NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

MATEMATIKA– VIŠA RAZINA

Rezultati probne državne mature

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

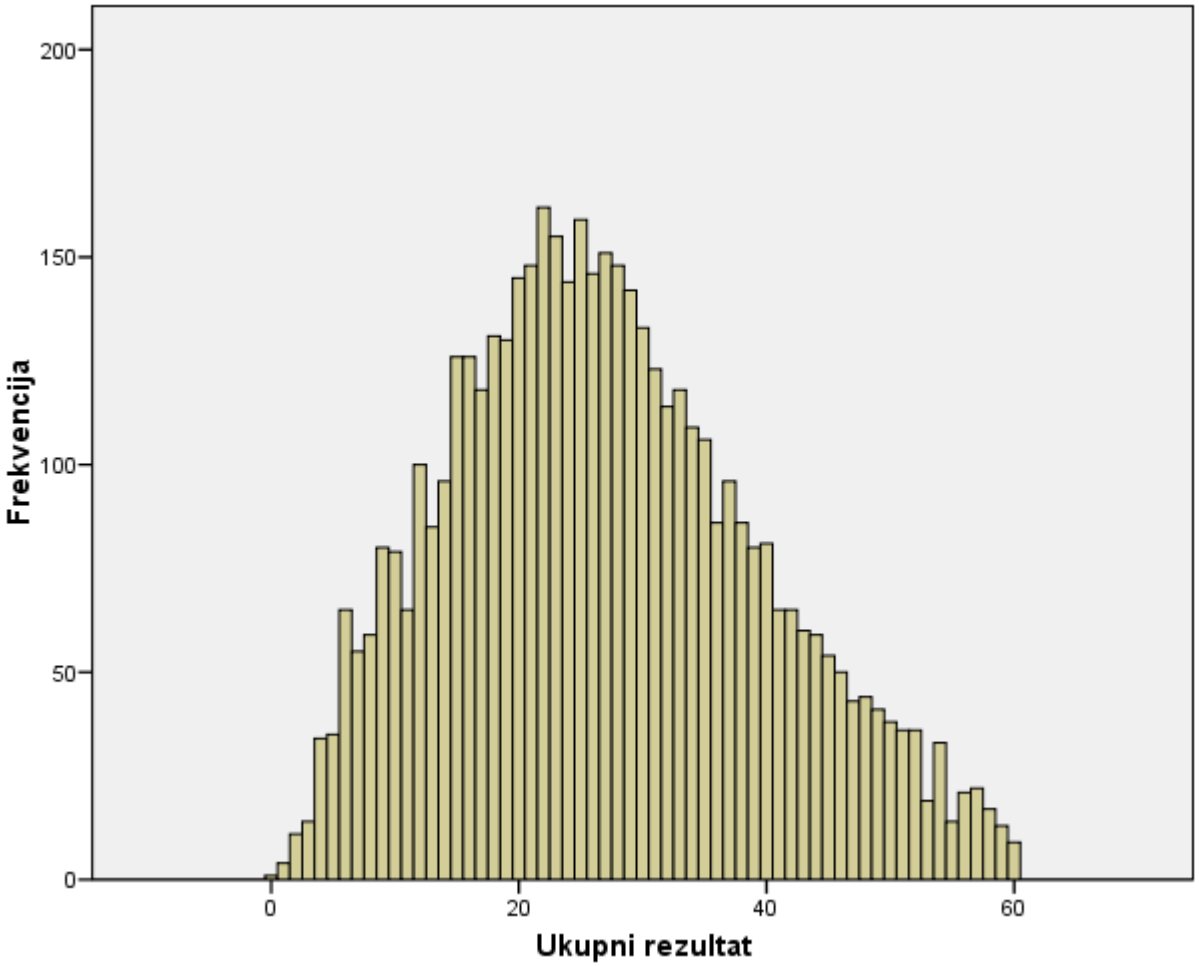
Deskriptivna statistika ukupnog rezultata

PARAMETAR		VRIJEDNOST
N		14955; 4785 (32%)*
k		45
M		27,0
SD		12,49
Standardna pogreška		3,75
Medijan		26
Mod		22
Raspon		0 – 60
Maksimum		60
Percentili	25	18
	50	26
	75	35
Cronbachov α		0,91

*- učenici koji na više od 10 zadataka otvorenog tipa nisu niti pokušali odgovoriti izbačeni su iz analize

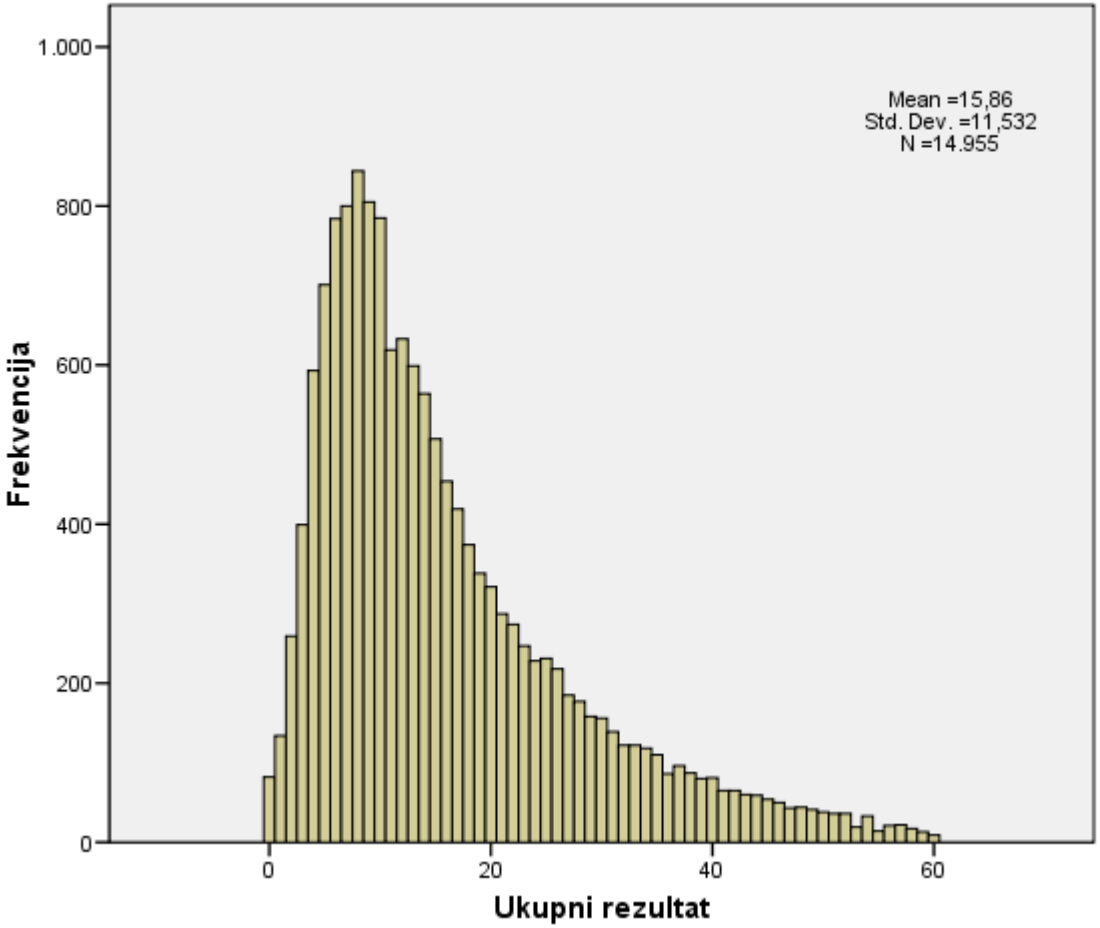
NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

Deskriptivna statistika ukupnog rezultata (selekcionirani uzorak)



NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

Deskriptivna statistika ukupnog rezultata (svi učenici)



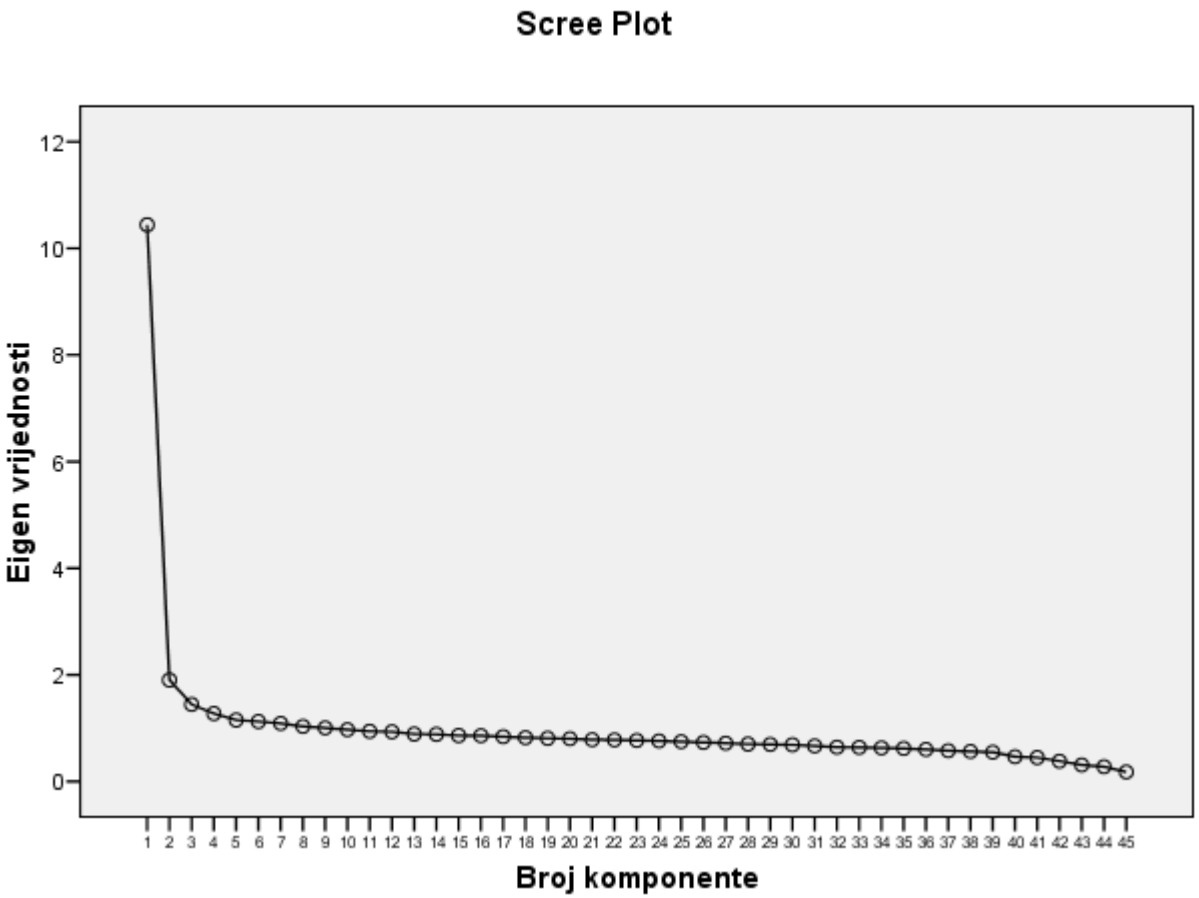
NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

Deskriptivna statistika ukupnog rezultata

Ocjena	1	2	3	4	5
Prag	-	12	20	28	45
%	45,5	26	13,3	11,9	3,3

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

Faktorska analiza



- 1 komponenta koja objašnjava 23,2% varijance

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

Raspodjela zadataka po težini

Težina zadatka	Broj zadatka
Vrlo težak (0 – 0,2)	25.2, **27**, 28.3
Težak (0,21 – 0,4)	6, 8, 13, 18.2, 23.2, 24.2, 25.1, 25.3, 28.2, 29.1, 29.2, 29.4, 29.5, 30
Srednje težak (0,41 – 0,6)	2, 4, 5, 7, 11, 12, 15, 16, 19.1, 19.2, 20.1, 20.2, 21.1, 21.2, 22.1, 22.2, 23.1, 29.3
Lagan (0,61 – 0,80)	9, 10, 17, 24.1, 26, 28.1
Vrlo lagan (0,81 – 1)	1, 3, 14, 18.1

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

MATEMATIKA

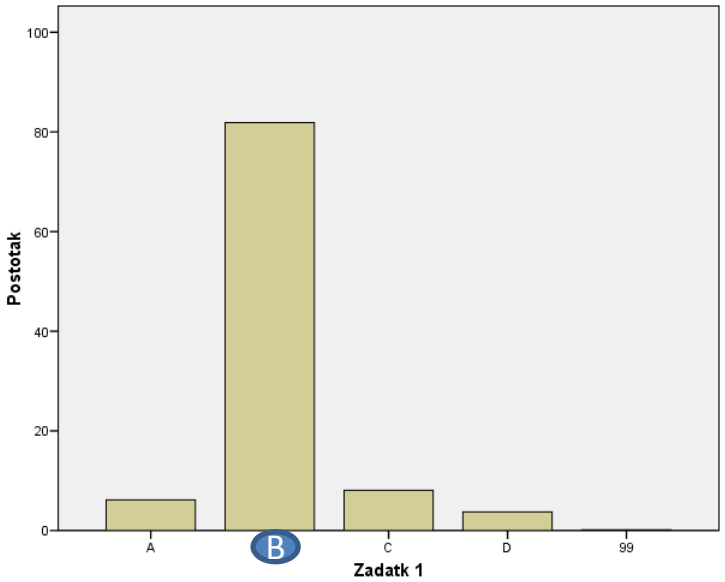
viša razina

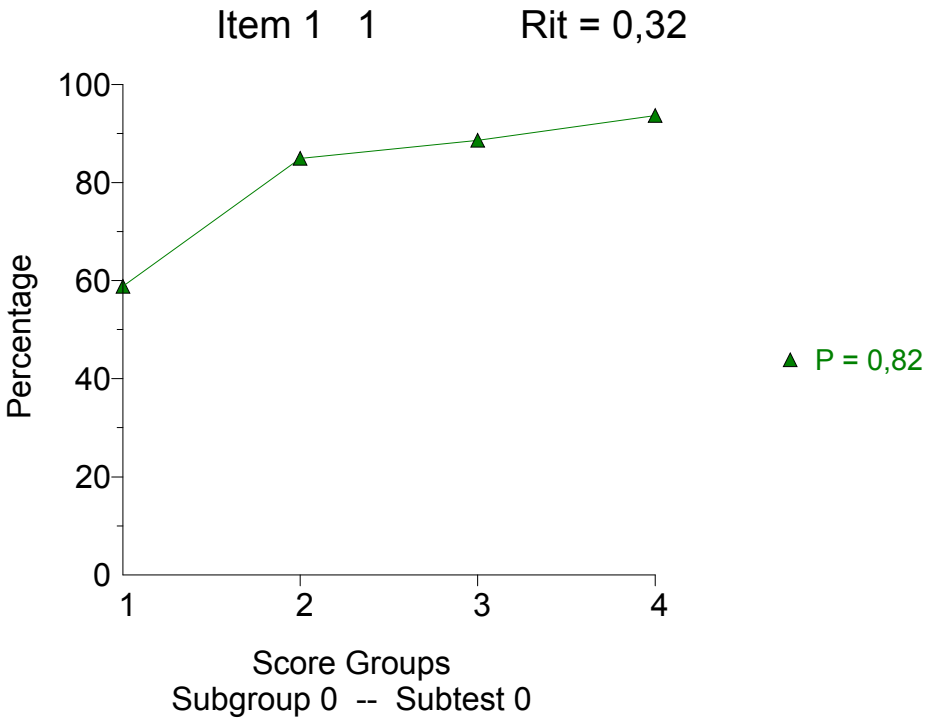
I. zadatci višestrukoga izbora

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

1. Koja je vrijednost razlomka $\frac{0.001^2}{100 \cdot 0.1}$?

M	0,82
M (O)	
ID	0,29

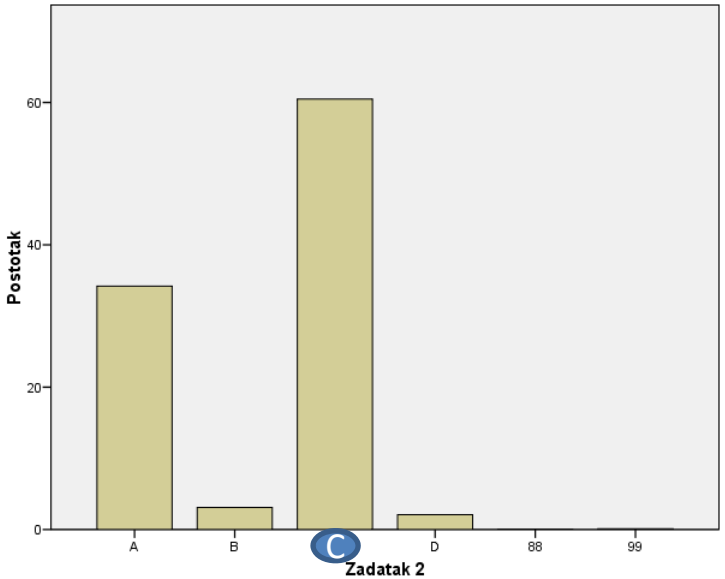


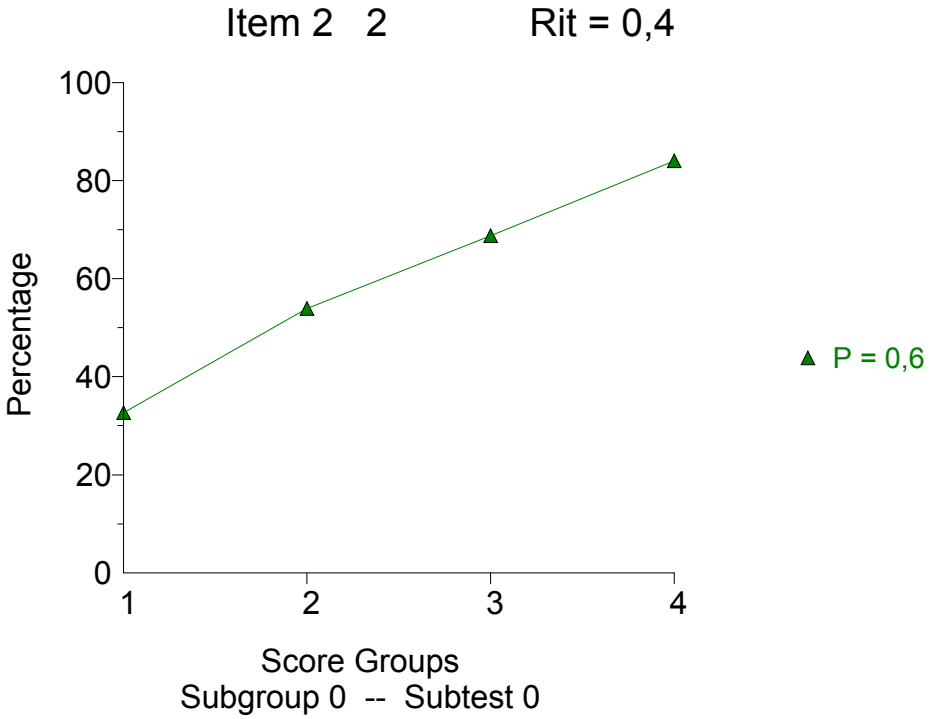


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

2. U 100 ml sirupa za snižavanje temperature sadržano je 2.4 g paracetamola. Koliko miligrama paracetamola ima u 5 ml sirupa?

