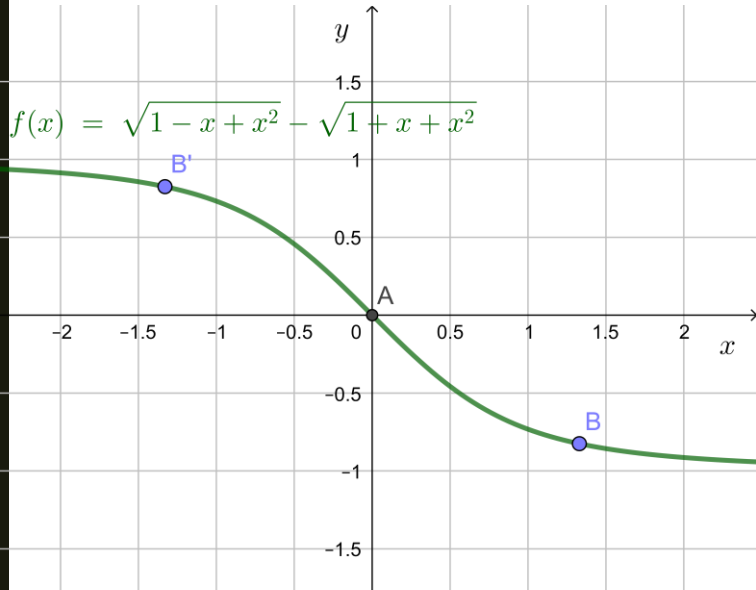
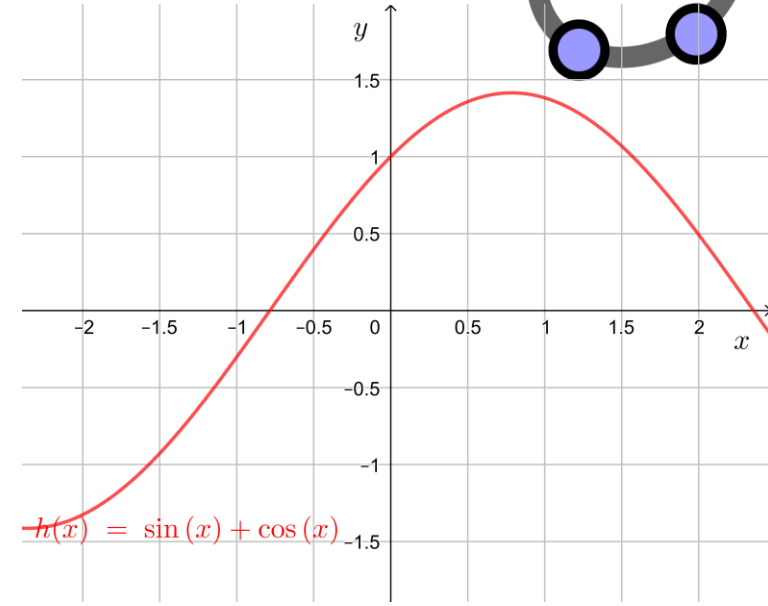
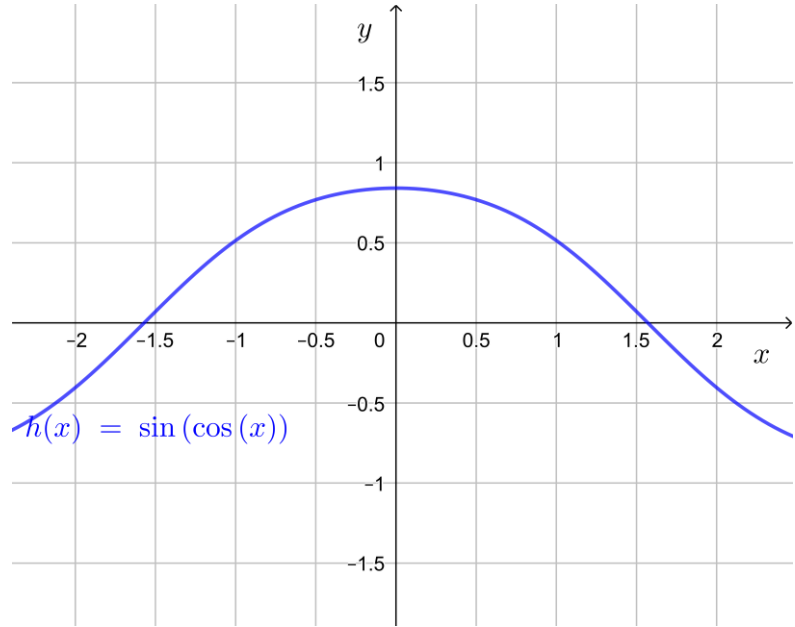
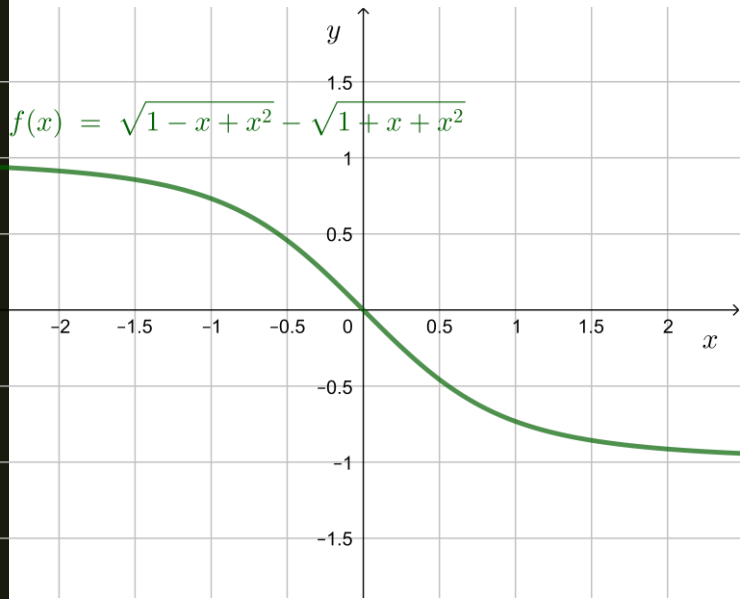
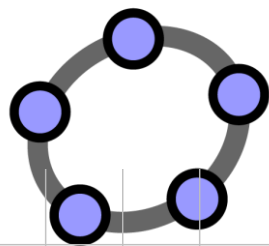