M	0,60
M (O)	
ID	0,36

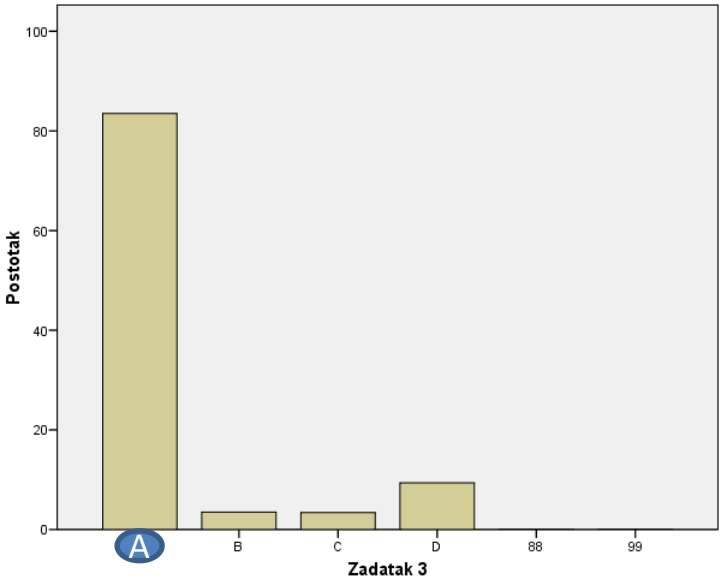


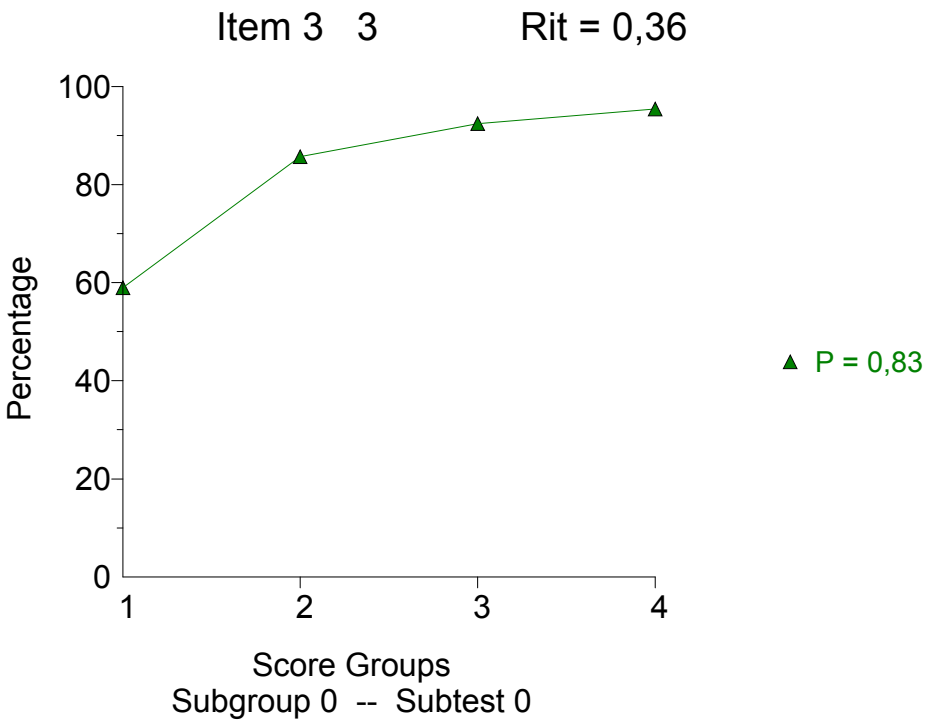


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

3. Ako su -1 i $\frac{3}{5}$ rješenja jednadžbe $5x^2 + kx - 3 = 0$, koliko je k.

M	0,83
M (O)	
ID	0,33

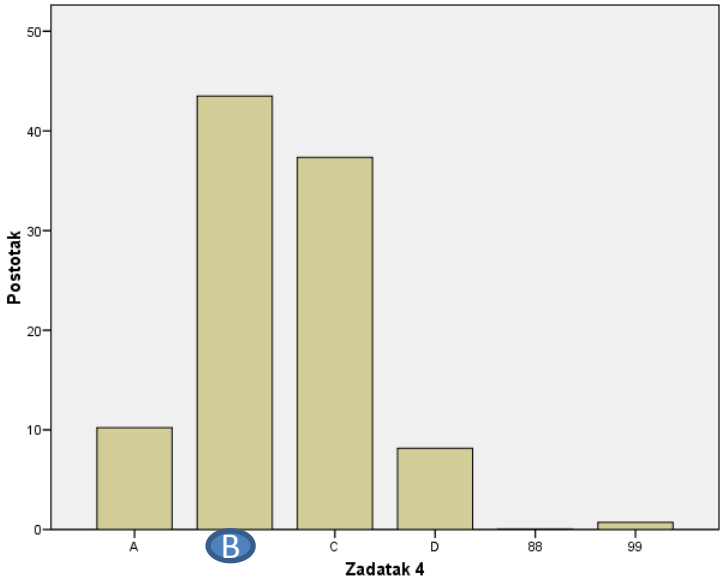


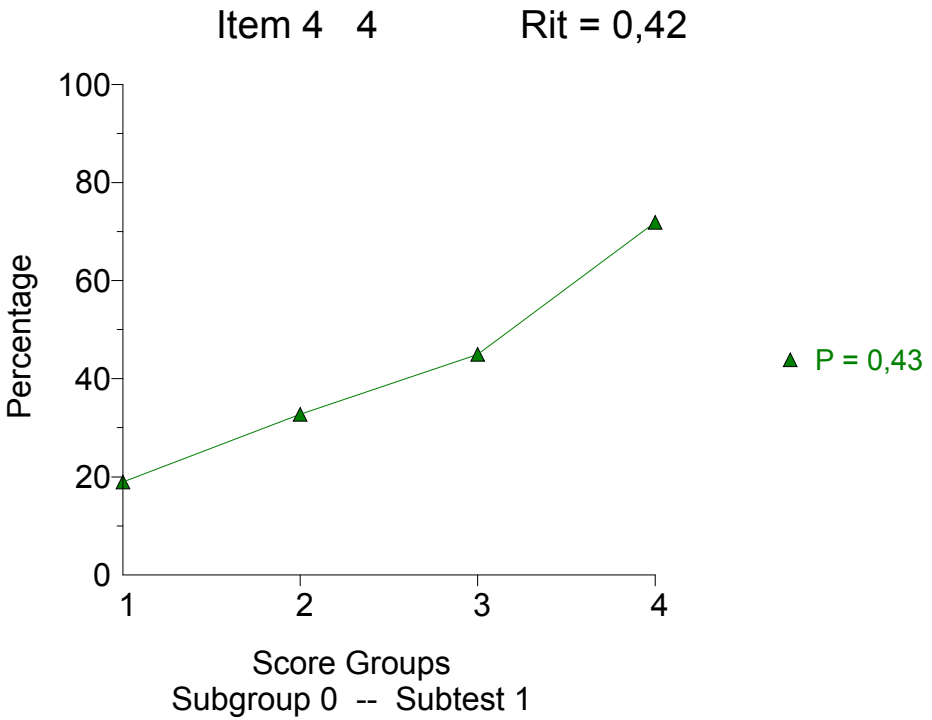


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

4. Kompleksa broj $\frac{2+3i}{3-2i}$ jednak je:

M	0,43
M (O)	
ID	0,37

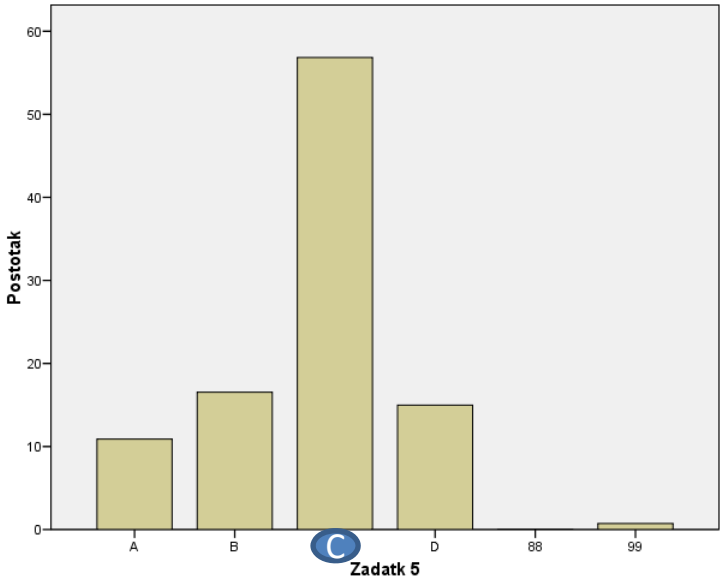


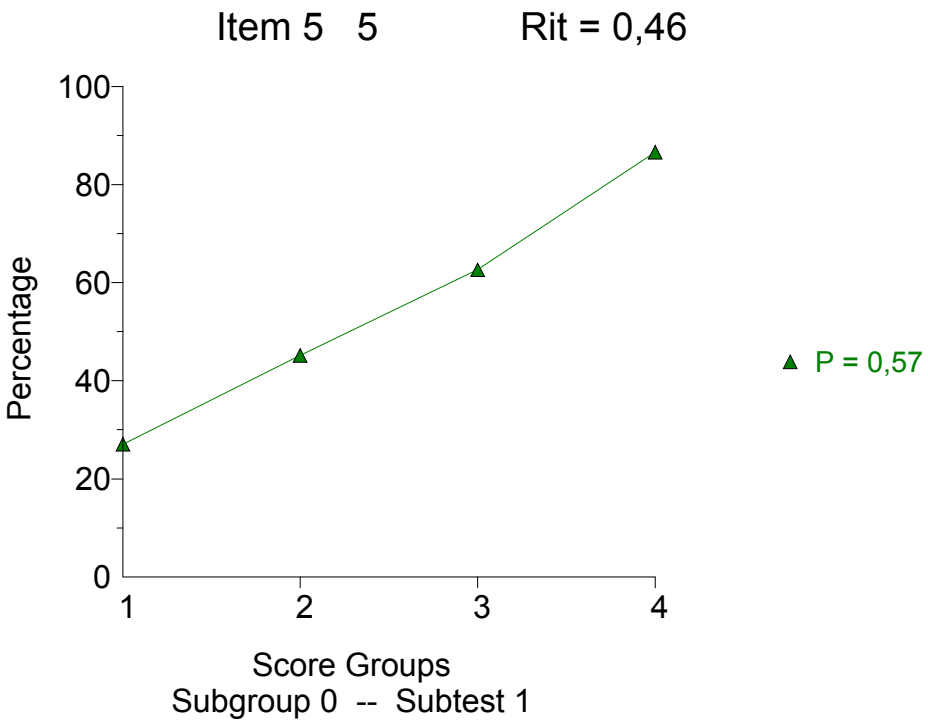


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

5. Rješenje jednadžbe $5 \cdot 9^{x+1} = 15$ nalazi se u intervalu:

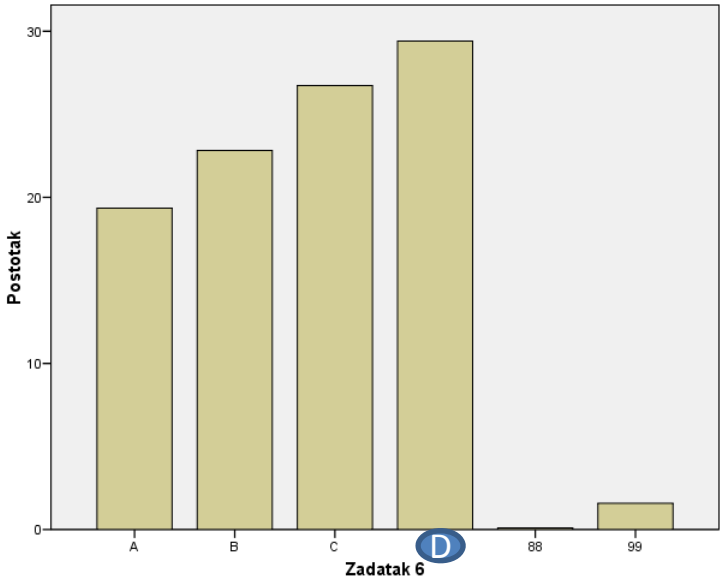
M	0,57
M (O)	
ID	0,41

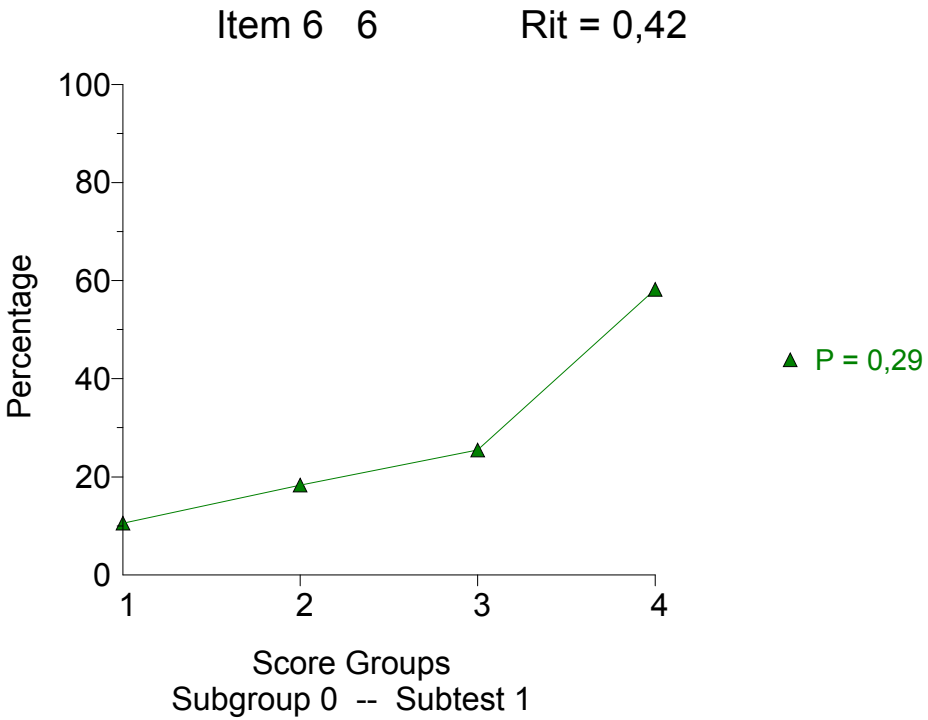




6. Odredite polumjer kružnice sa slike.

M	0,29
M (O)	
ID	0,37

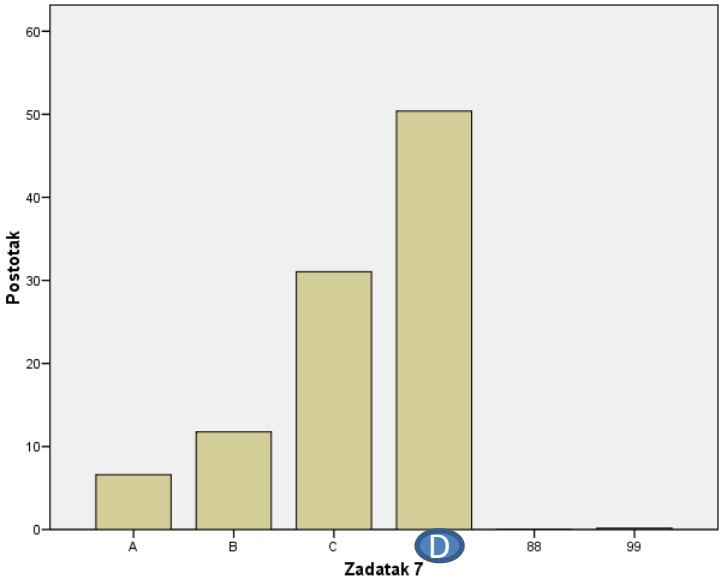


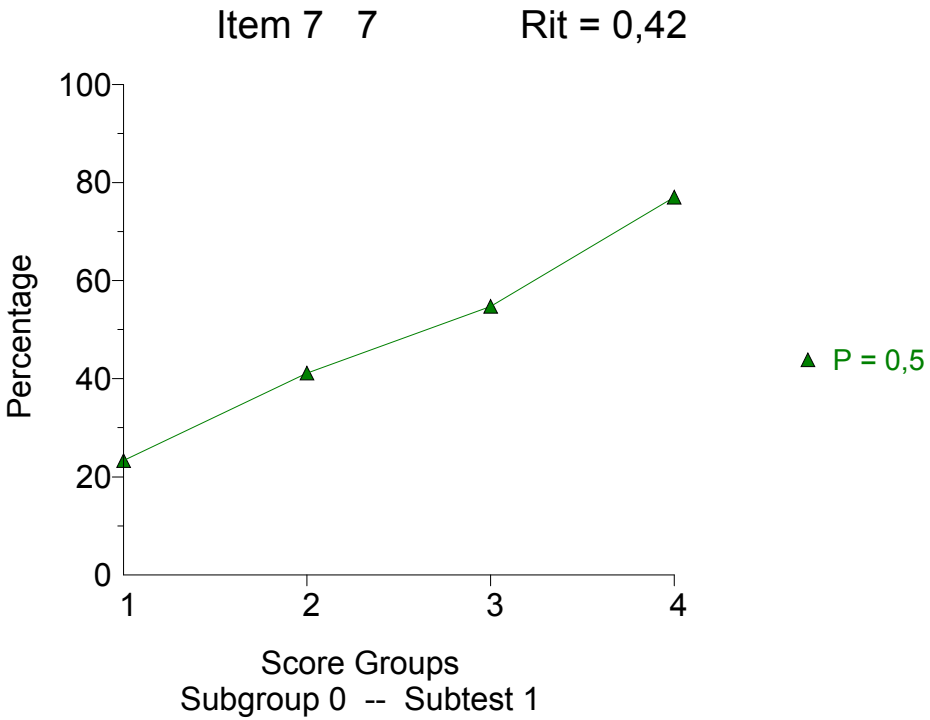


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

7. Za vektore sa slike vrijedi:

M	0,50
M (O)	
ID	0,37

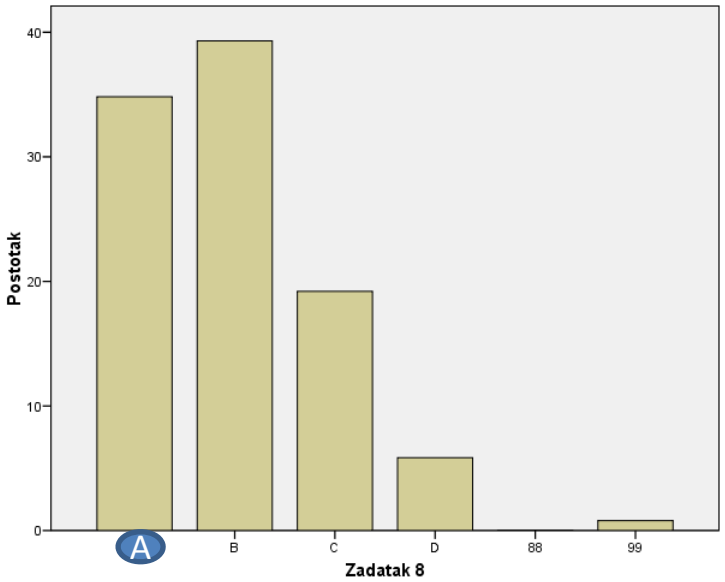


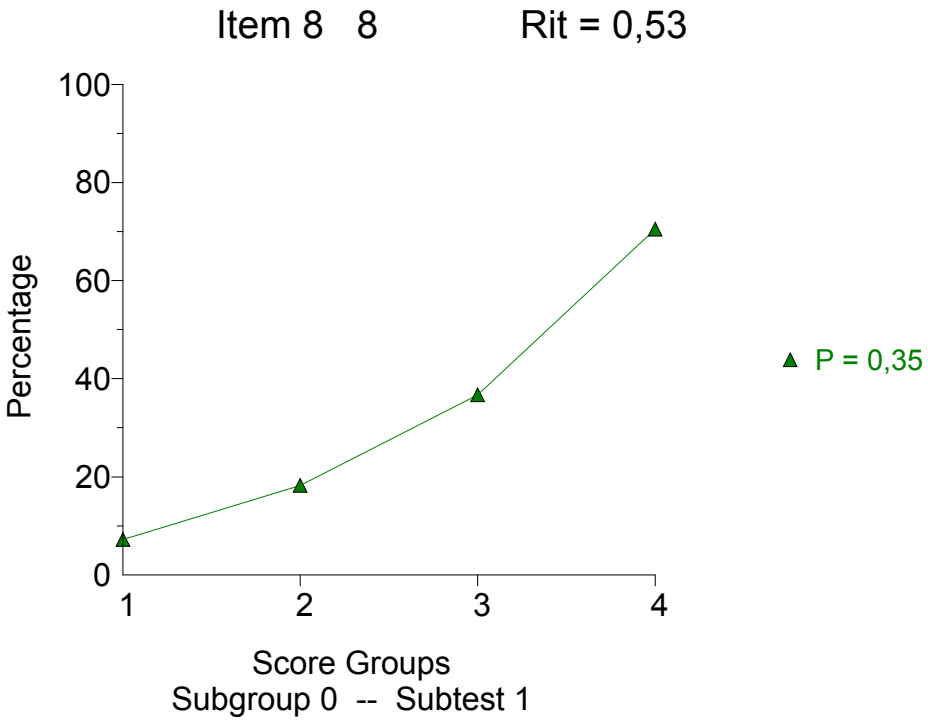


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

8. Izraz $\log_2 4a + \log_2 2a^2$ jednak je:

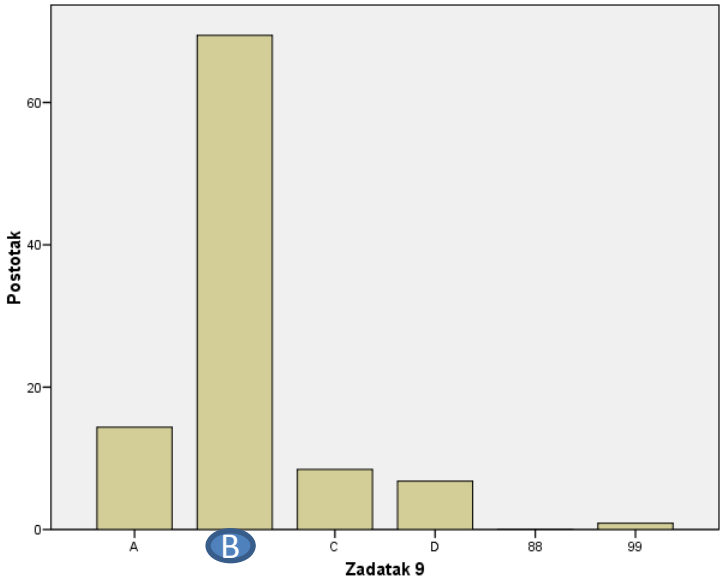
M	0,35
M (O)	
ID	0,48

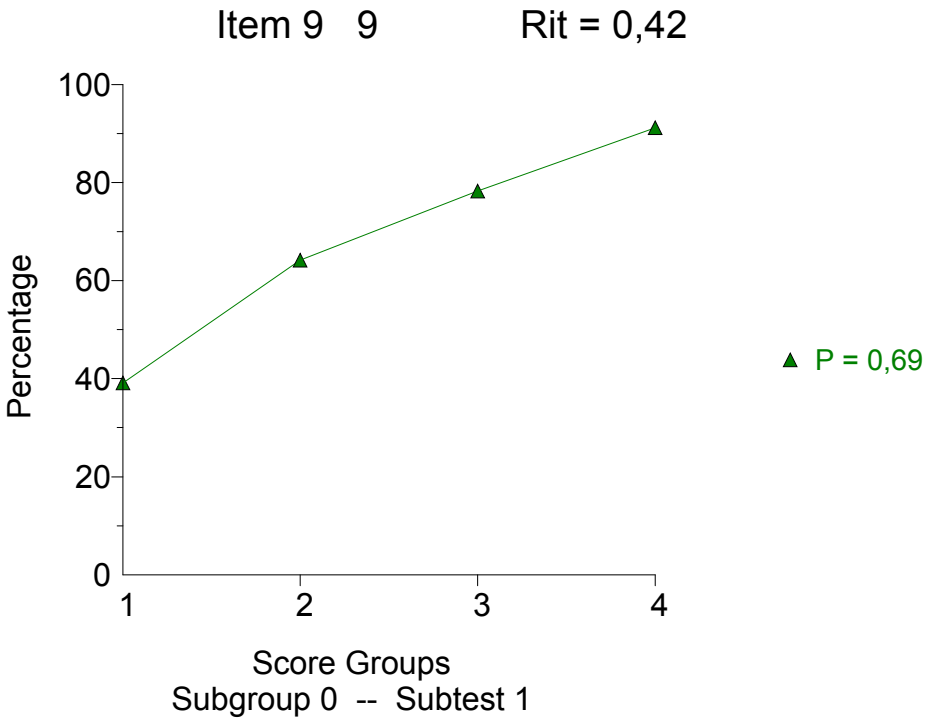




9. Odredite fokuse elipse zadane jednadžbom $3x^2+8y^2= 120$.

M	0,69
M (O)	
ID	0,38

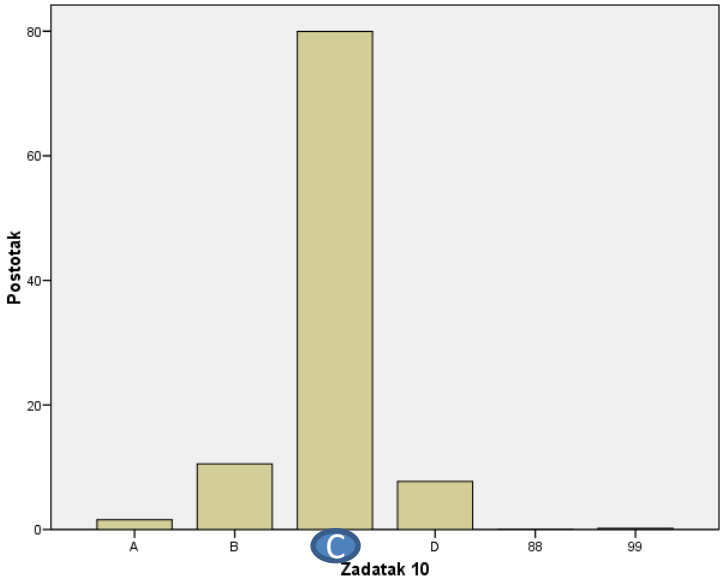


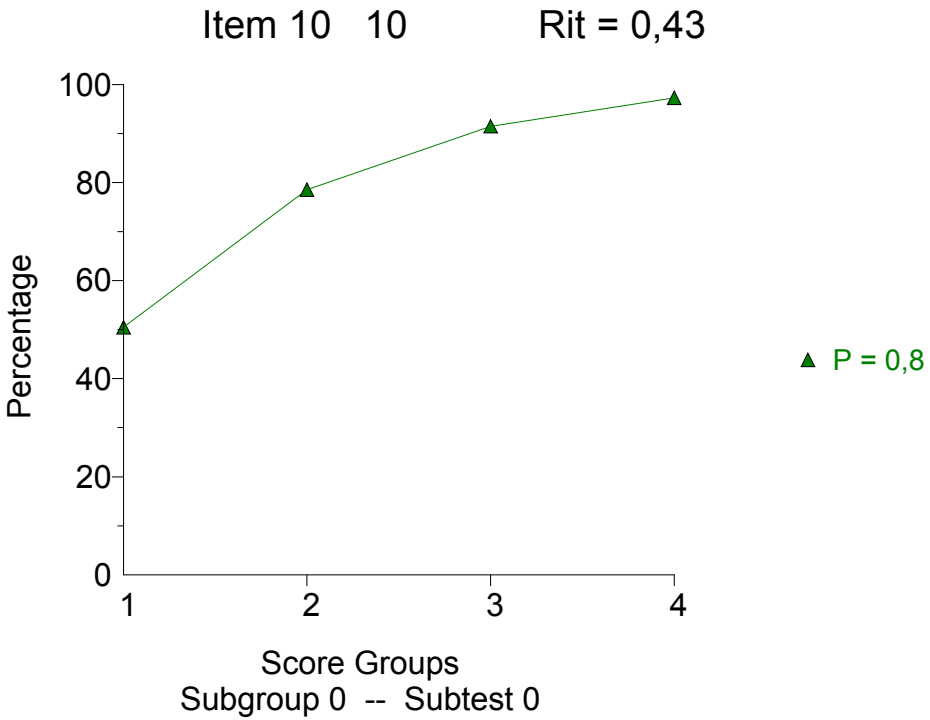


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

10. U plesnu se grupu upisalo 120 učenika. Mladići čine 20% grupe. Naknadno su se upisale 2 djevojke i 18 mladića. Koliki je sada postotak mladića u plesnoj grupi?

M	0,80
M (O)	
ID	0,40

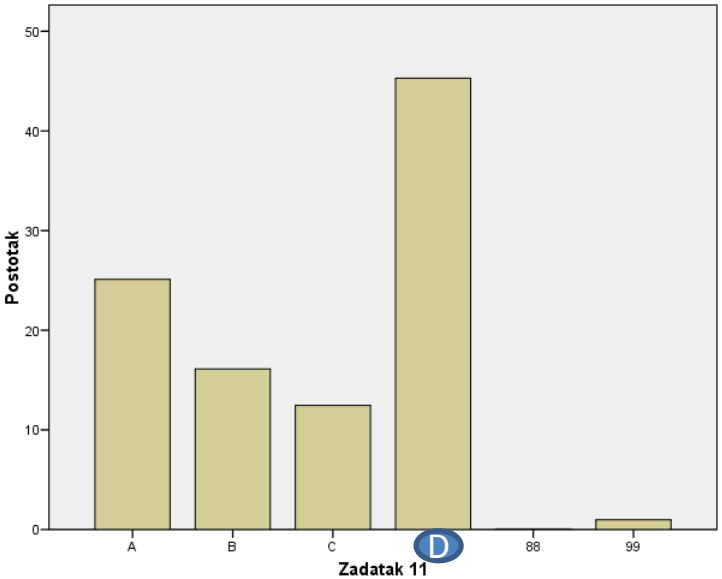


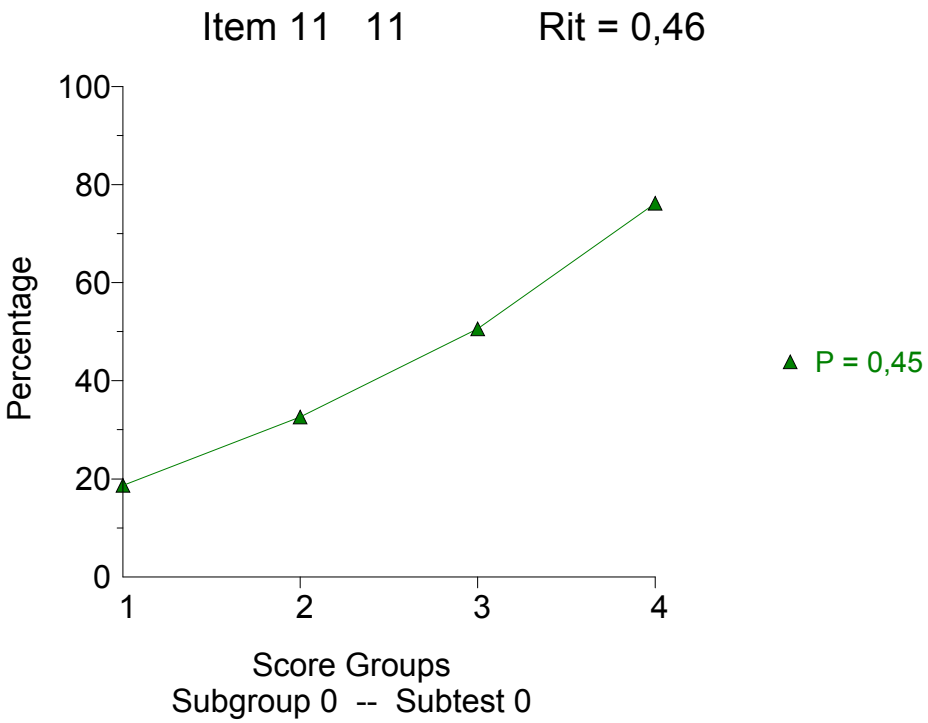


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

11. Mjere kutova trokuta su u omjeru 1:10:4. najdulja stranica ima duljinu 10cm. Kolika je tada duljina najkraće stranice zaokružena na jednu decimalu?