Uvodni dio sata

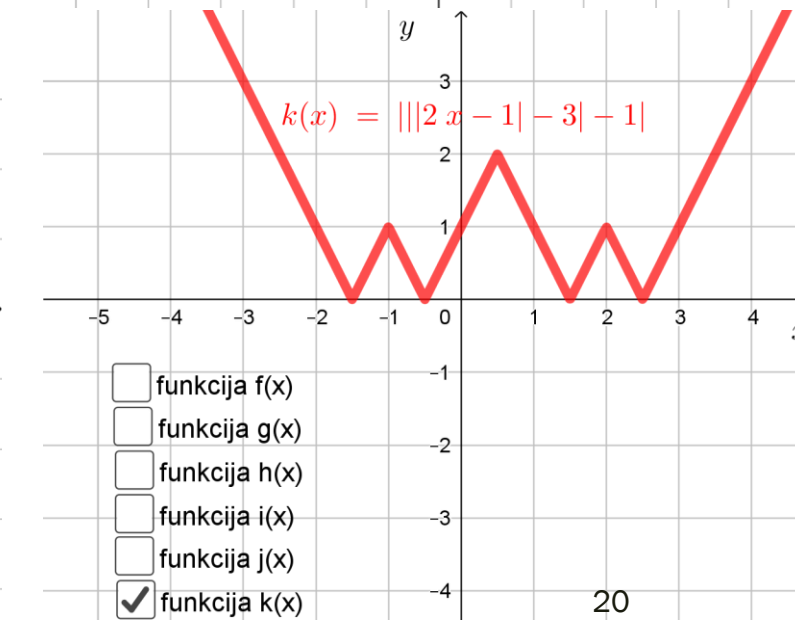
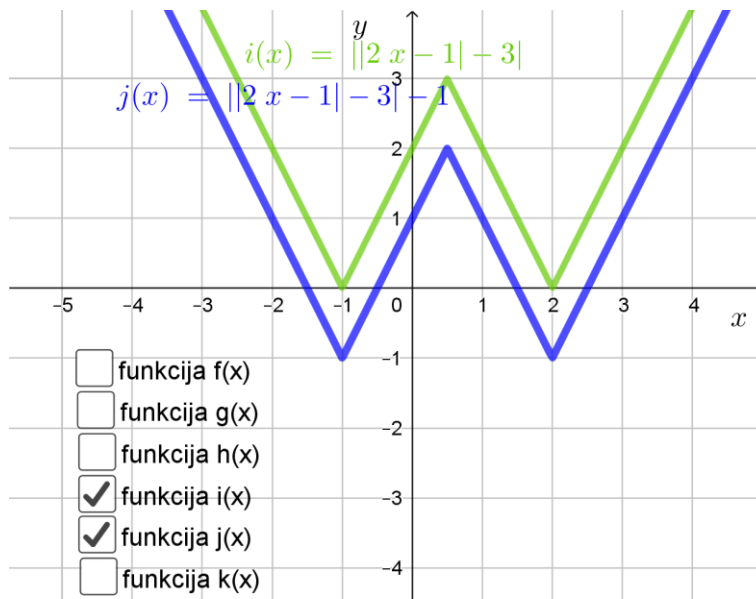
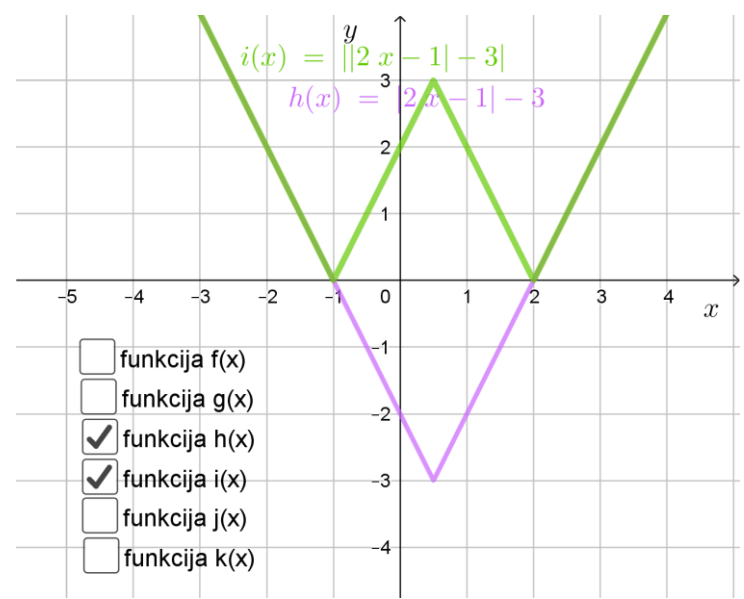
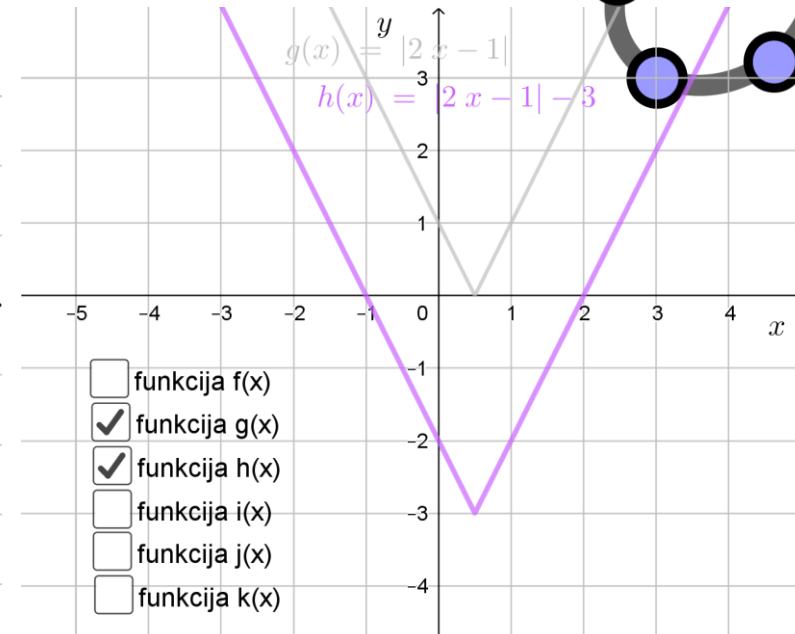
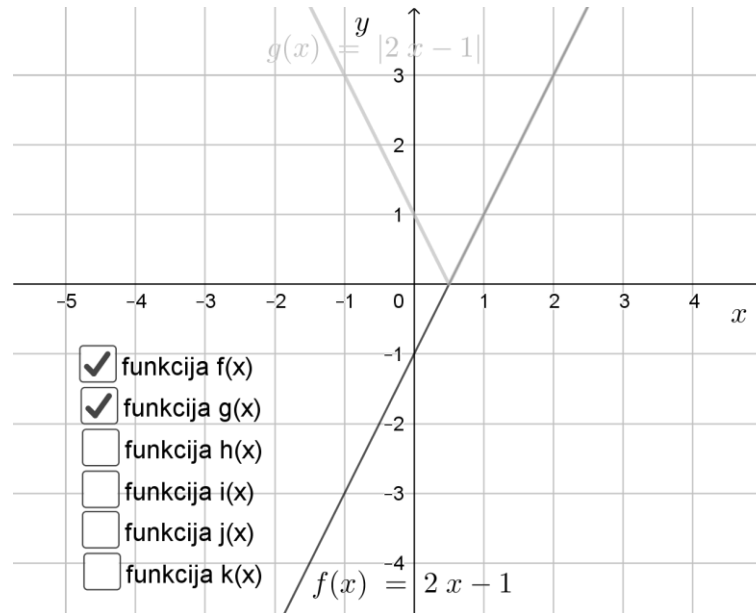
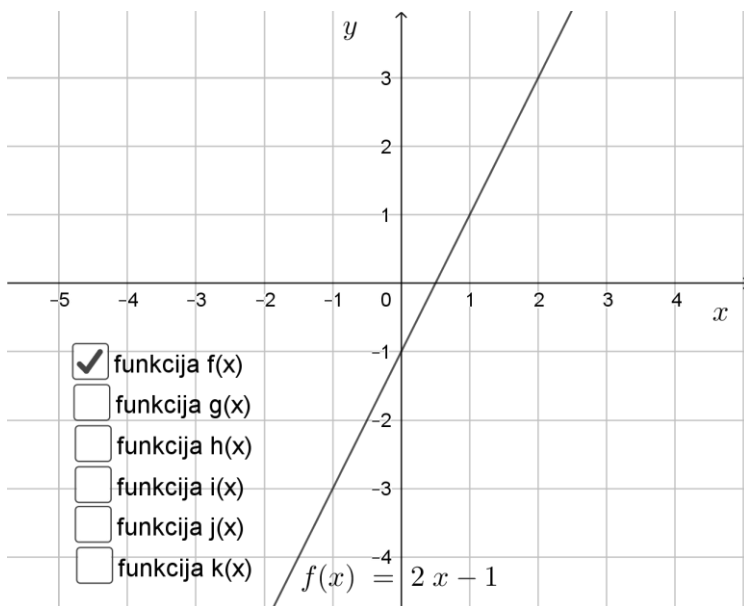
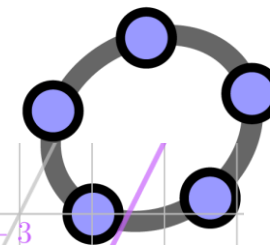


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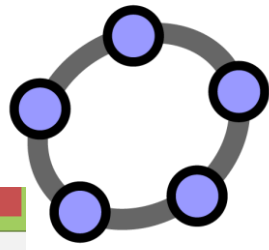
Središnji dio sata



Završni dio sata <https://www.geogebra.org/m/bBtuNahw>



Domaća zadaća



2.a 2017./18 - Tablica za ... Marina

Secure | https://www.geogebra.org/group/evaluationgrid/id/Vk4UZnJs6

Apps ★ Bookmarks Google Facebook kudfrangalovicpeter Gimnazija "Fran Galc Koprivnica.net // Gra YouTube - Broadcast Pristigla pošta (123) Other bookmarks

GeoGebra Marina Njerš

← 2.a 2017./18

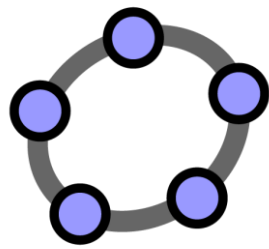
Objave Članovi Materijali **Vrednovanje**

Filteri: [Icons]