M	0,46
M (O)	
ID	0,39

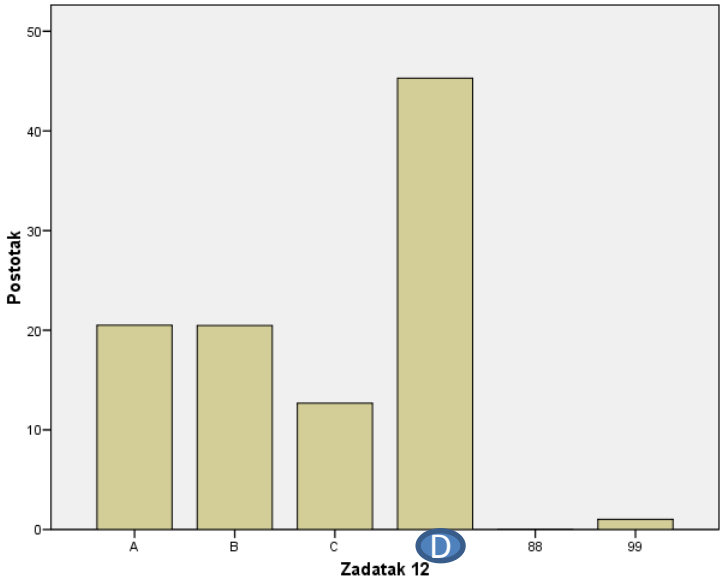


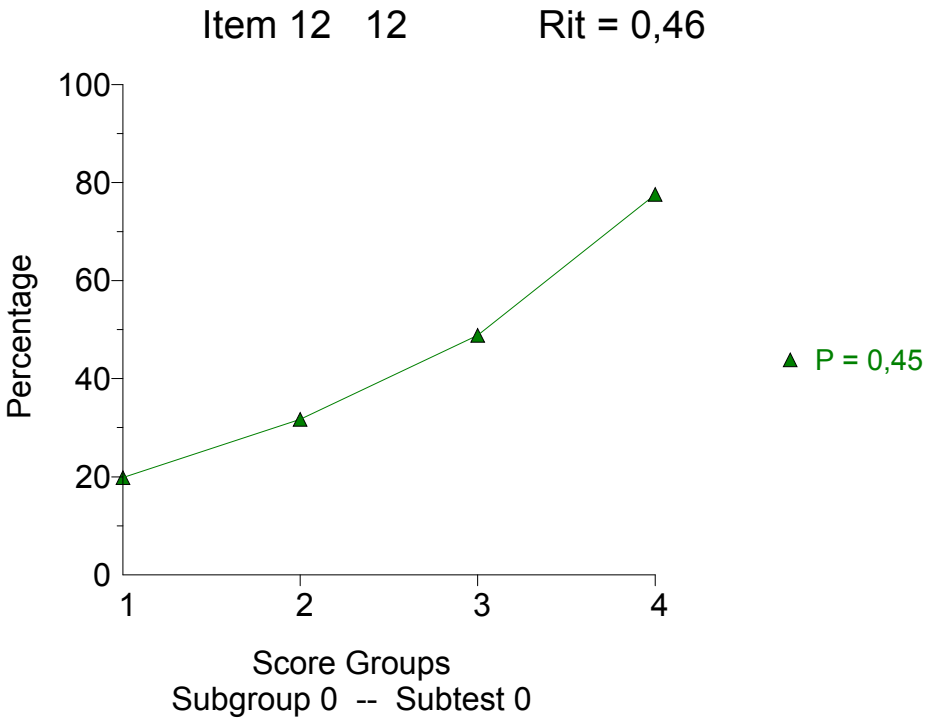


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

12. Razlomak $\frac{1 - x^{-3}y^{-3}}{x^{-2}y^{-2} + x^{-1}y^{-1} + 1}$ jednak je:

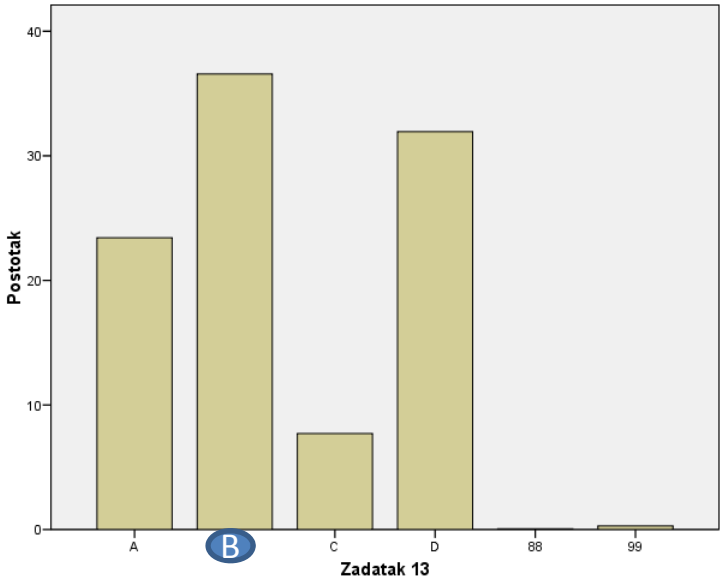
M	0,45
M (O)	
ID	0,40

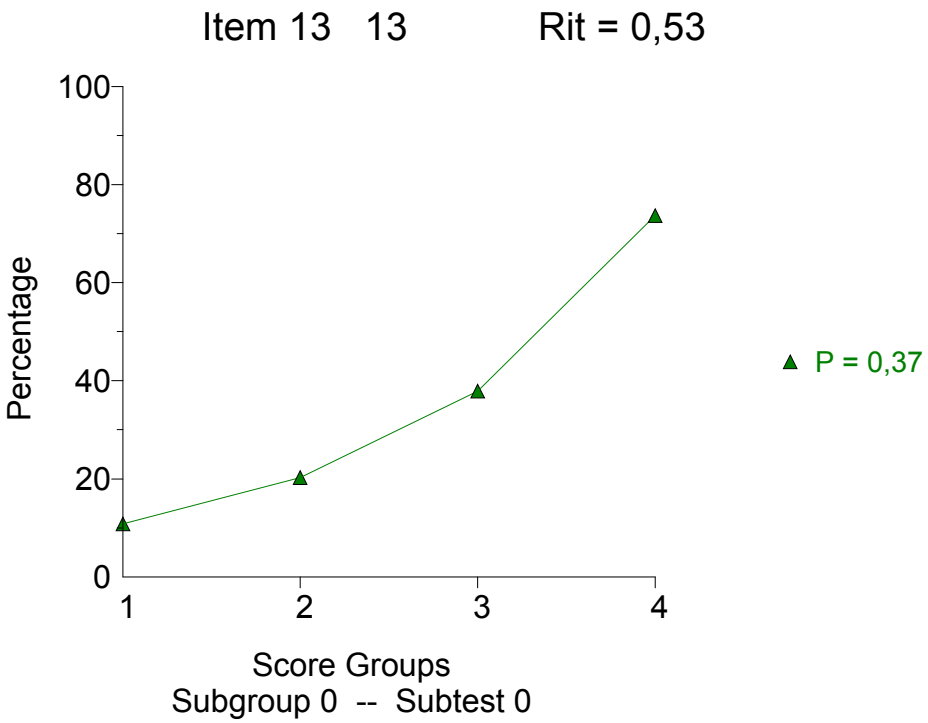




13. Funkcija $f(x)=ax^2+c$ prikazana je grafom na slici. Koeficijent a jednak je:

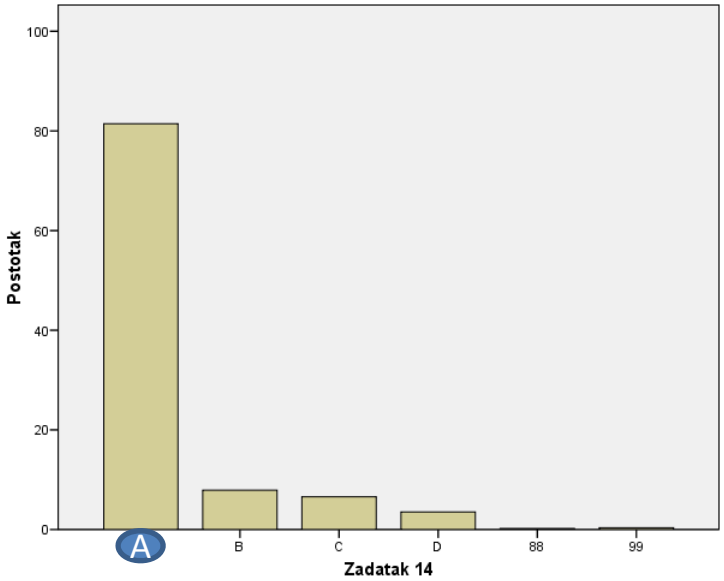
M	0,37
M (O)	
ID	0,47

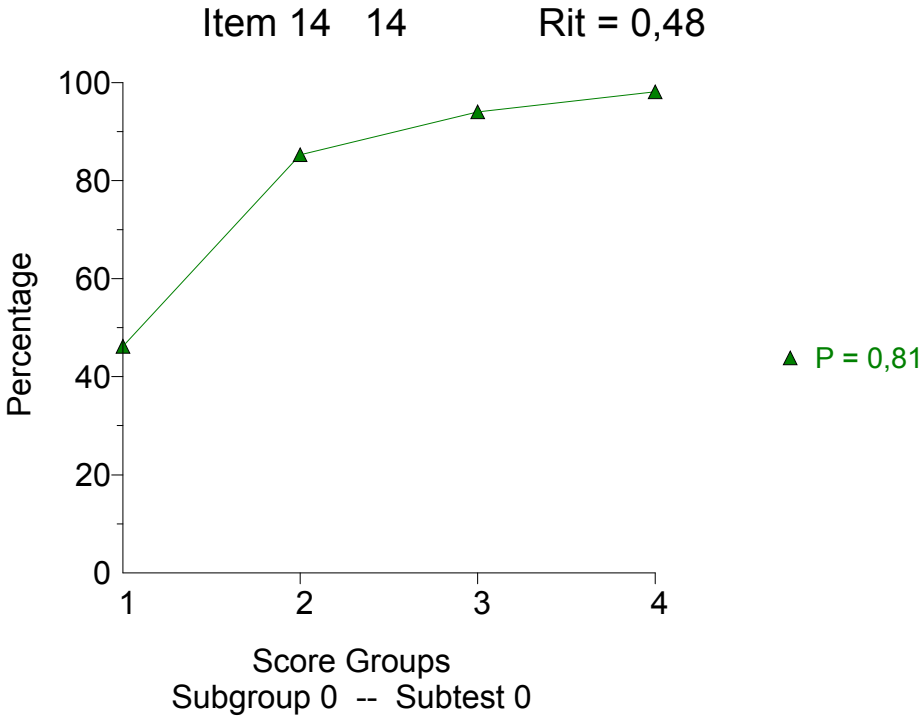




14. Odredite h iz formule S= rπ (r+2h).

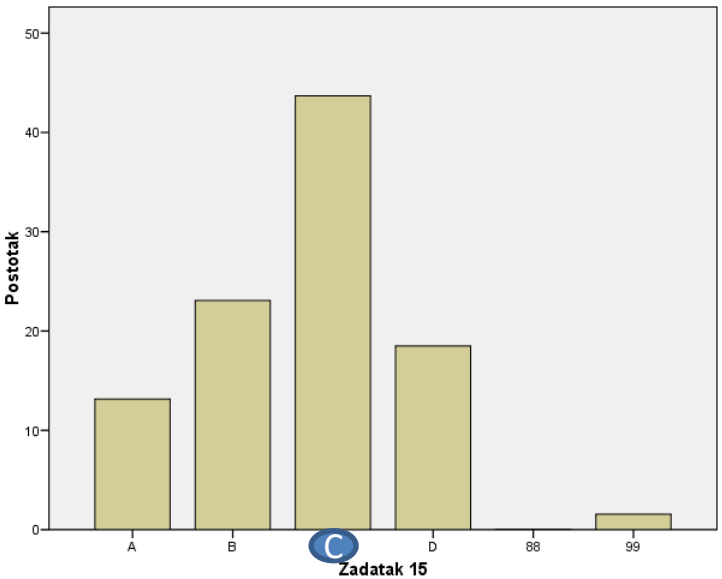
M	0,81
M (O)	
ID	0,43

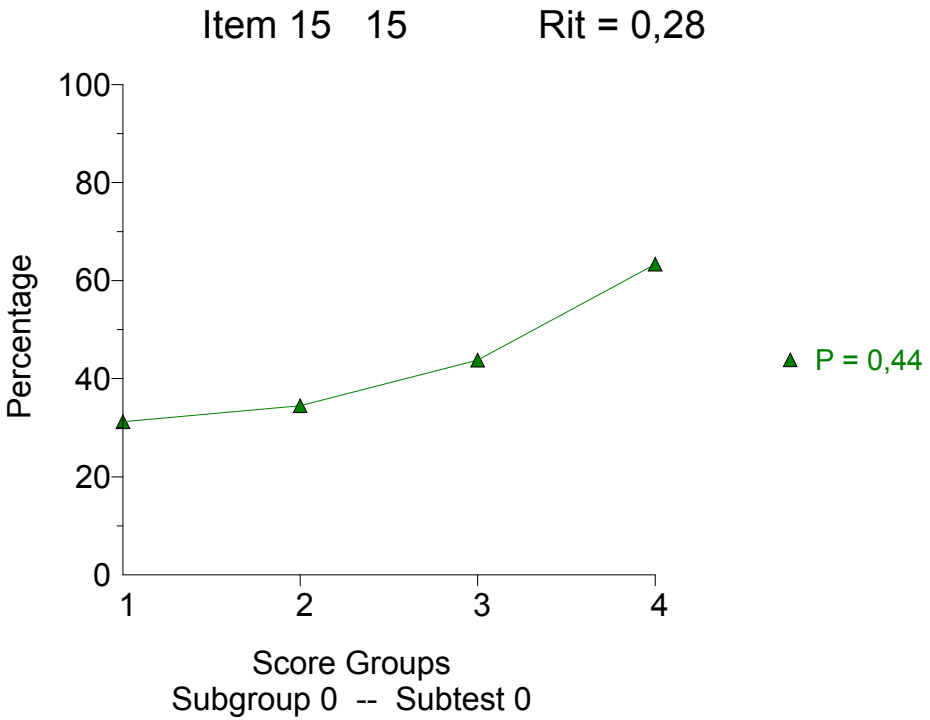




15. Osnovka (baza) uspravne četverostrane piramide je kvadrat. Duljina visine piramide je 8 cm. Mjera kuta između bočnoga brida i ravnine osnovke je 55˚. Odredite oplošje te piramide.

M	0,44
M (O)	
ID	0,20





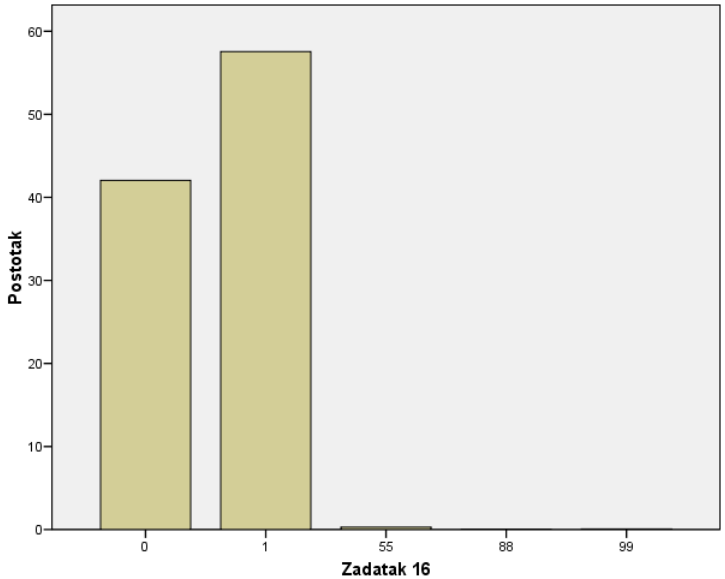
NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

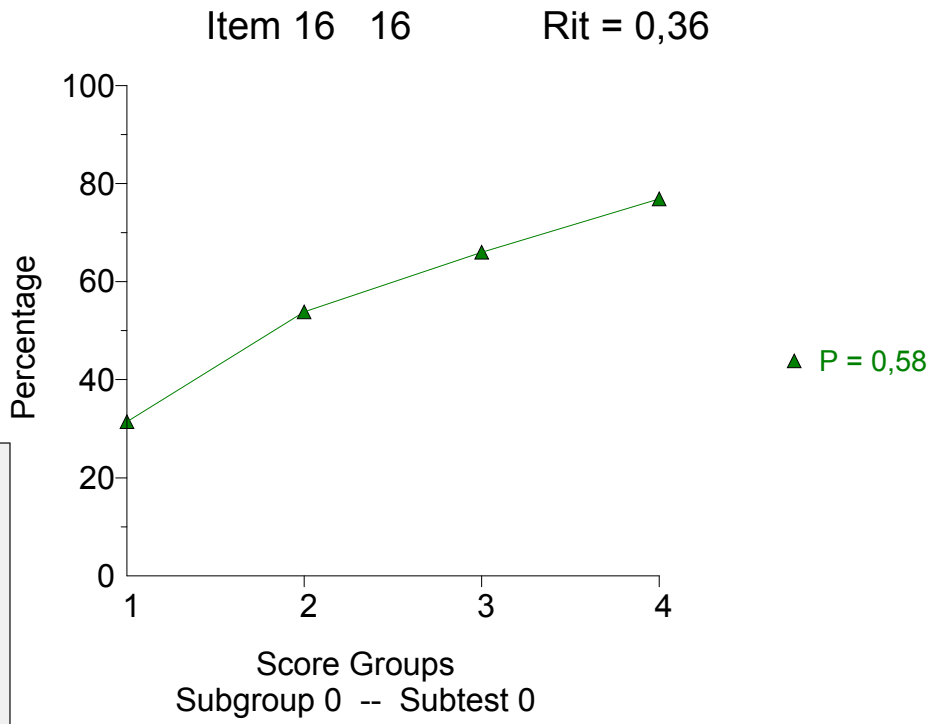
II. Zadatci kratkih odgovora

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

16. Izračunajte $\left(1.5-\frac{8}{15}\cdot\left(3\frac{1}{4}+\frac{1}{2}\right)\right):0.5$

M	0,58
M (O)	
ID	0,32

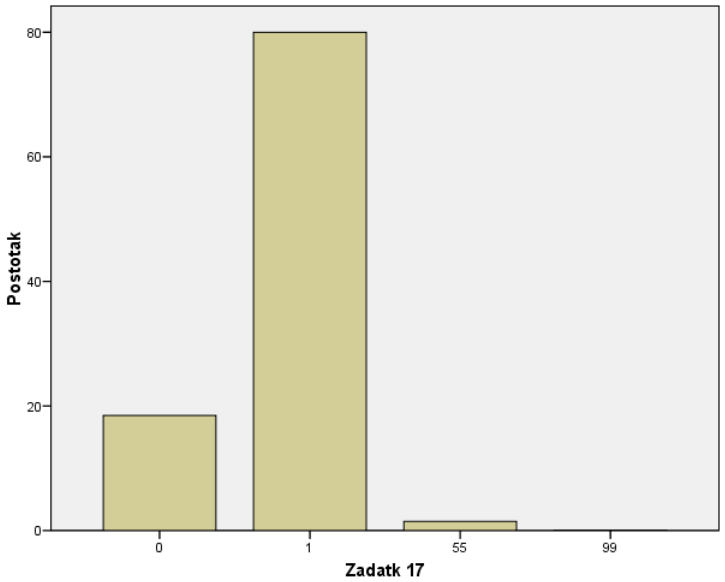


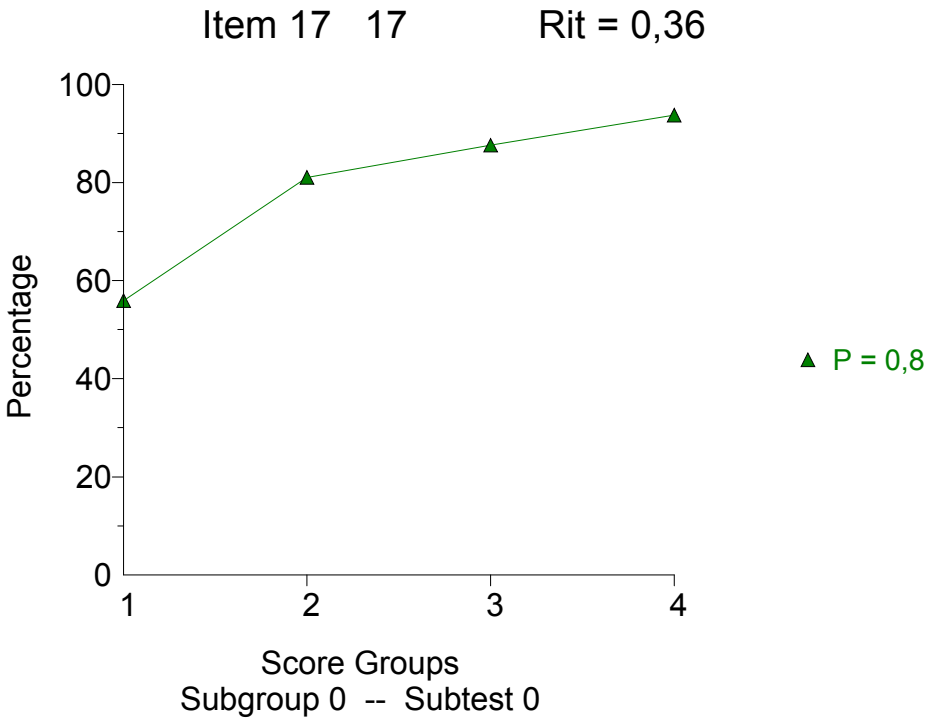


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

17. Riješite jednadžbu $\frac{2x-3}{x+5} = -2.$

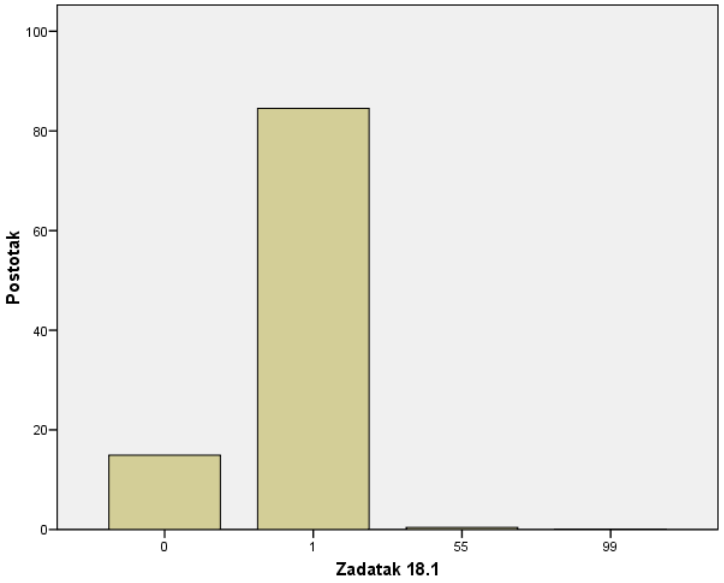
M	0,80
M (O)	
ID	0,33

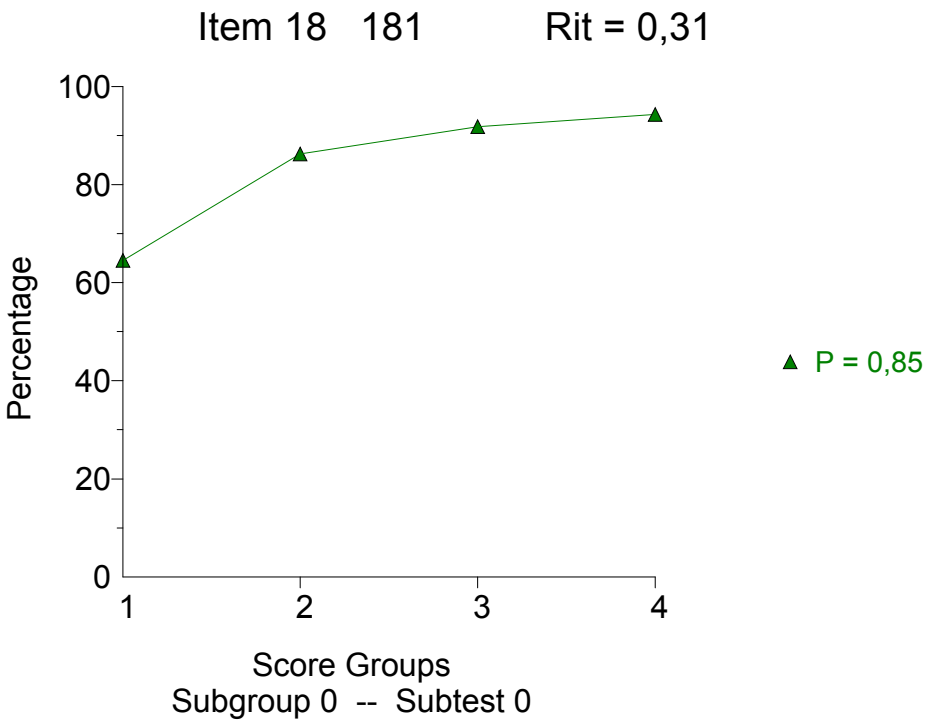




18.1. Riješite jednadžbu $2x^2 - 5x + 2 = 0$.

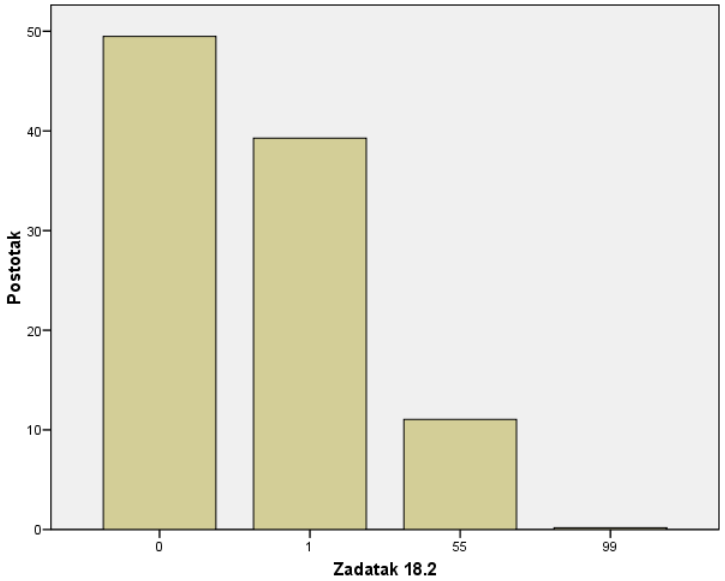
M	0,85
M (O)	
ID	0,29

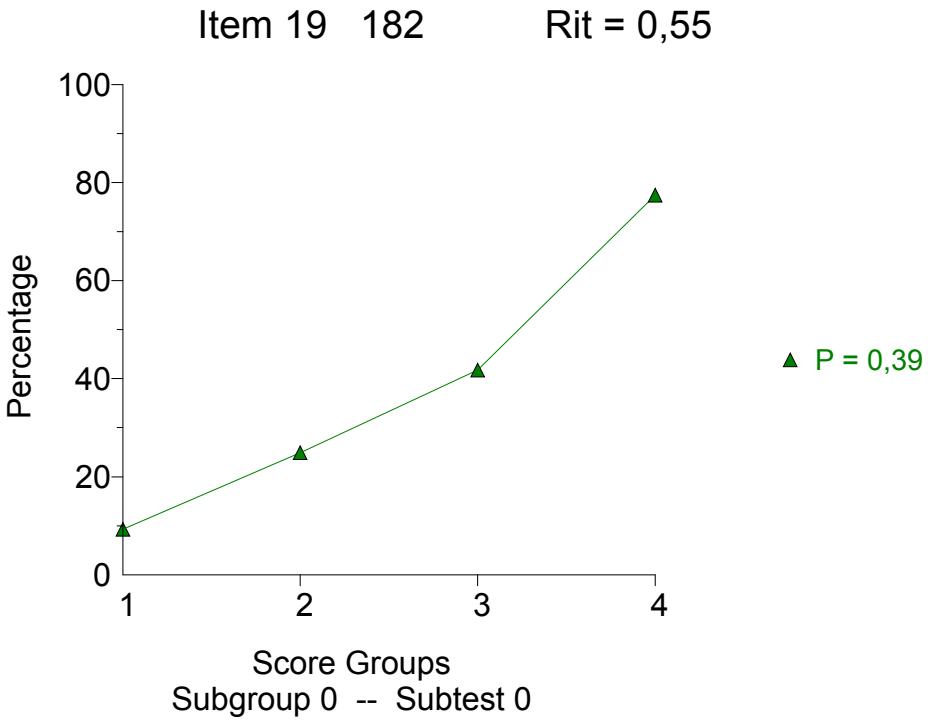




18.2. Riješite nejednadžbu $2x^2 - 5x + 2 < 0$.

M	0,39
M (O)	
ID	0,52





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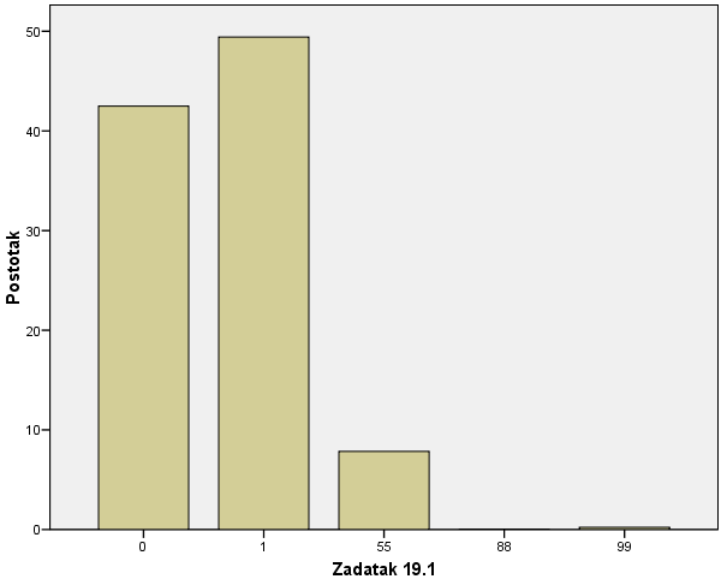
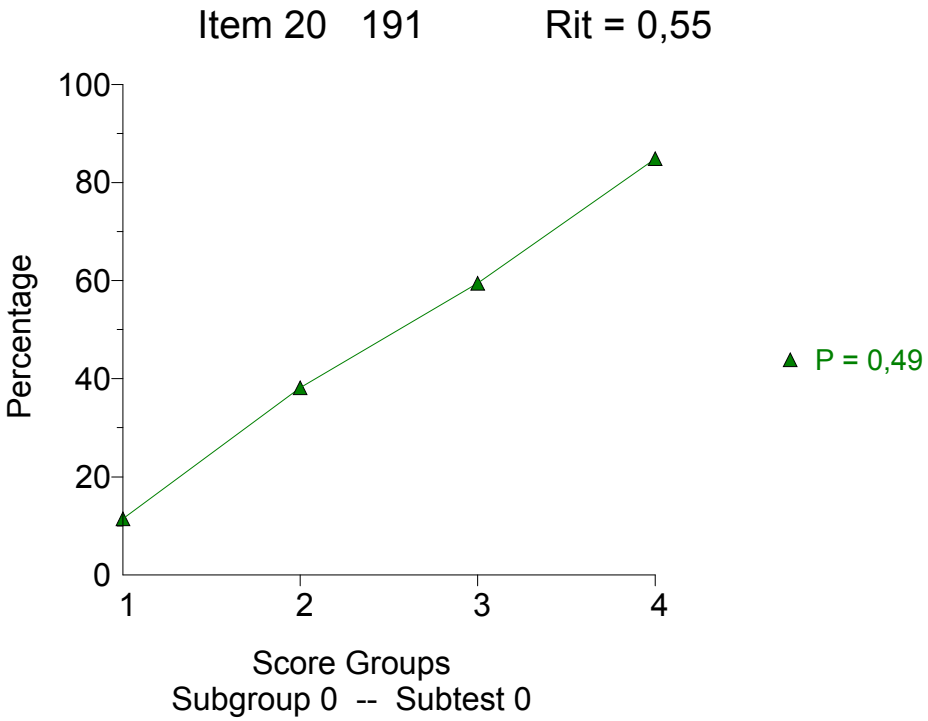
19. U trokutu ABC je mjera kuta a = 20˚, lABl = 26 cm i lACl = 18 cm.

19.1. izračunajte duljinu stranica $\overline{BC}$

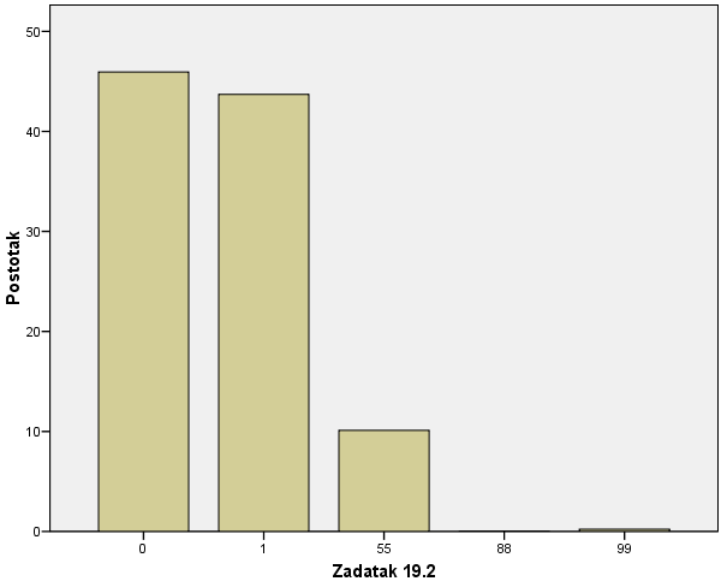
M	0,49
M (O)	
ID	0,52

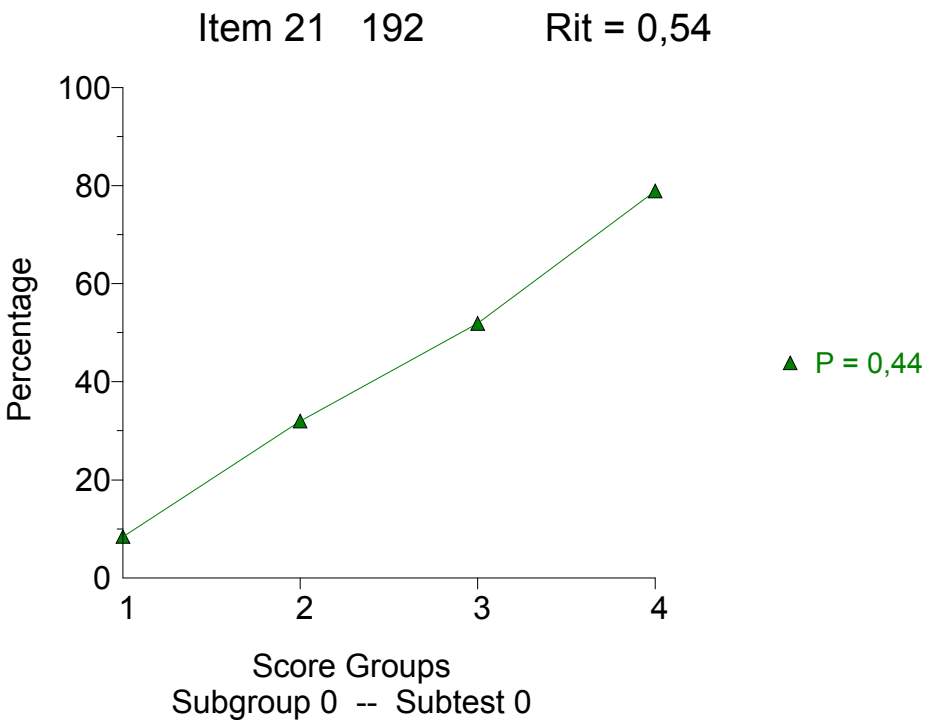




19.2. izračunajte mjeru kuta β pri vrhu B.

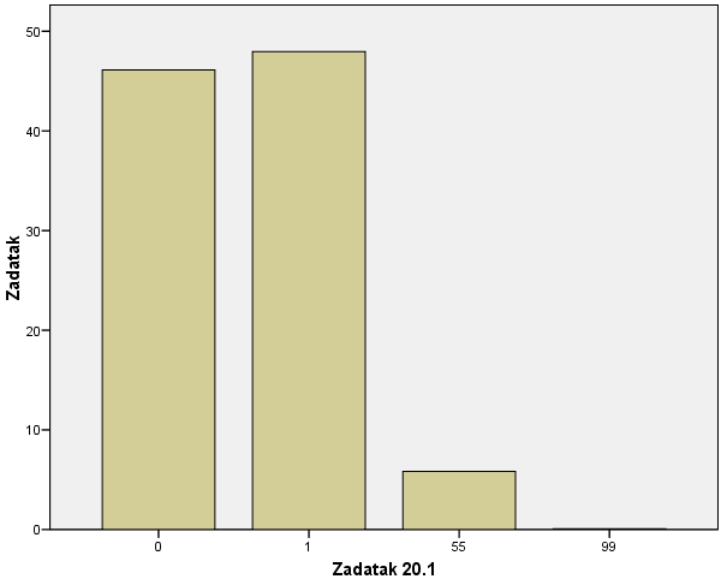
M	**0,44**
M (O)	
ID	**0,51**

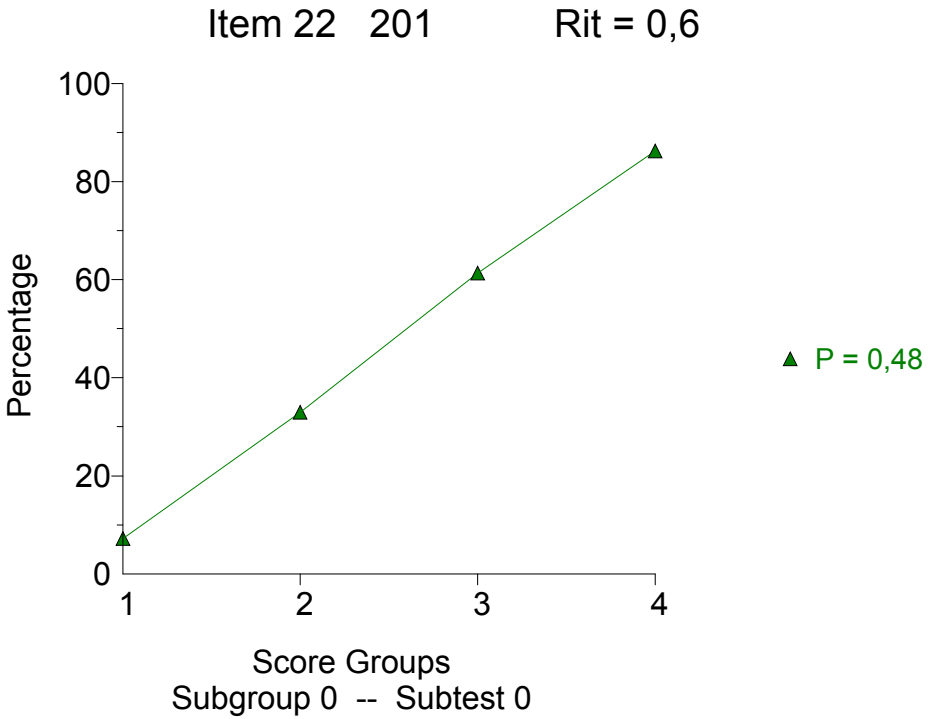




20.1. Napišite jednadžbu pravca prikazanoga grafom.

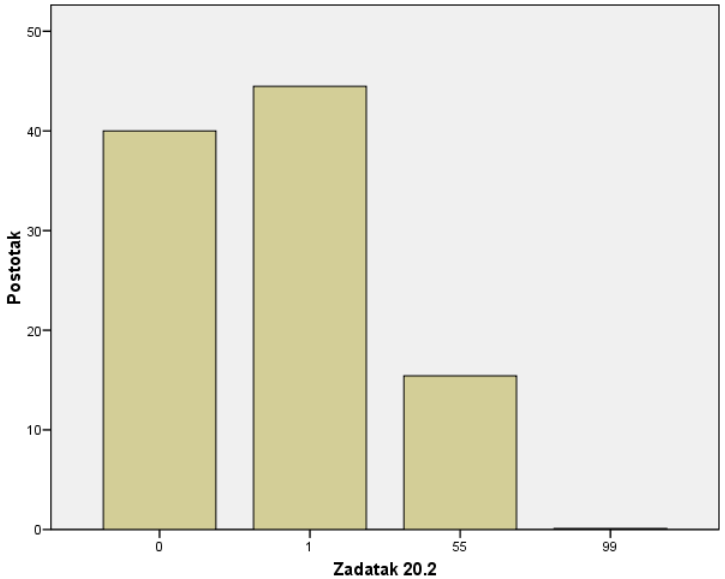
M	0,48
M (O)	
ID	0,58

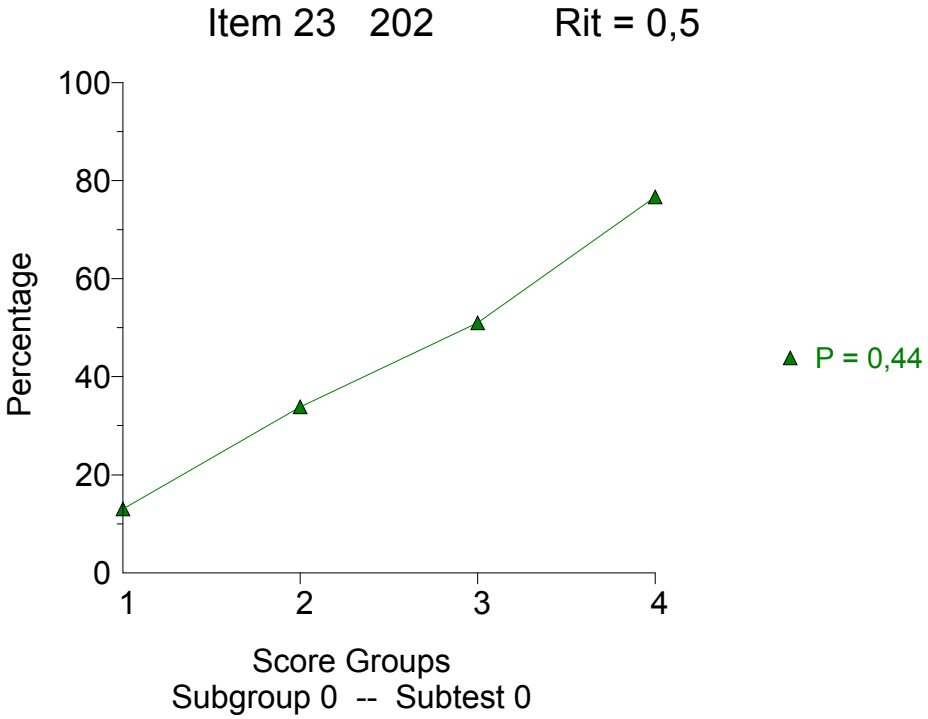




20.2. Izračunajte površinu trokuta kojega pravac zatvara s koordinatnim osima.

M	0,44
M (O)	
ID	0,47

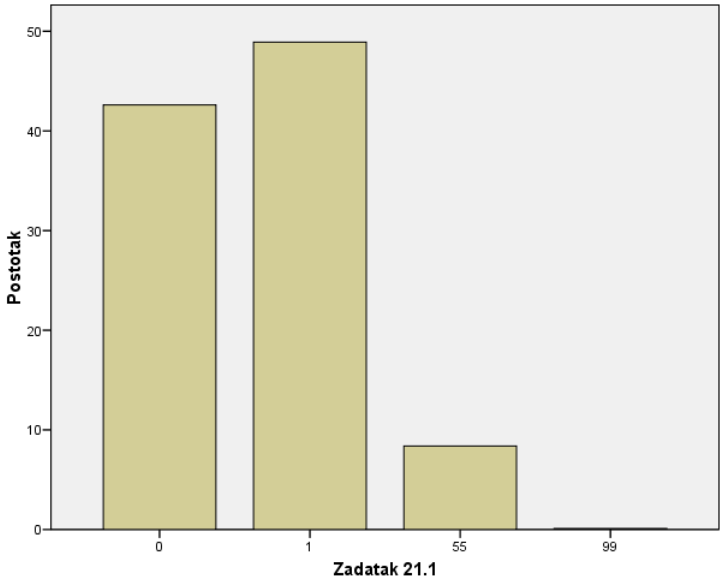


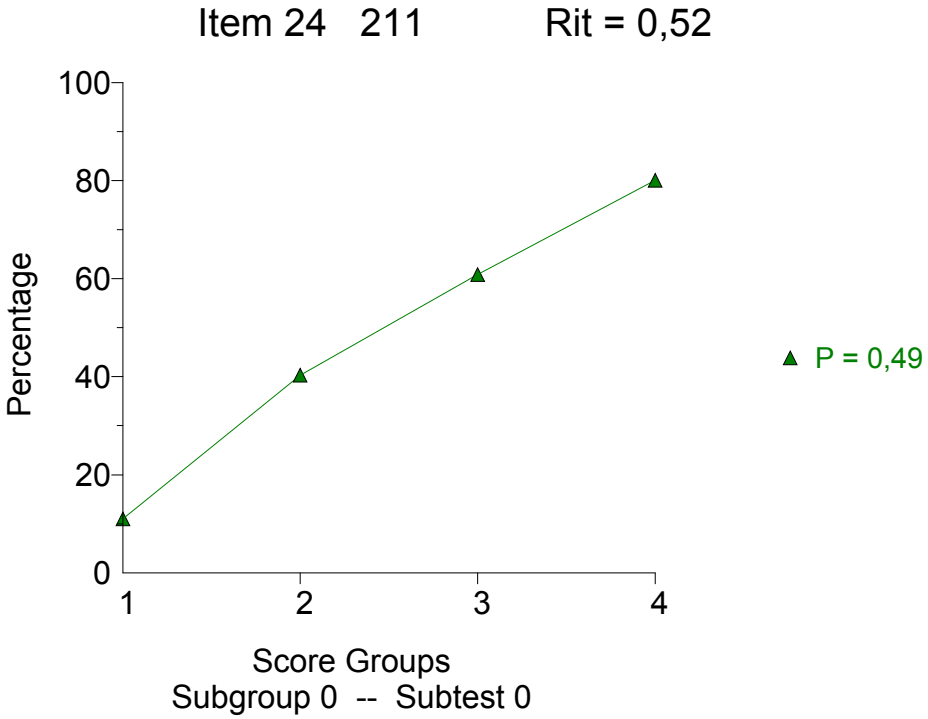


21. Zadan je pravac $y = -\frac{1}{2}x + 4.$

21.1. odredite udaljenost ishodišta oda zadanoga pravca.