	Grafovi funk...	Graf logarit...	Graf logarit...	Graf logarit...	Graf ekspan...	Graf ekspan...	Graf ekspan...	Graf ekspan...	Zadatak 2.	Zadatak 1.
	Graf funkcije	Logaritamska ...	Logaritamska ...	Logaritamska ...	Eksponecijal...	Eksponecijal...	Eksponecijal...	Eksponecijal...	Projektni zada...	Eksponecijal...
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[Redacted]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓ ZAKAŠN...
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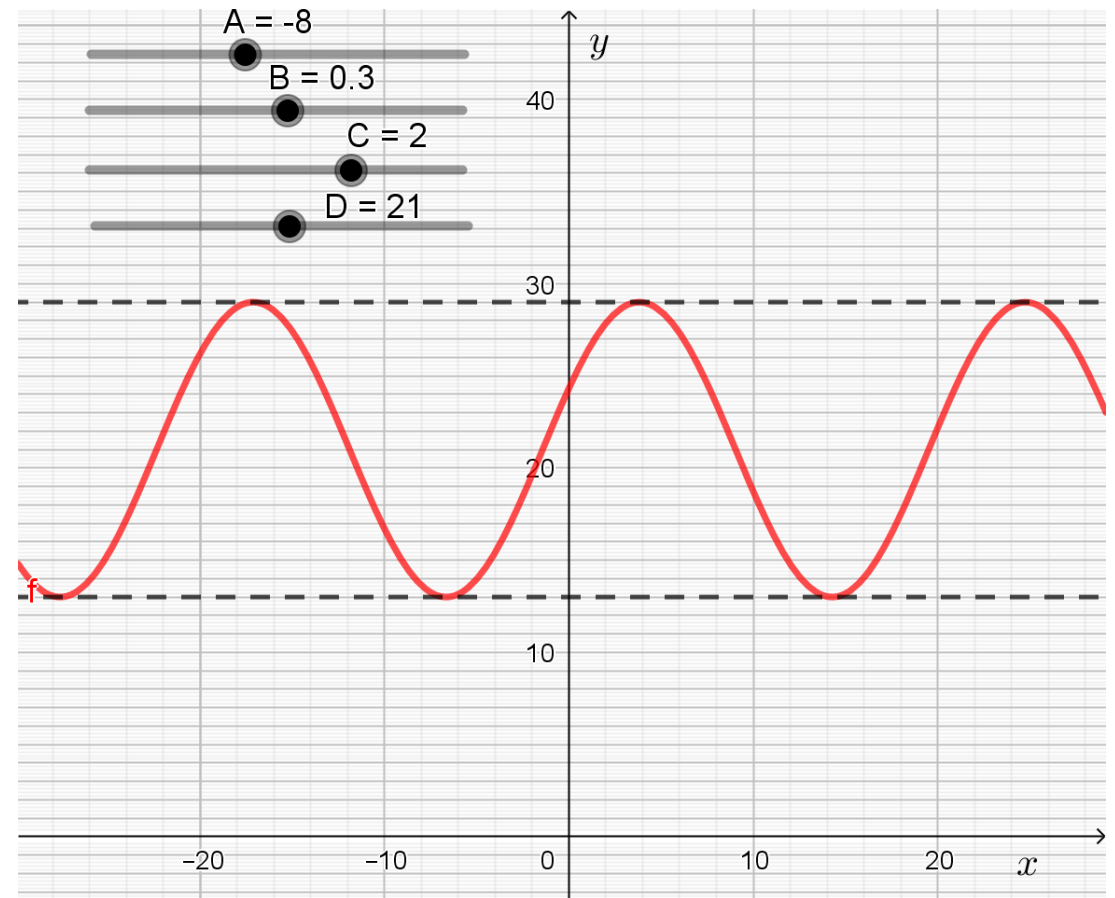
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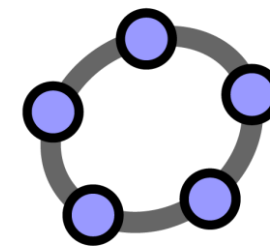
Pomoć kod učenja...






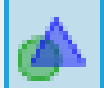




15. Temperatura $T(t)$ izražena u $^{\circ}\text{C}$ mijenja se prema formuli $T(t) = A \cos(Bt + C) + D$ gdje je t vrijeme u satima. Kolike su vrijednosti parametara A i D ako je maksimalna temperatura 29°C , minimalna 13°C i $A < 0$?

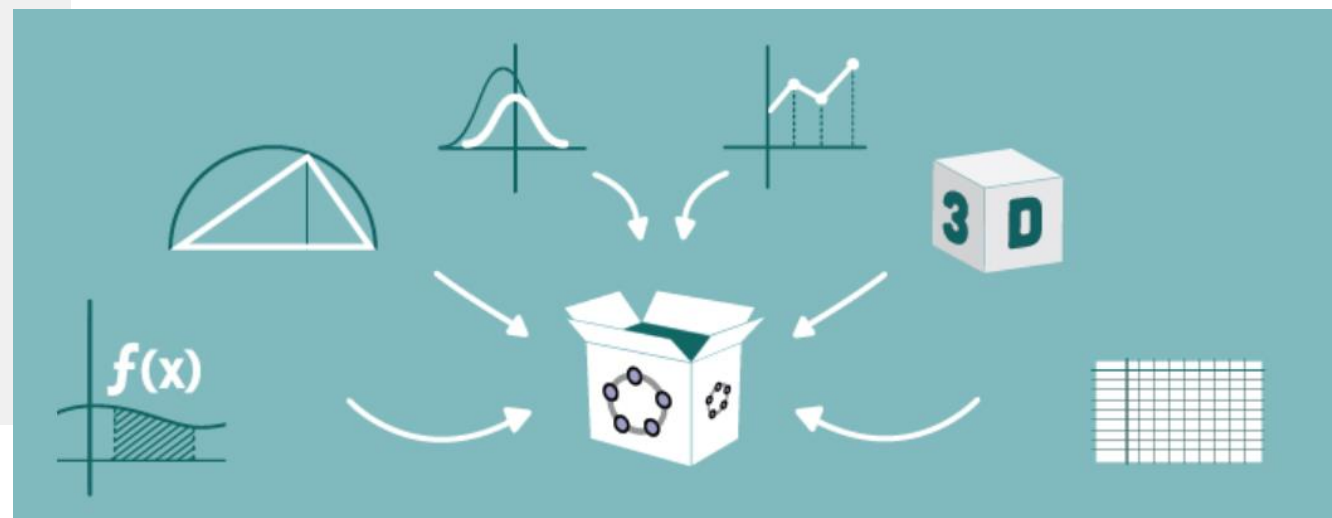
- A. $A = -16, D = 21$
- B. $A = -16, D = 45$
- C. $A = -8, D = 21$
- D. $A = -8, D = 45$

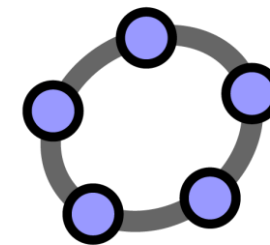




GeoGebra nije samo geometrija

-  Algebra
-  Tablica
-  Simboličko računanje (CAS)
-  Grafički prikaz
-  Grafički prikaz 2
-  3D grafički prikaz
-  Opis konstrukcije
-  Kalkulator vjerojatnosti



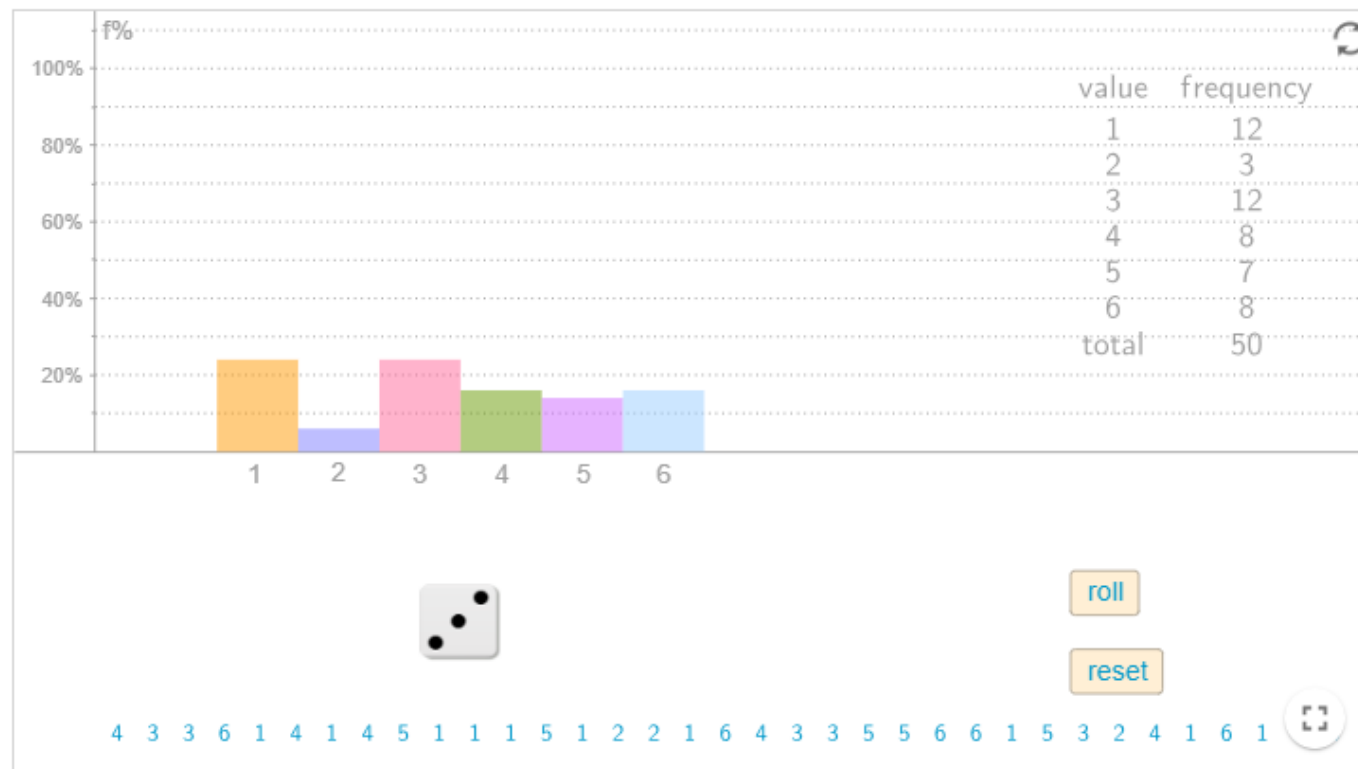


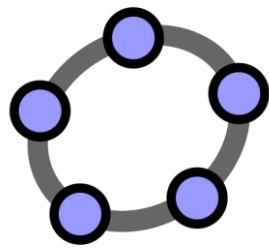
Materijali www.geogebra.org

Simulacija bacanja kocke <https://www.geogebra.org/m/hZPtarsG>

rolling a dice

Autor: sonom





Aritmetički i geometrijski niz

Aritmetički niz

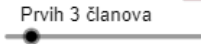
Autor: Šime Šuljić, Alex CHIK

Upišite prvi član i razliku niza u polja.