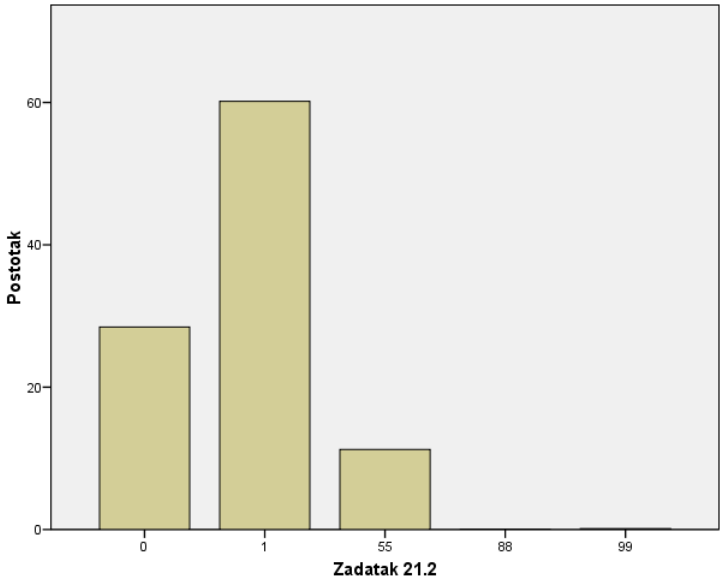
M	0,49
M (O)	
ID	0,49

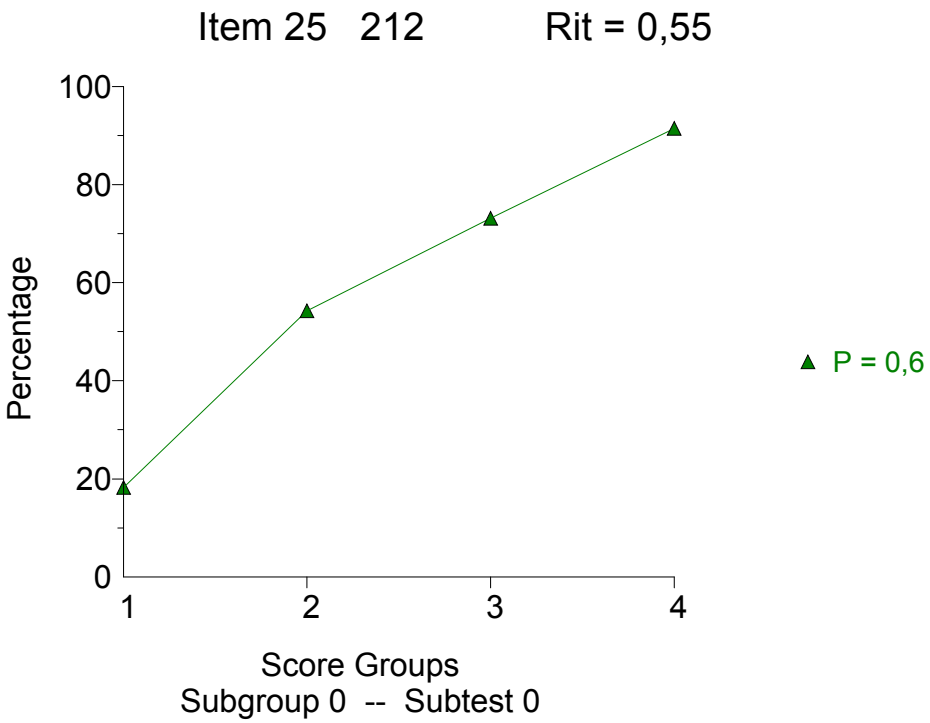




21.2. odredite pravac koji prolazi točkom (4,0) i usporedan je sa zadanim pravcem.

M	0,60
M (O)	
ID	0,53

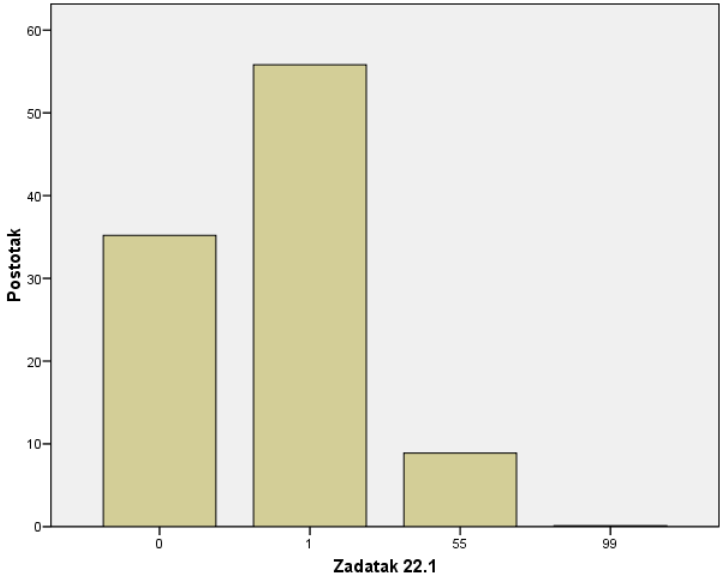


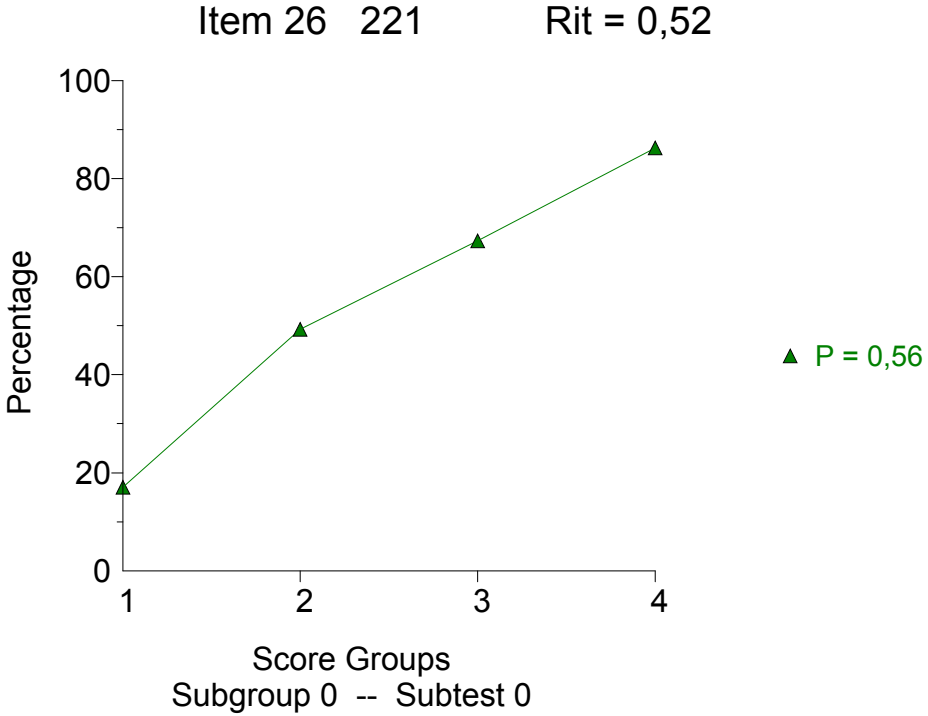


22. Kružnica je zadana jednadžbom $(x+1)^2+(y-2)^2=25$.

22.1. odredite točku T (-1,y) zadane kružnice za koju je y>0.

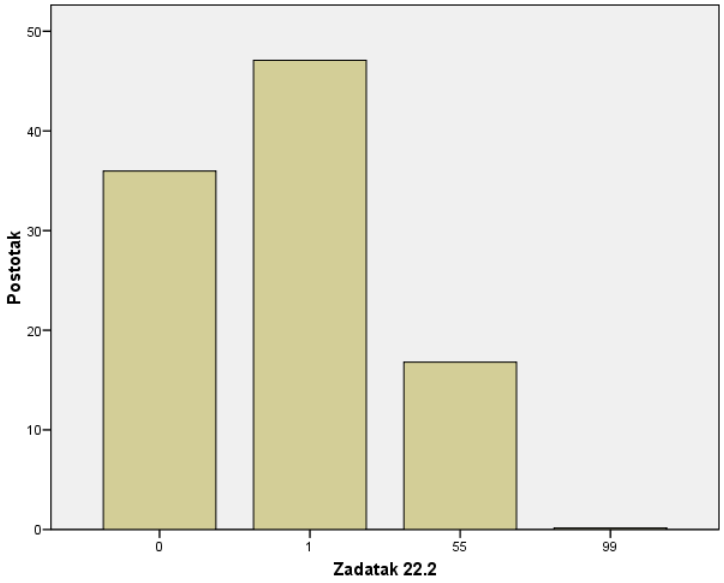
M	0,56
M (O)	
ID	0,49

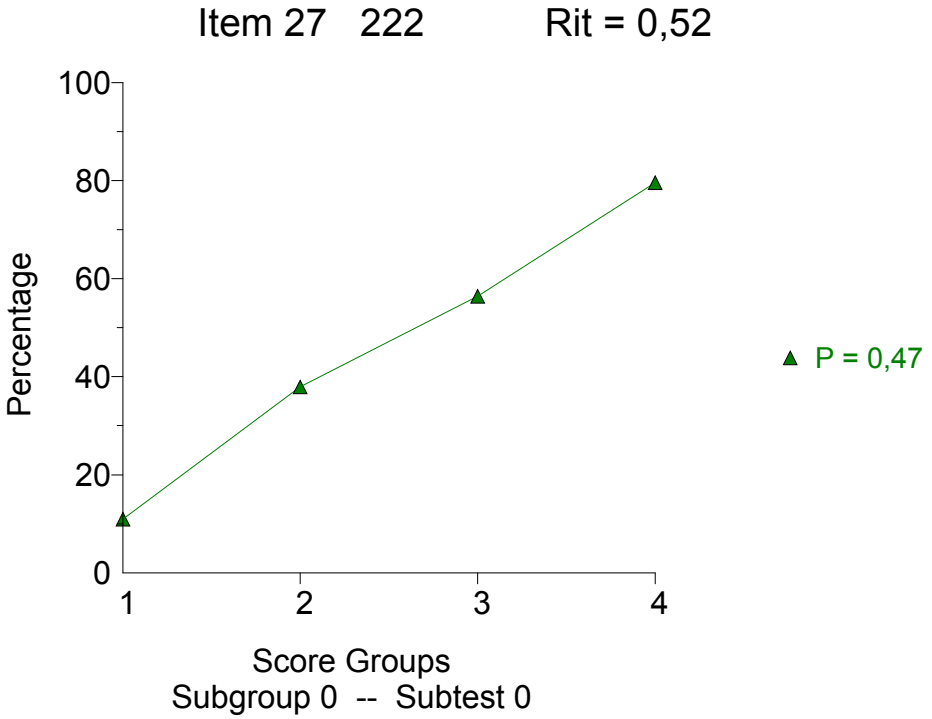




22.2. Odredite jednadžbu tangente u točki *A* (2, 6).

M	**0,47**
M (O)	
ID	**0,49**

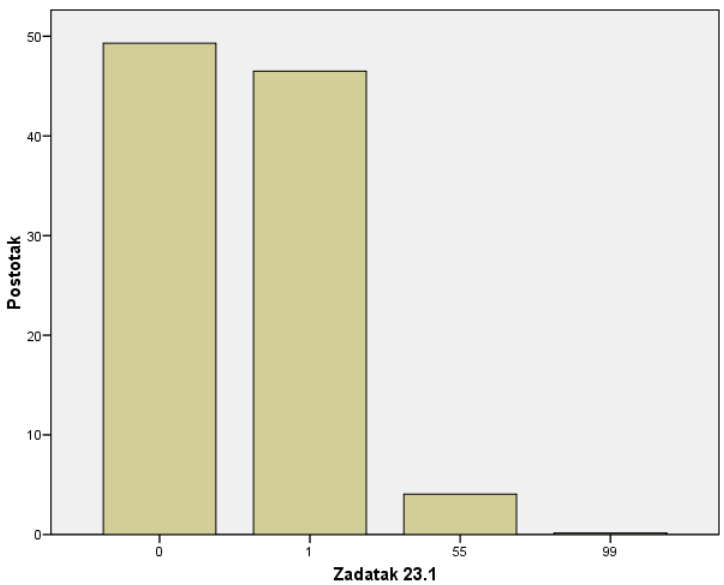


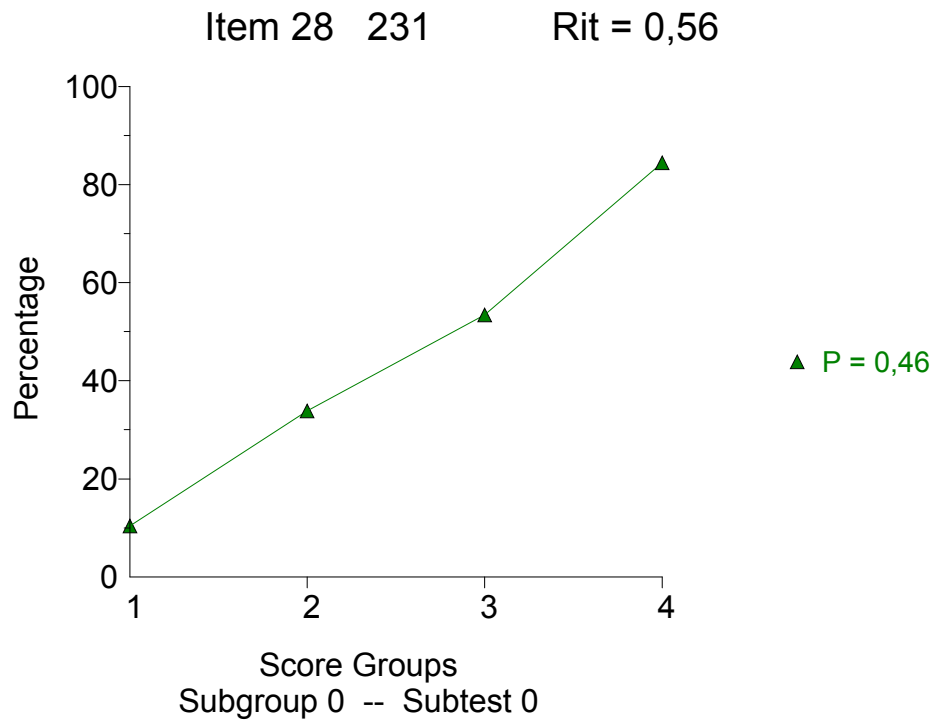


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

23.1. Odredite $\sin\left(\frac{7\pi}{4}\right)$.

M	0,46
M (O)	
ID	0,53

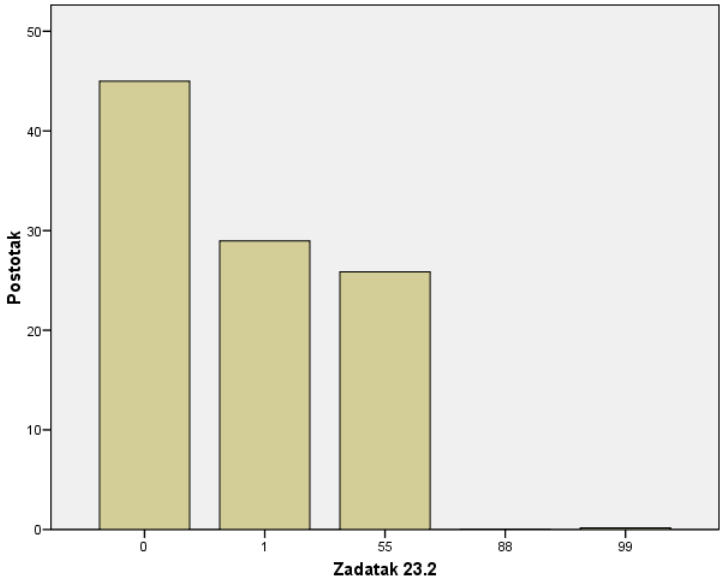


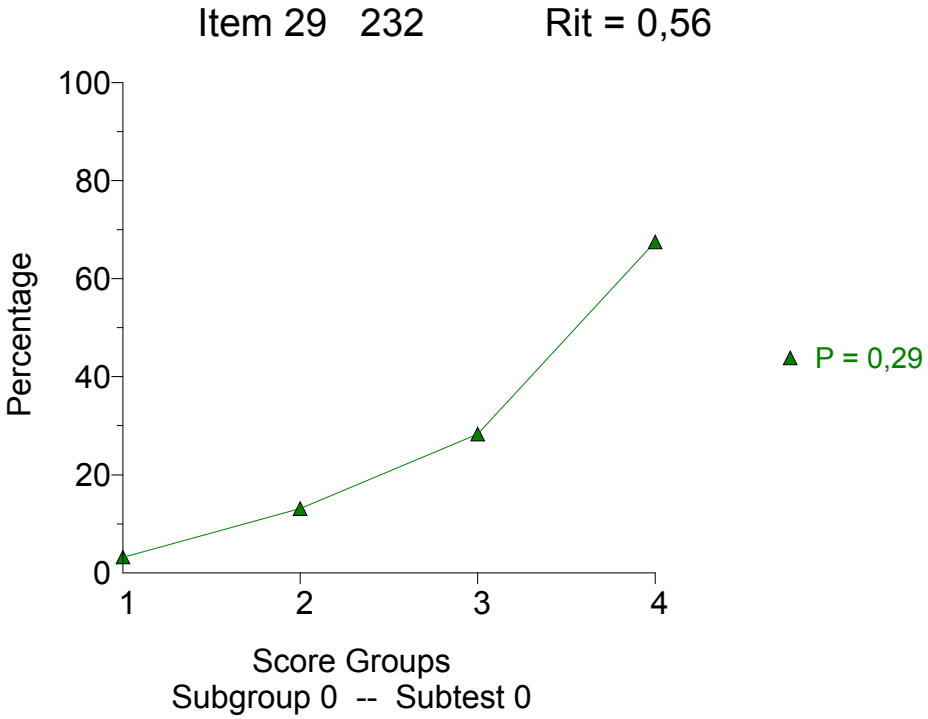


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

23.2. $x = \frac{7\pi}{4}$ odredite vrijednost funkcije $f(x) = \frac{\cos x - \sin x}{\cos^2 x + 1}$.

M	0,29
M (O)	
ID	0,53



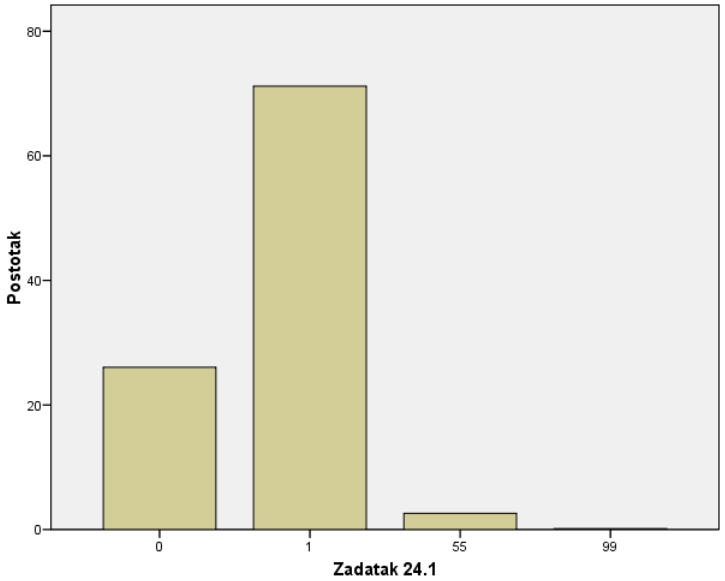


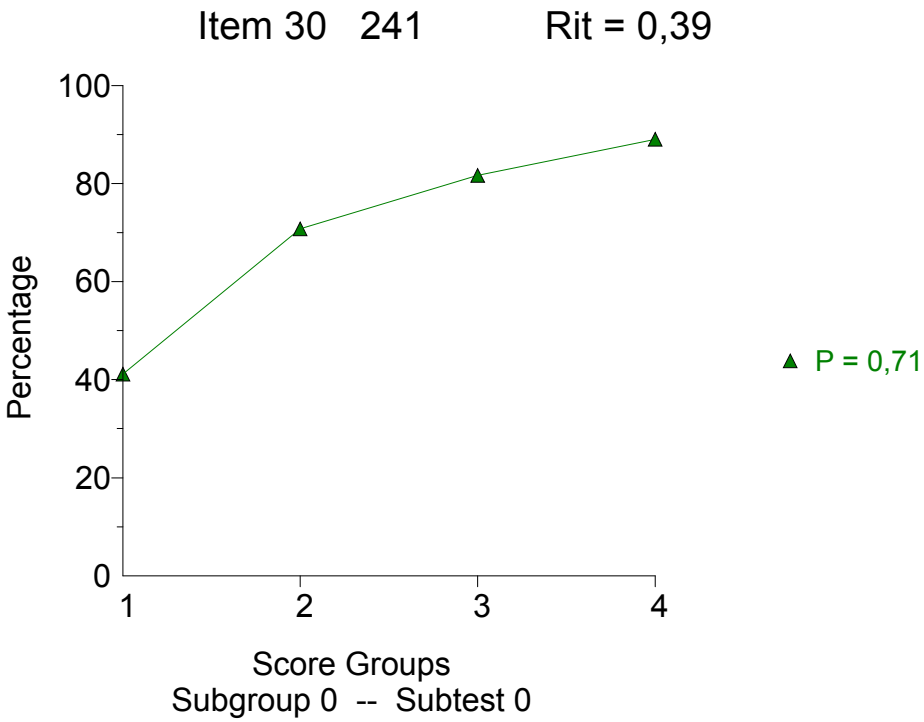
NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

24. Ulaganjem 1000 kn u banku nakon n godina dobiva se $1000 \cdot \left(\frac{5.2}{100}\right)^n$. kuna.

24.1. koliki je iznos nakon 5 godina?