Aritmetički niz

Prvi član: $a = 16$

Razlika niza: $d = 2$



Prvih nekoliko članova
16, 18, 20

Tablica 1 Tablica 2

n	1	2	3
$T(n)$	16	18	20

Opći član $T(n)$

$$T(n) = 16 + (n - 1)(2)$$

$$T(n) = \underline{\underline{2n + 14}}$$

n	$T(n)$	$T(n)$
1	$16 + (0)(2)$	16
2	$16 + (1)(2)$	18
3	$16 + (2)(2)$	20

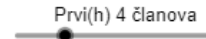
Geometrijski niz

Autor: Šime Šuljić, Alex CHIK

Geometrijski niz

Prvi član: ($\neq 0$) $a = 16$

Kvocijent niza: ($\neq 0$) $r = 2$ $r = 2$



$-\frac{1}{2}$	$-\frac{1}{3}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$
-2	-3	-4	4	3	2

Prvih nekoliko članova
16, 32, 64, 128

Tablica 1 Tablica 2

n	1	2	3	4
$T(n)$	16	32	64	128

n	$T(n)$	$T(n)$
1	$16(2)^0$	16
2	$16(2)^1$	32
3	$16(2)^2$	64
4	$16(2)^3$	128

Opći član $T(n)$

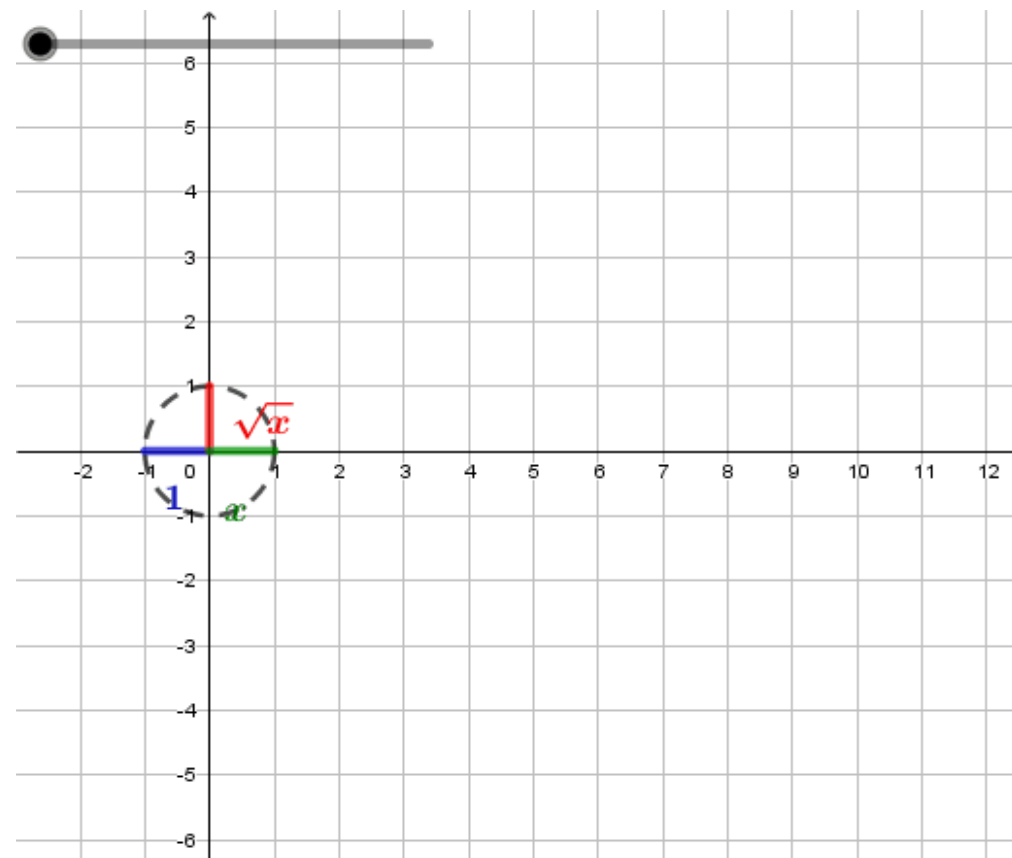
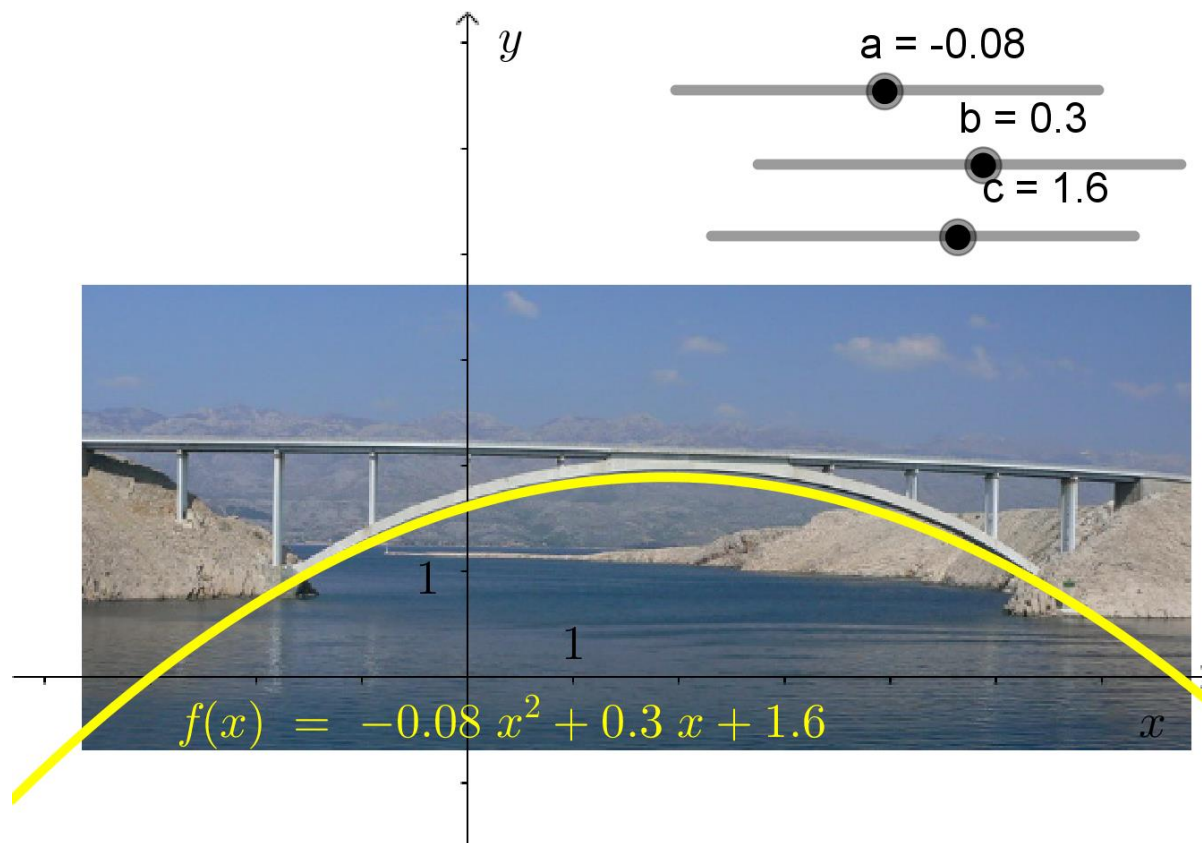
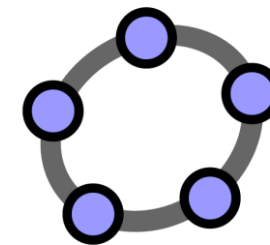
$$T(n) = \underline{\underline{16(2)^{n-1}}}$$

gMath 互動數學教室 <http://www.geogebra.org>

<https://www.geogebra.org/m/dWEbRtz9>

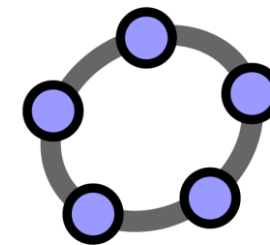
<https://www.geogebra.org/m/aWQ2hA85>

Učeník = istraživač



<https://www.geogebra.org/m/gUHkm8XT>


Projekti



Portal eTwinning Live My TwinSpaces Login

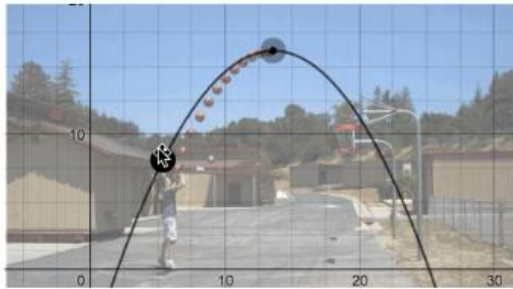
Home » Kvadratna jednačba i kvadratna funkcija

Moja, a Tvoja – MaTeMaTika



"Moja, a Tvoja - MaTeMaTika" je hrvatski nacionalni eTwinning projekt u kojem će učenici samostalno smišljati zadatke iz matematike koji prate postojeći plan i program u gimnazijama. Smišljat će zadatke koji su primjenjivi u stvarnom životu, a povezani su s nastavnim jedinicama koje redovno rade. Suradivat će s kolegama iz drugih hrvatski...