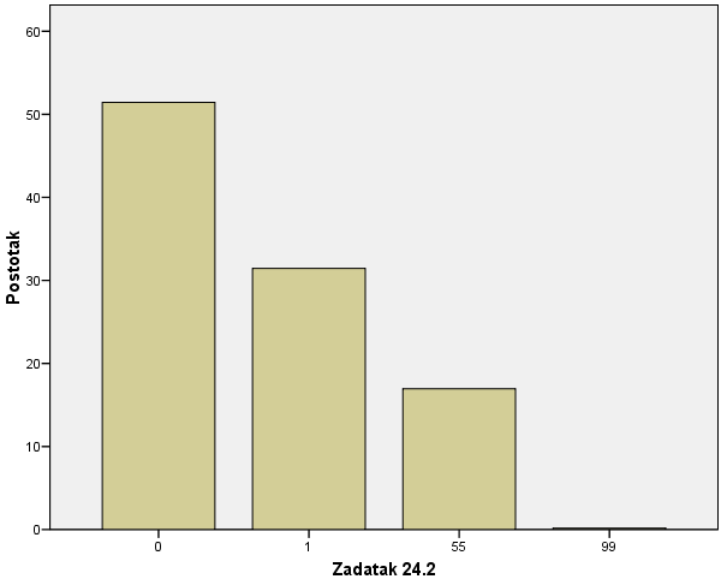
M	0,71
M (O)	
ID	0,36

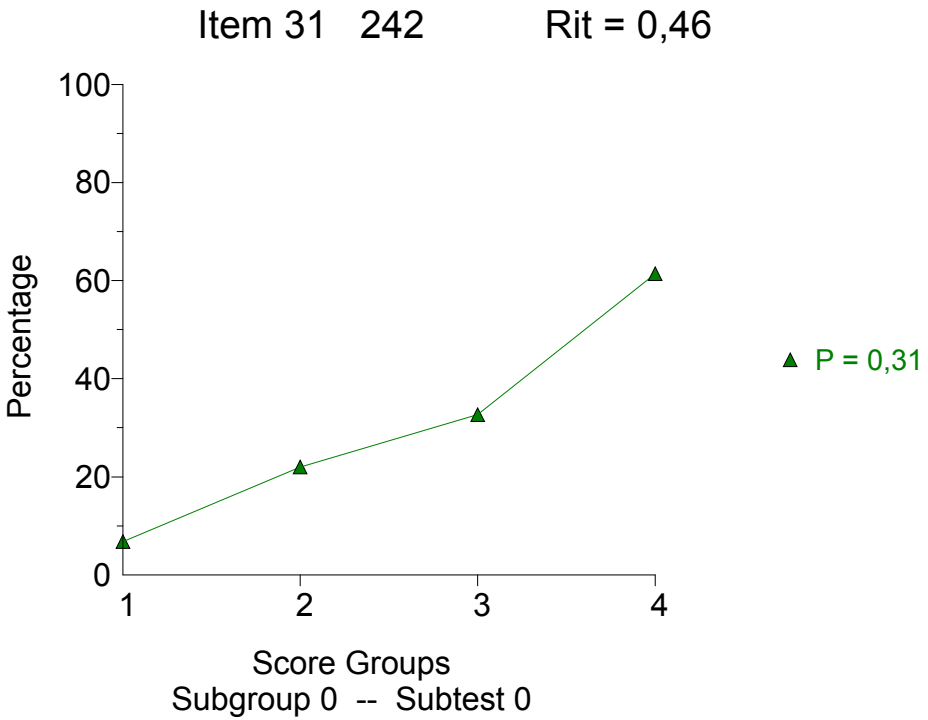




24.2. Za koliko bi godina iznos od 1000 kn narastao na 10 000 kn?

M	0,31
M (O)	
ID	0,43



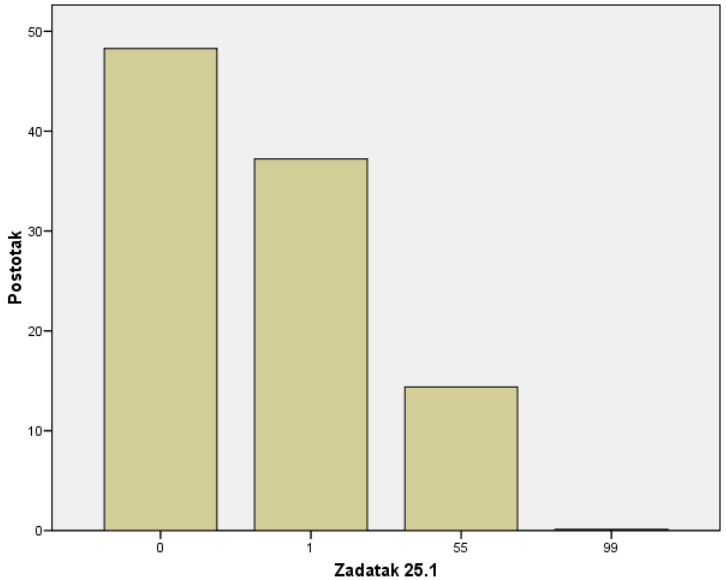


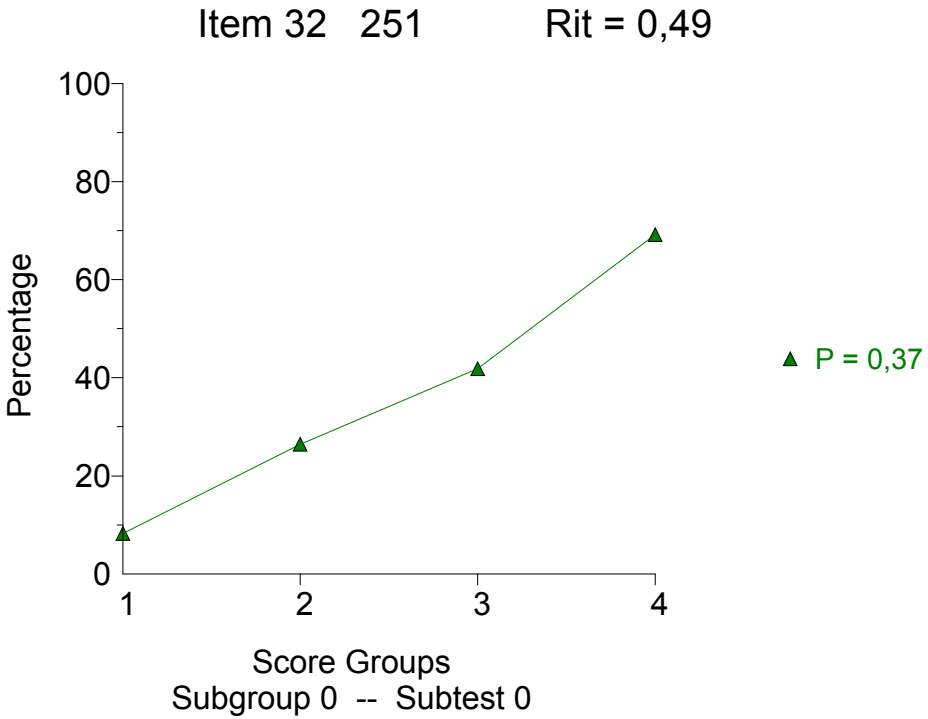
NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

25. Temperatura T (u ˚C) u stakleniku t sati nakon početka sumraka dana je formulom $T(t) = \frac{1}{4}t^2 - 5t + 30$, $0 \leq t \leq 12$. Uzima se da sumrak počinje u 19:00 sati.

25.1. Kolika je temperatura bila u 21:00 sat?

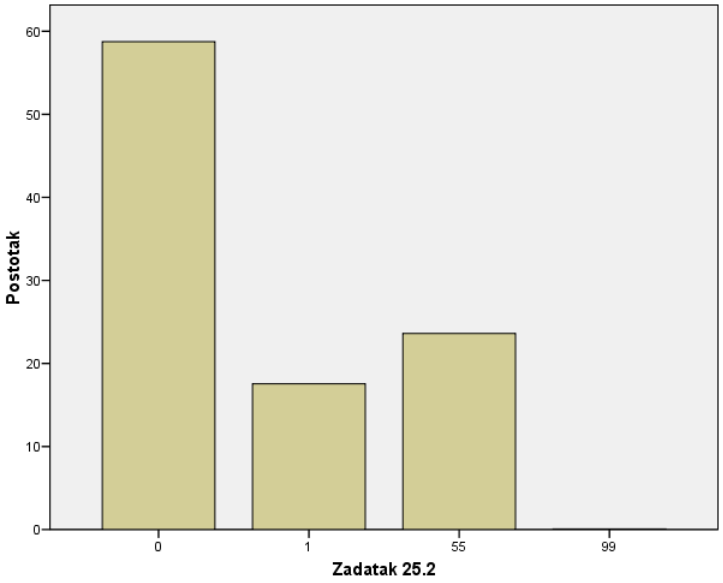
M	0,37
M (O)	
ID	0,46

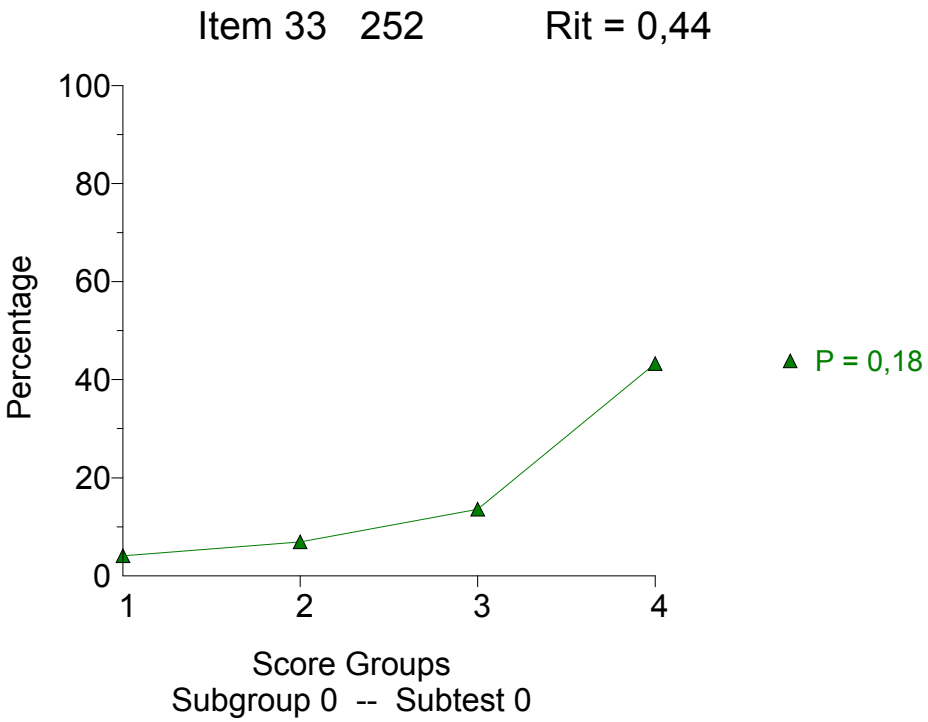




25.2. U koliko je sati temperatura bila minimalna?

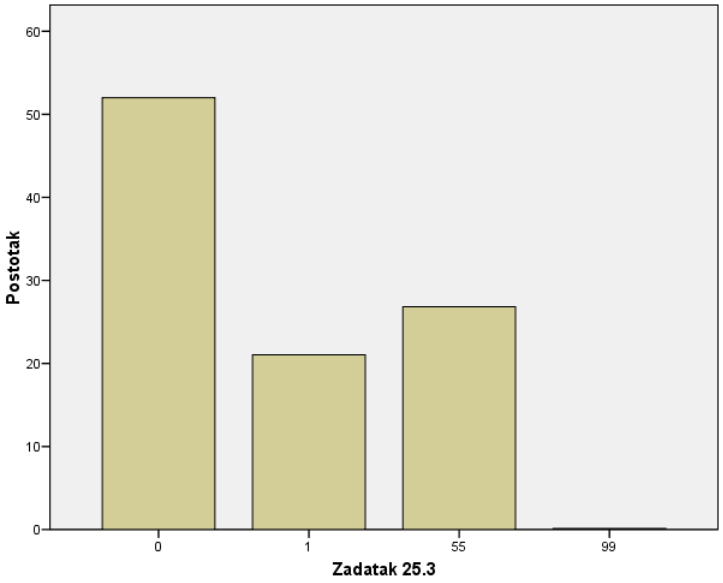
M	0,18
M (O)	
ID	0,42

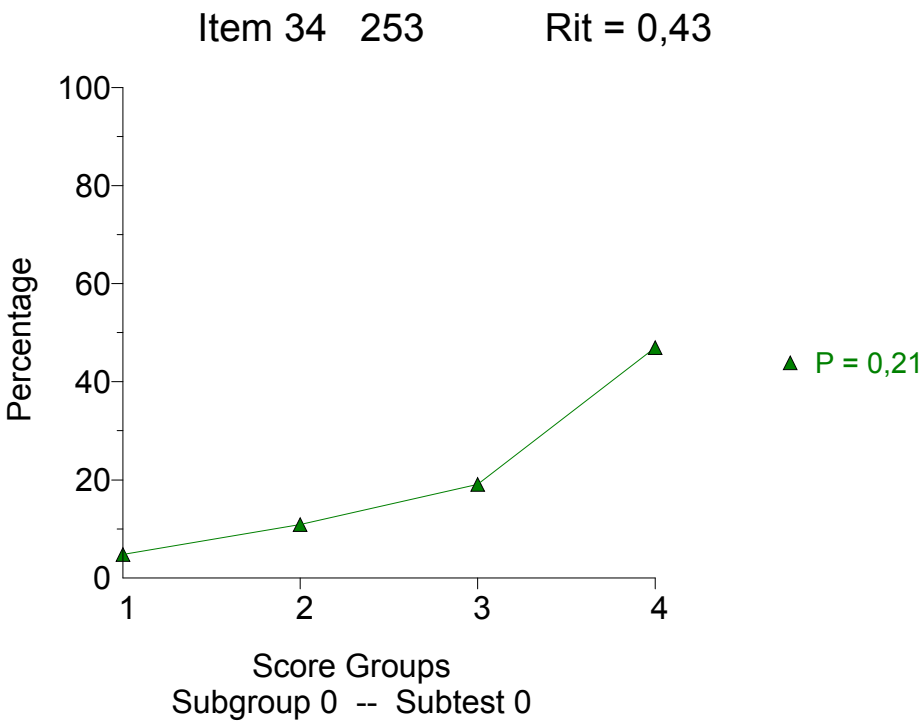




25.3. Koliko je iznosila minimalna temperatura u stakleniku?

M	0,21
M (O)	
ID	0,41

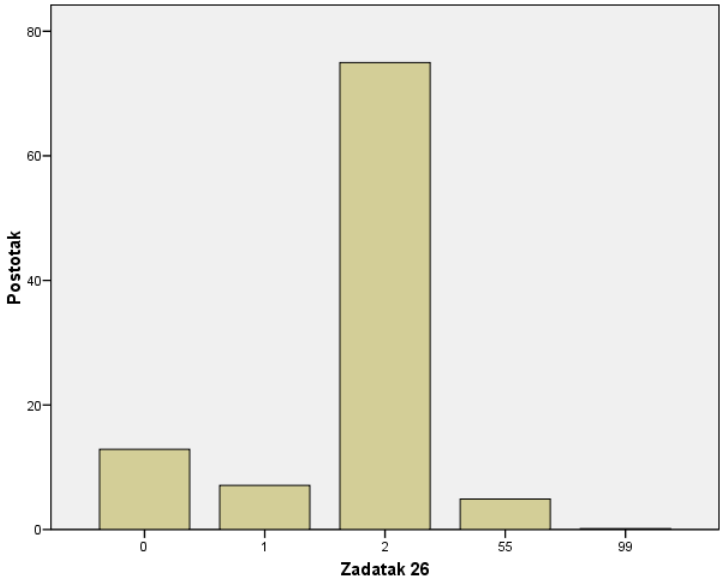


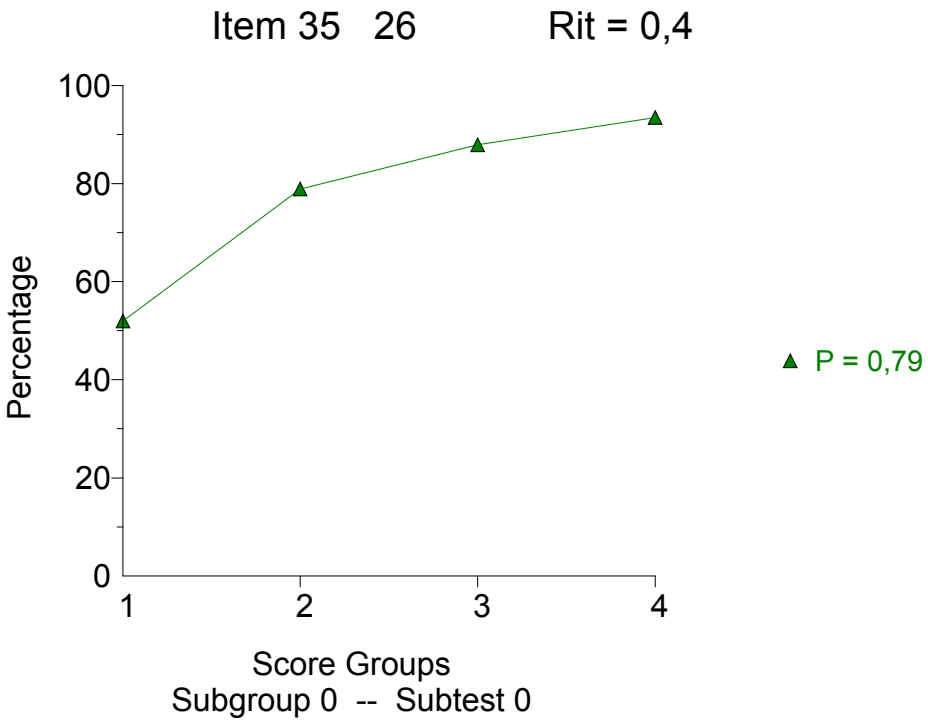


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

26. Marija je za sedamnaesti rođendan dobila na dar buket od 17 ruža, bijelih i crvenih. Cijena bijele ruže je 8 kn, a crvene 9 kn. koliko je u buketu bilo crvenih, a koliko bijelih ruža ako je buket plaćen 142 kn?