Kvadratna jednačba i kvadratna funkcija

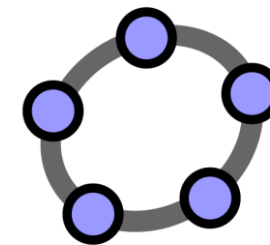


Gimnazija "Fran Galović" Koprivnica

Povijesne crtice
Girolamo Cardano <https://poo.pl/Brkl1?>

Pages

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- LOGO
- [VEČER MATEMATIKE ...](#)
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 - [Kompleksni brojevi - fraktali](#)
 - [Kvadratna jednačba i kvadratna funkcija](#)
 - [Trigonometrija pravokutnog trokuta](#)
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 - [Stereometrija](#)
- ZBIRKA ZADATAKA
 - [Sretan Božić!](#)
 - [DAN BROJA e ...](#)
 - [Dan broja PI](#)
 - [IZLET u Zagreb :\)](#)



Digitalno vrijeme e – knjige u GeoGebri

≡ GeoGebra <https://www.geogebra.org/m/MjV6DBrw>

Osnovno o linearnom programiranju

Uvod

Linearne nejednadžbe

Primjena linearnog programiranja

Osnovno o linearnom programiranju

Autor: Marina Njerš

Digitalni udžbenik namijenjen učenicima 3. razreda opće gimnazije.

Ishodi:

- definirati problem linearnog programiranja
- modelirati situaciju iz stvarnog života
- rješavati problem linearnog programiranja



Sadržaj

Uvod

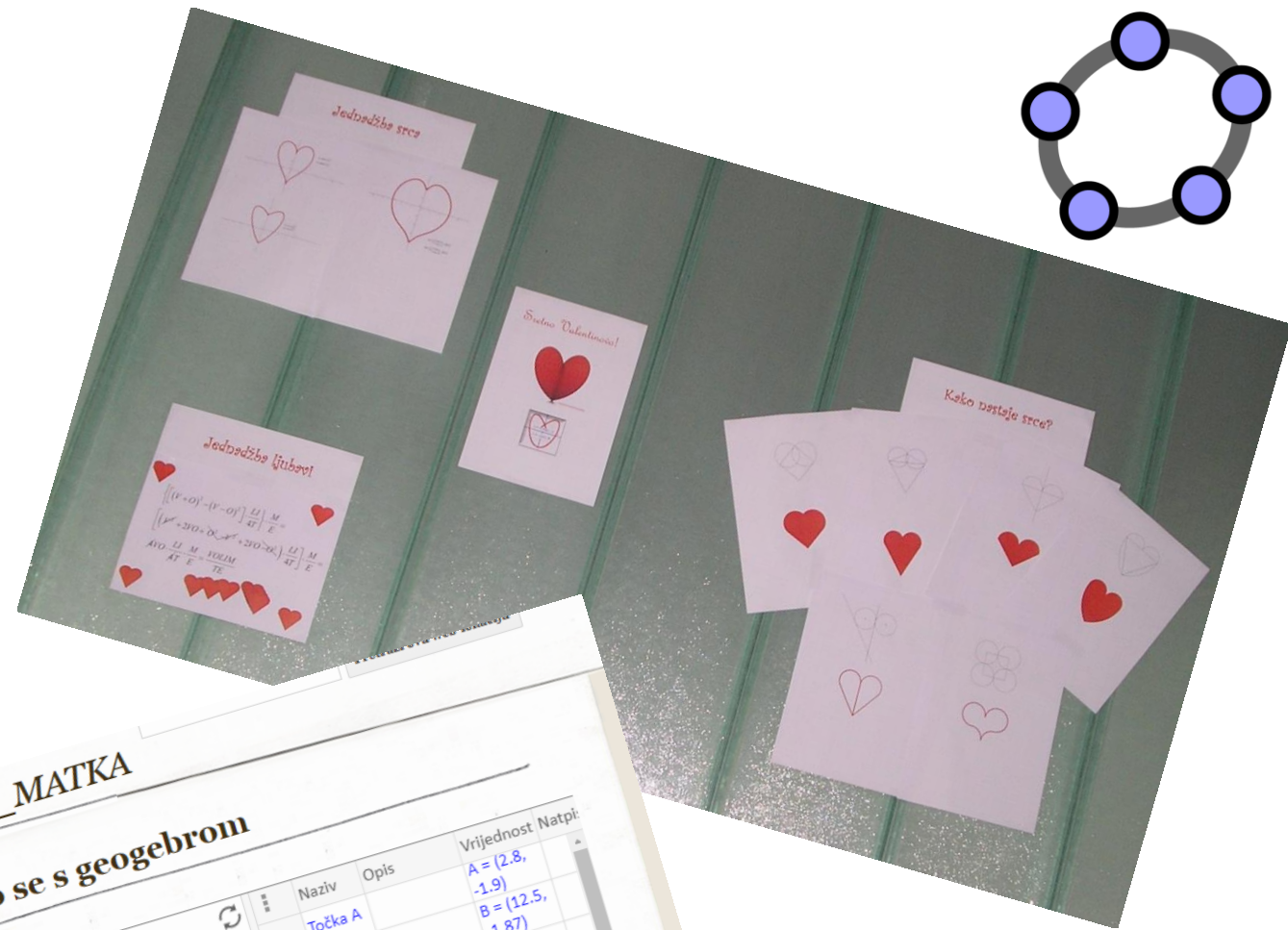
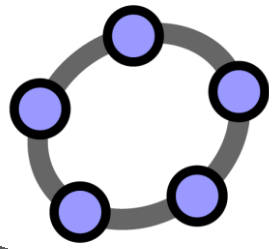
Uvod u problem

Linearne nejednadžbe

Linearne nejednadžbe

I gdje još?

- Web stranice
- Ilustracije
- Školski panoi



VALENTINOVO_I_MATKA

Poigrajmo se s geogebrom

Upoznajmo se!
[Click here to read about me!](#)

Zadaci
Pokušaj i ti!

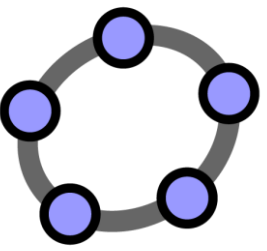
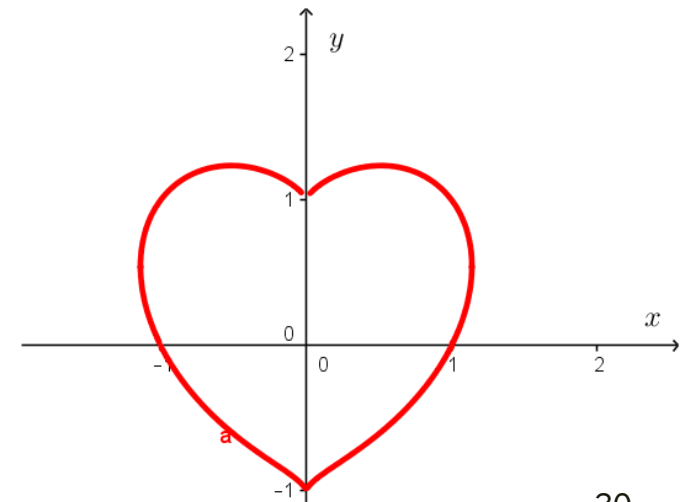
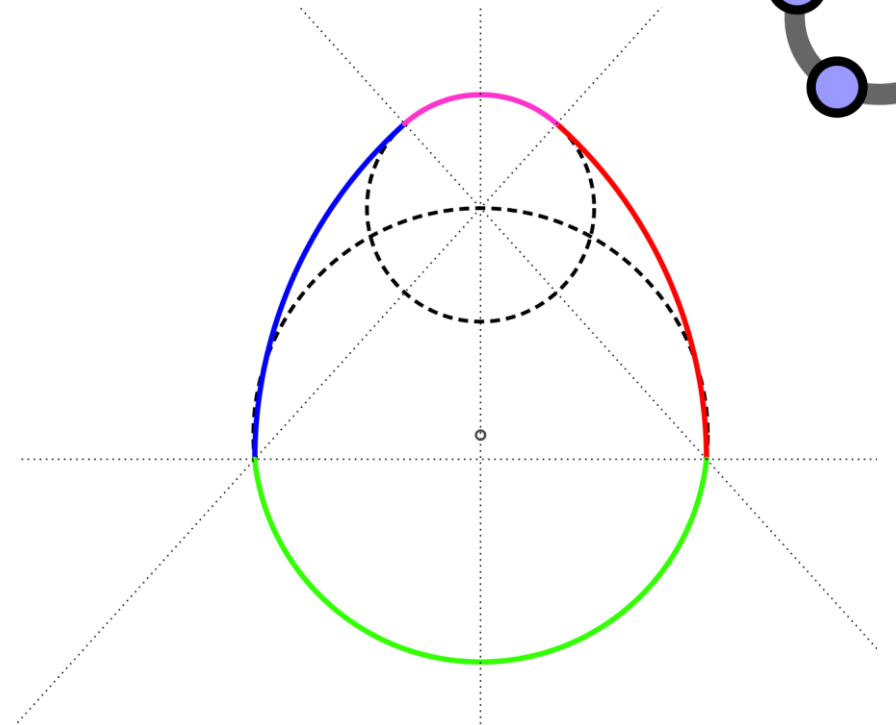
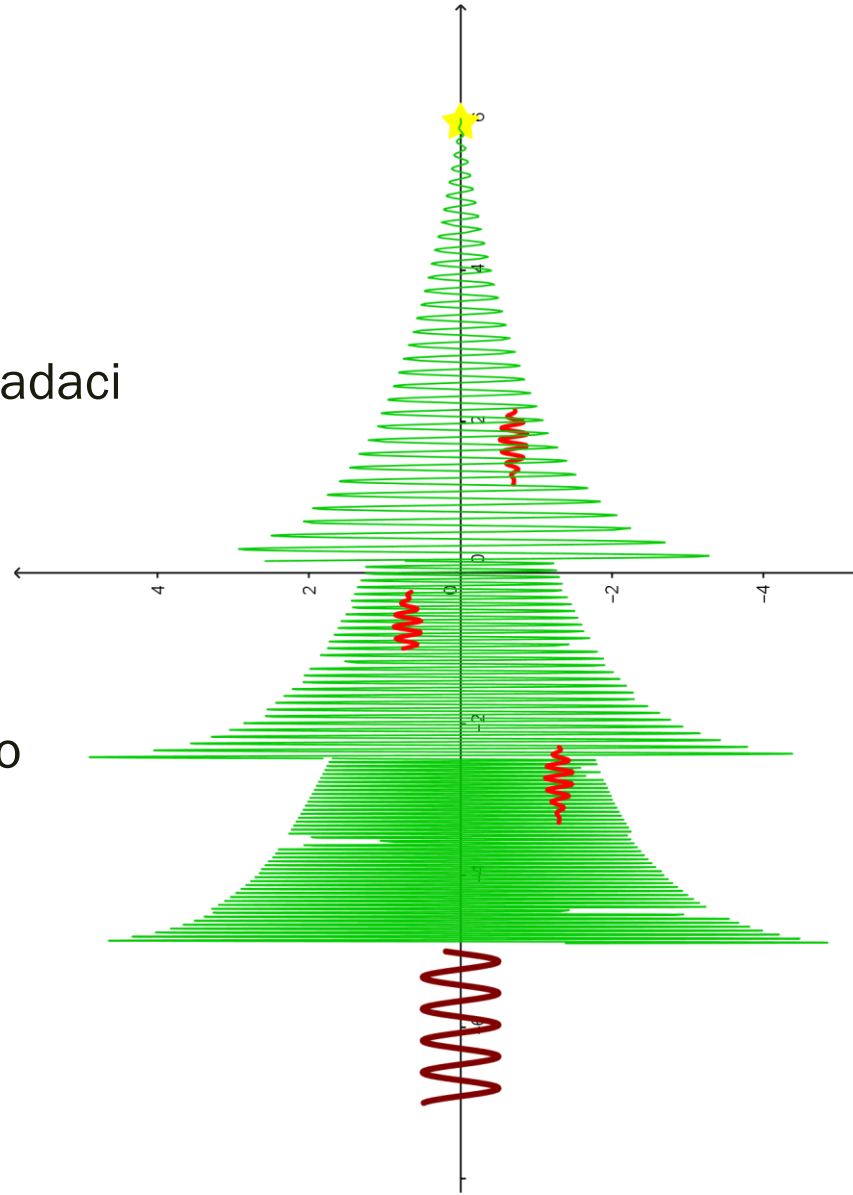
Naslovnica
Matematika na Valentinovi!

Galerija slika
Galerija slika

Još primjera
Poigrajmo se s geogebrom

	Naziv	Opis	Vrijednost	Natpi:
1	Točka A		$A = (2.8, -1.9)$	
2	Točka B		$B = (12.5, -1.87)$	
3	Dužina a	Dužina A, B	$a = 9.7$	
4	Pravac b	Pravac kroz A okomit na a	$b: -9.7x - 0.03y = -27.1$	
5	Pravac c	Pravac kroz B okomit na a	$c: -9.7x - 0.03y = -121.19$	
6	Kružnica d	Kružnica kroz B sa središtem A	$d: (x - 2.8)^2 + (y + 1.9)^2 = 94.09$	
7	Točka C	Presjek od d i b	$C = (2.77, 7.8)$	
8	Pravac e	Pravac kroz C okomit na b	$e: 0.03x - 9.7y = -75.57$	

- Tematski zadaci
- Čestitke
- Božić
- Uskrs
- Valentinovo

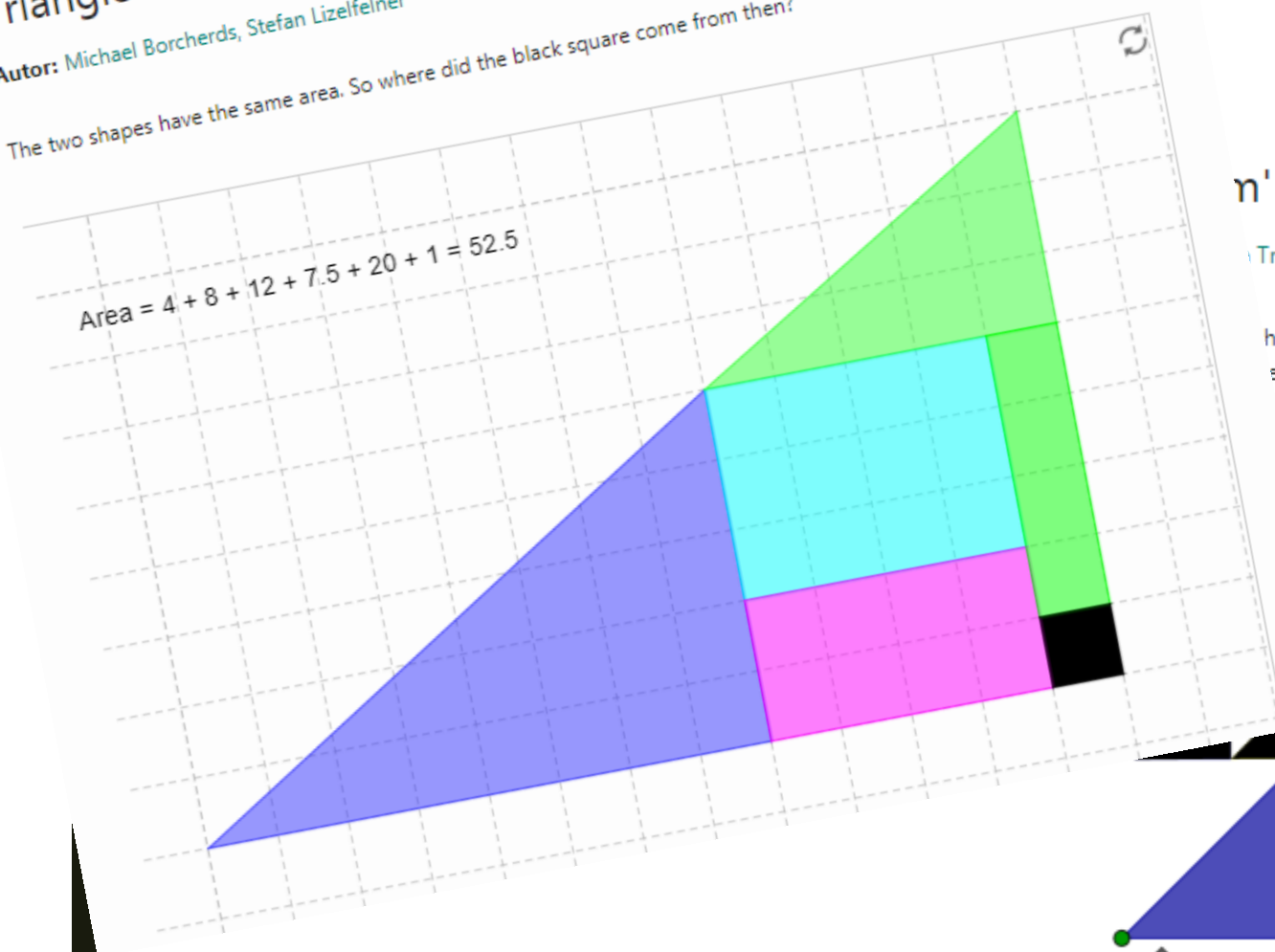


Triangle Paradox (Missing square puzzle)

Autor: Michael Borcherts, Stefan Lizelfelner

The two shapes have the same area. So where did the black square come from then?

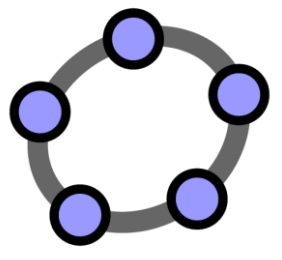
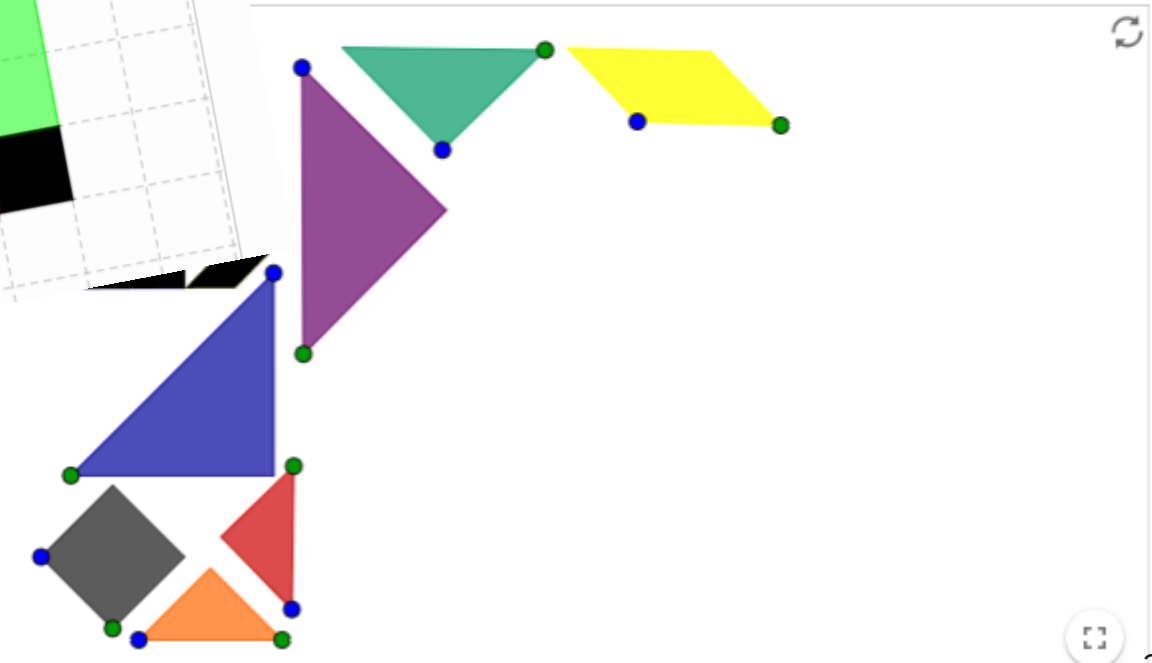
$$\text{Area} = 4 + 8 + 12 + 7.5 + 20 + 1 = 52.5$$



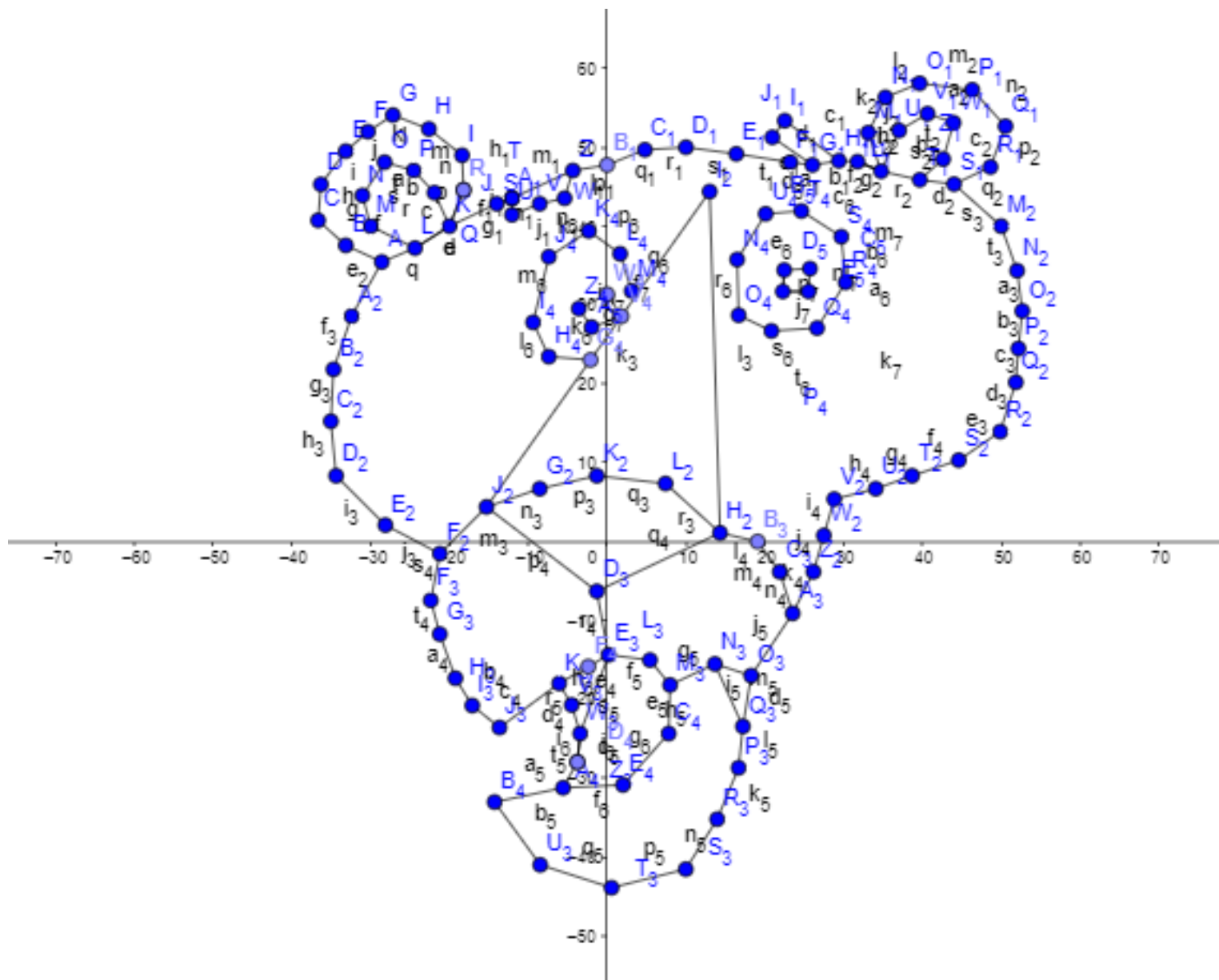
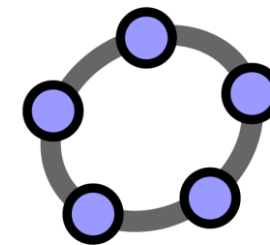
n' Puzzle 'Cat'

Translation Team German

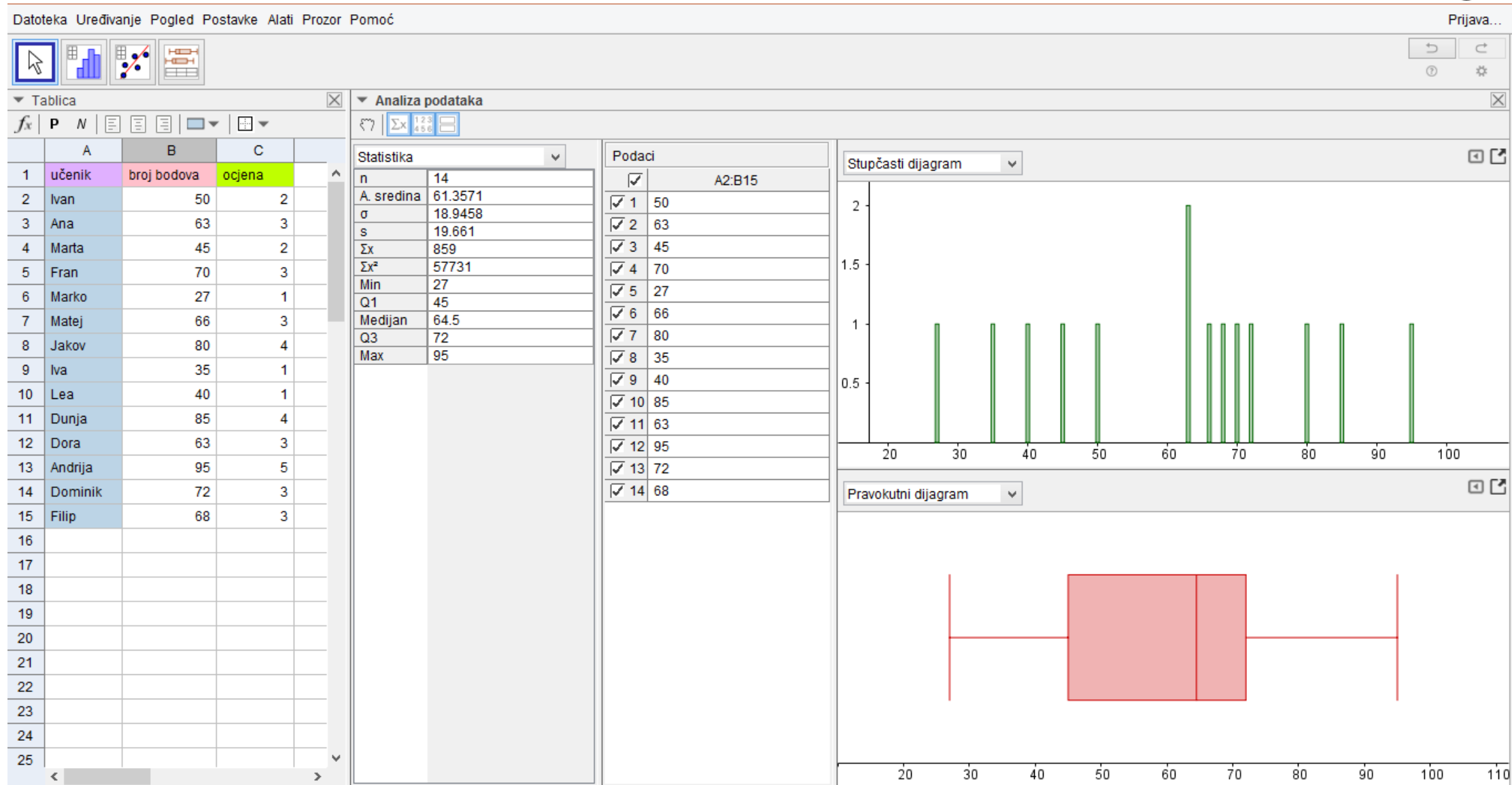
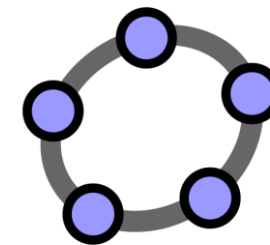
Shapes below in order to recreate the cat shown. You can translate the shapes by dragging the blue points. You can rotate the shapes by dragging the green points with the mouse. Click the little icon in the upper right corner in order to reset the puzzle.

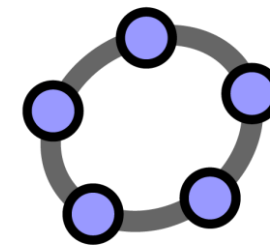


Učnički radovi



Razredna statistika





Gdje i kako naučiti GeoGebru?

Mala škola GeoGebre

Autor: Damir Belavić

<https://www.geogebra.org/m/eehF54nU>

<https://www.geogebra.org/search/%C5%A0ime%20%C5%A0kola>

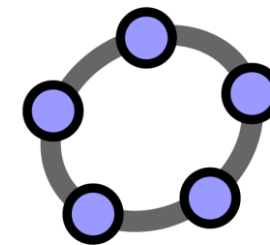
<https://www.geogebra.org/search/%C5%BEfekt>

<https://www.geogebra.org/m/Wy...>

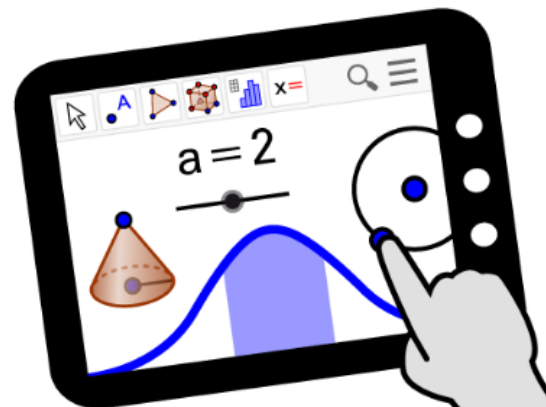
- Online pomoć – priručnik
- Facebook grupa
- Istraživanje GeoGebre



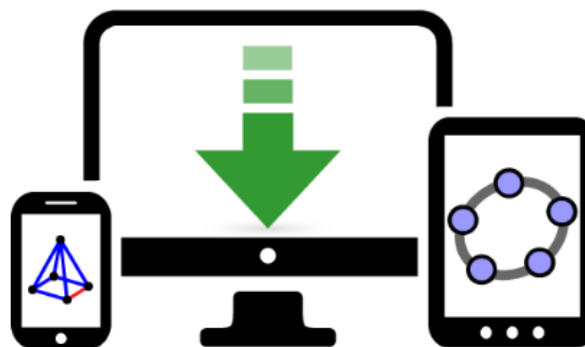
Uvjeti



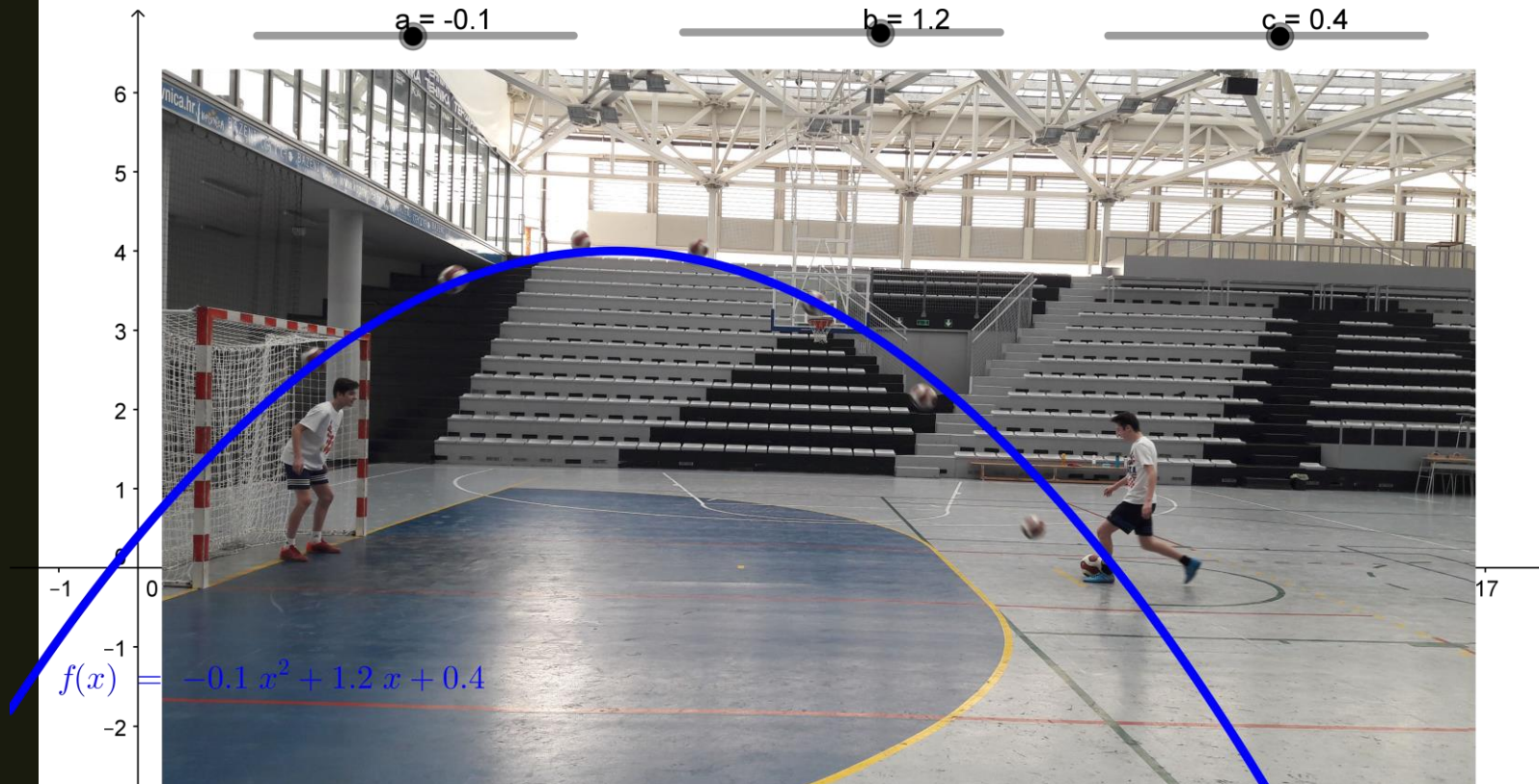
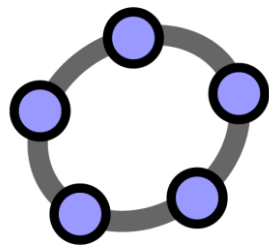
Materials



GeoGebra Math Apps



Budimo u trendu



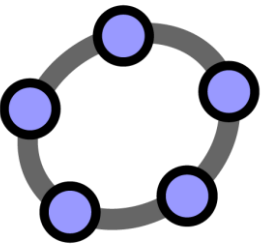
Geometry of a soccer ball / football

Autor: Prof.pantaloni

Truncated icosahedron gives a soccer ball.
An icosahedron has 20 faces and 12 vertices.
So on the ball, how many pentagons? Hexagons?



<https://www.geogebra.org/m/CnEfCW63>



Hvala!

marina.njers@skole.hr