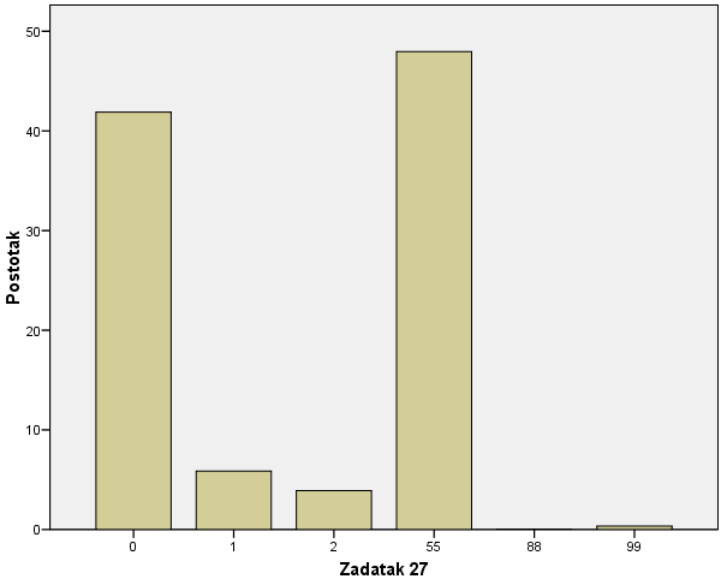
M	1,57 (0,79)
M (O)	
ID	0,35

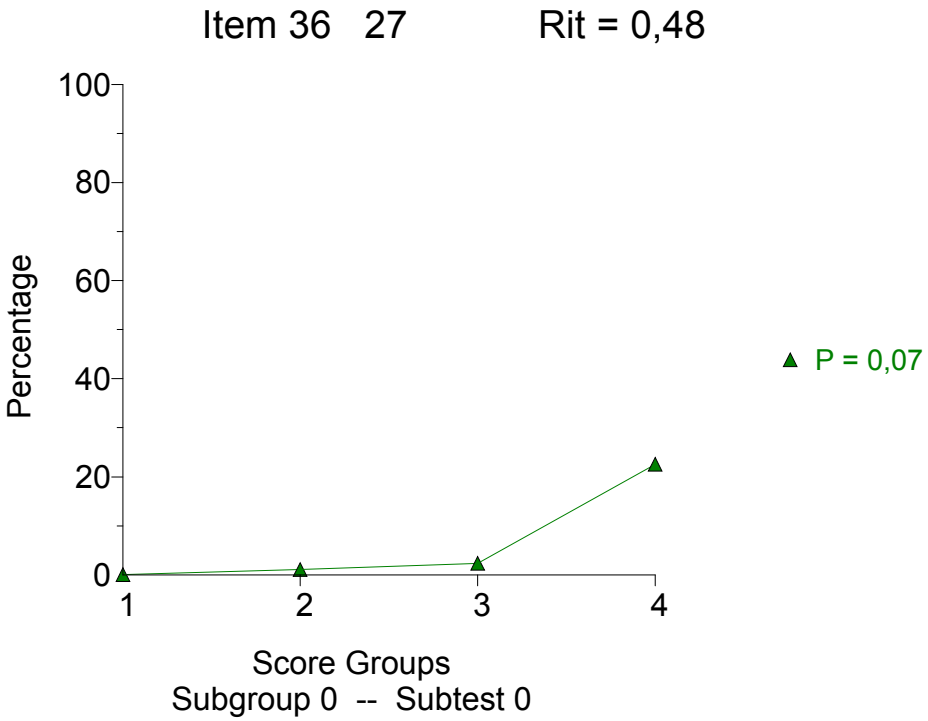




27. Odredite rješenja jednadžbe cos 2x – cosx=0 iz intervala $[0,2\pi\rangle$.

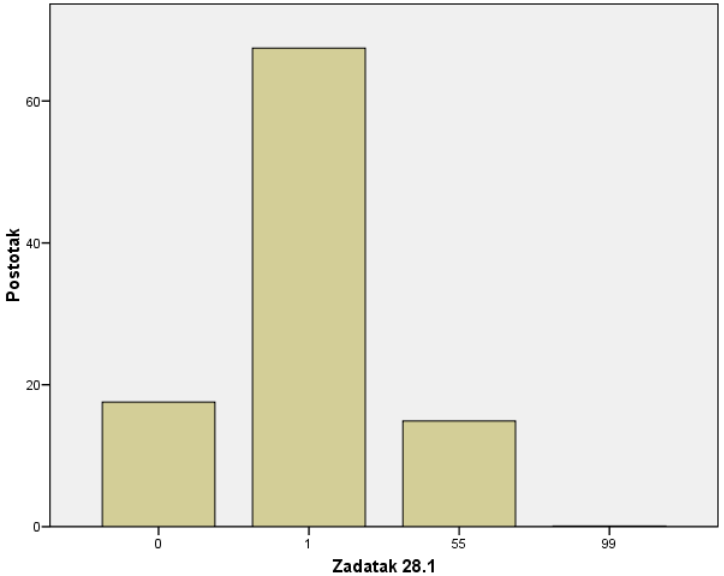
M	**0,14 (0,07)**
M (O)	
ID	**0,35**

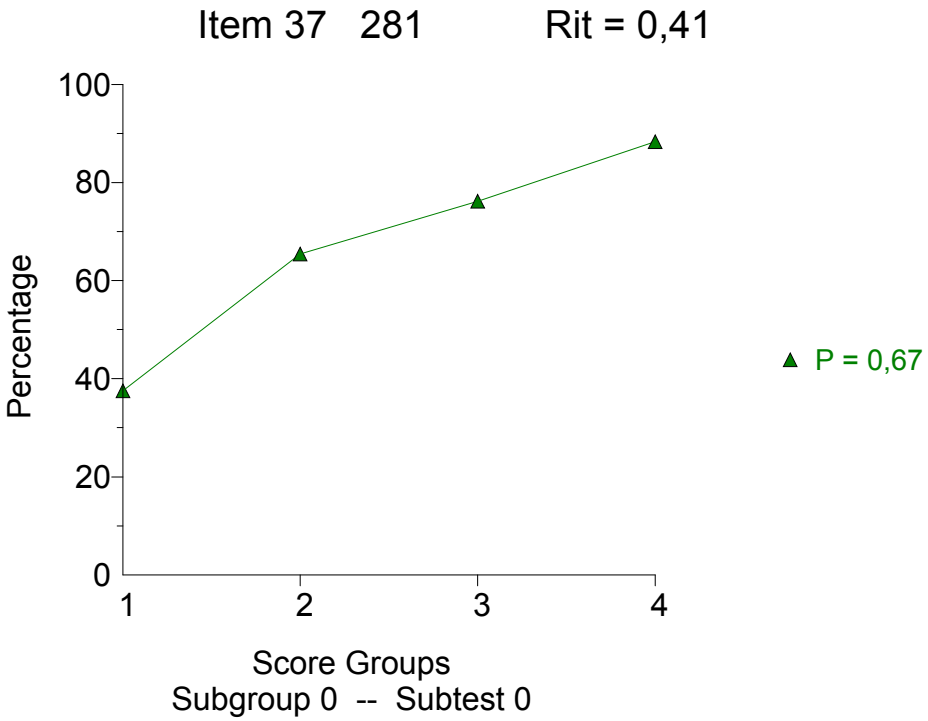




28.1. Zadane su točke A(1,2), B(3,5,). Odredite vektor $\vec{a} = \overrightarrow{AB}$ kao linearnu kombinaciju jediničnih vektora $\vec{i}$ $\vec{j}$

M	0,67
M (O)	
ID	0,38

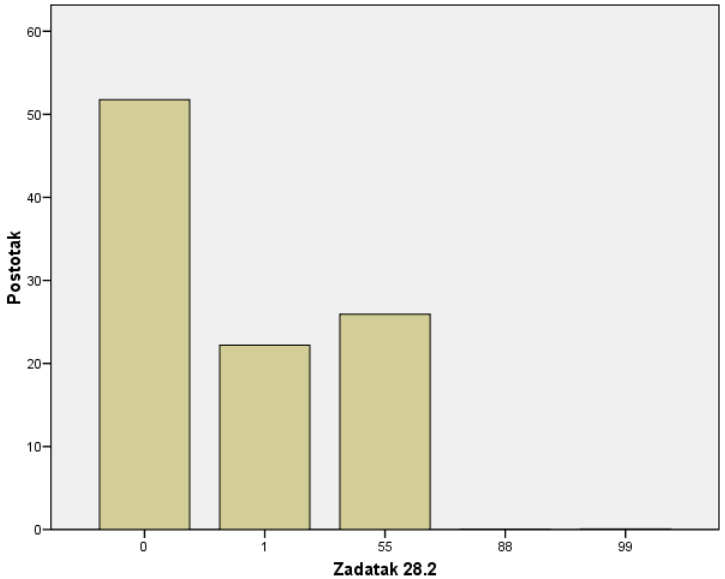


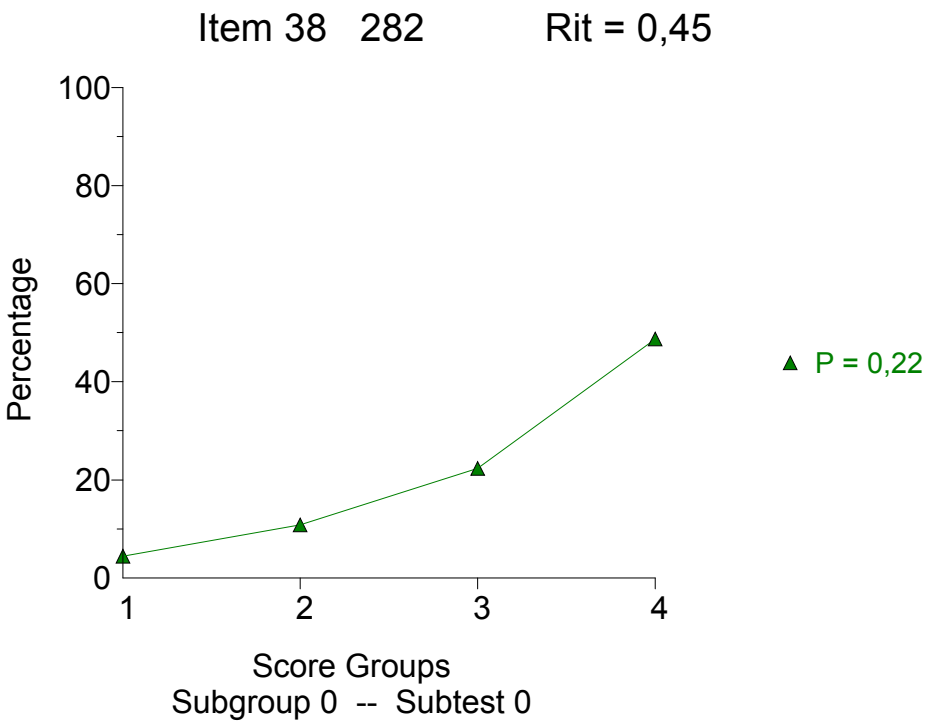


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

28.2. odredite $(2\vec{i}+3\vec{j})\cdot(\vec{i}-4\vec{j})$.

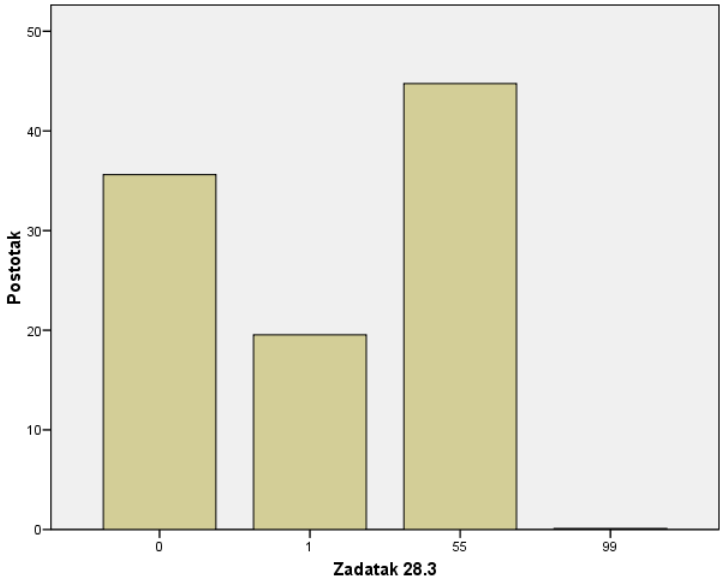
M	0,22
M (O)	
ID	0,42

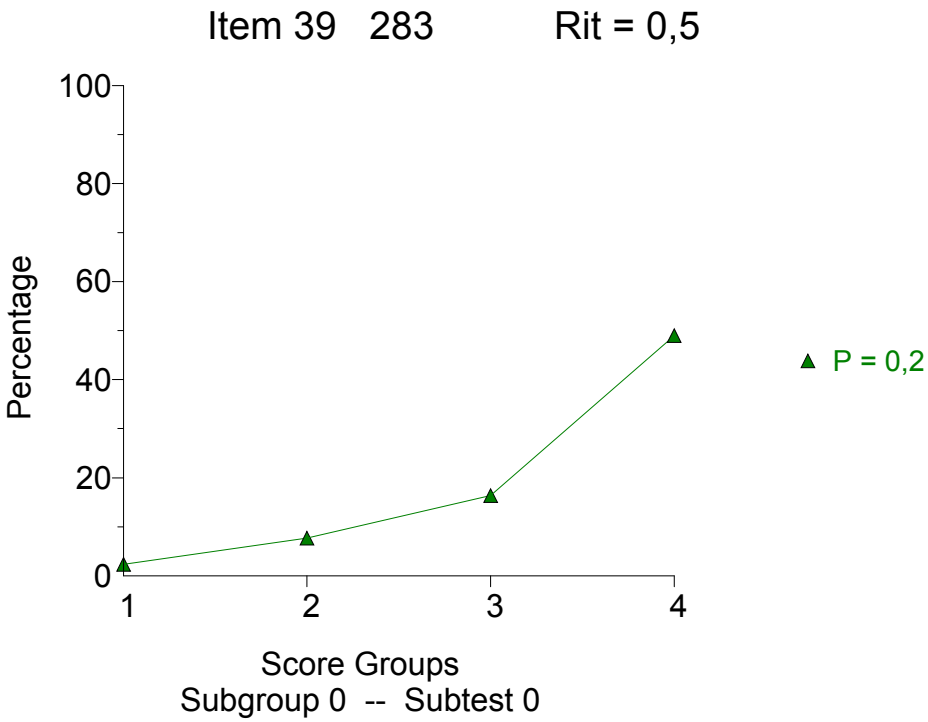




28.3. Odredite a tako da su vektori $a\vec{i}+3\vec{j}$ i $\vec{i}-4\vec{j}$ okomiti.

M	**0,20**
M (O)	
ID	**0,48**





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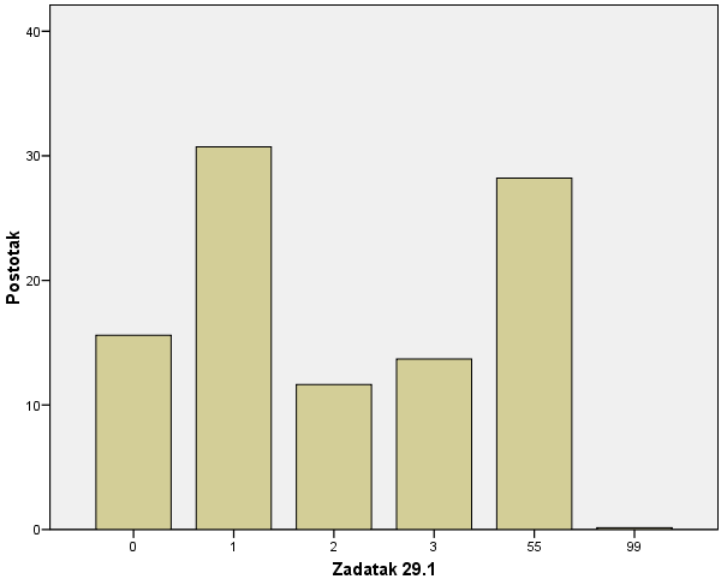
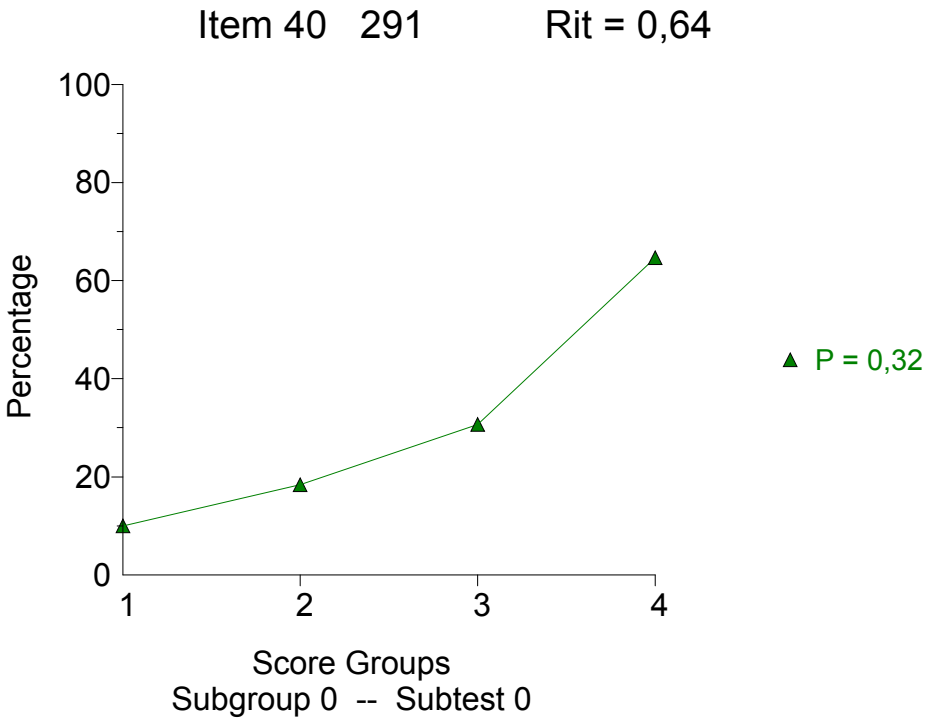
III. Zadatci produženih odgovora

NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

29.1. Odredite amplitudu i period funkcije $f(x) = 3\sin\frac{x}{2}$ te sve nultočke iz intervala [0,6π].

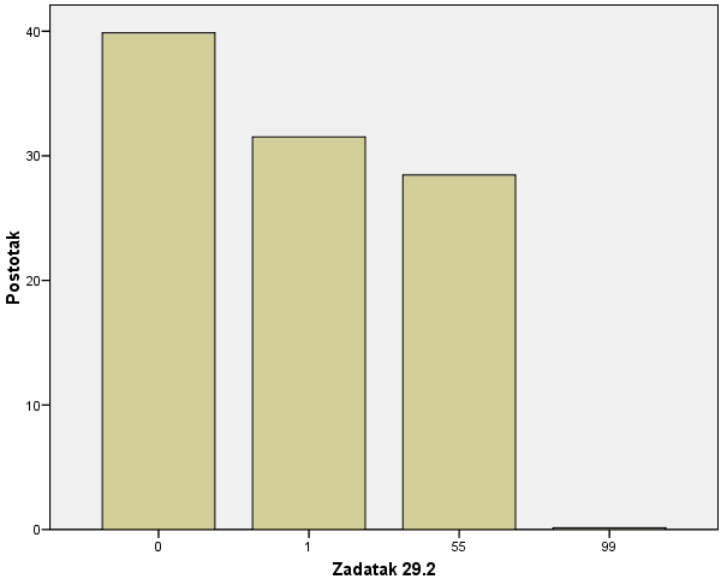
M	0,95 (0,32)
M (O)	
ID	0,59

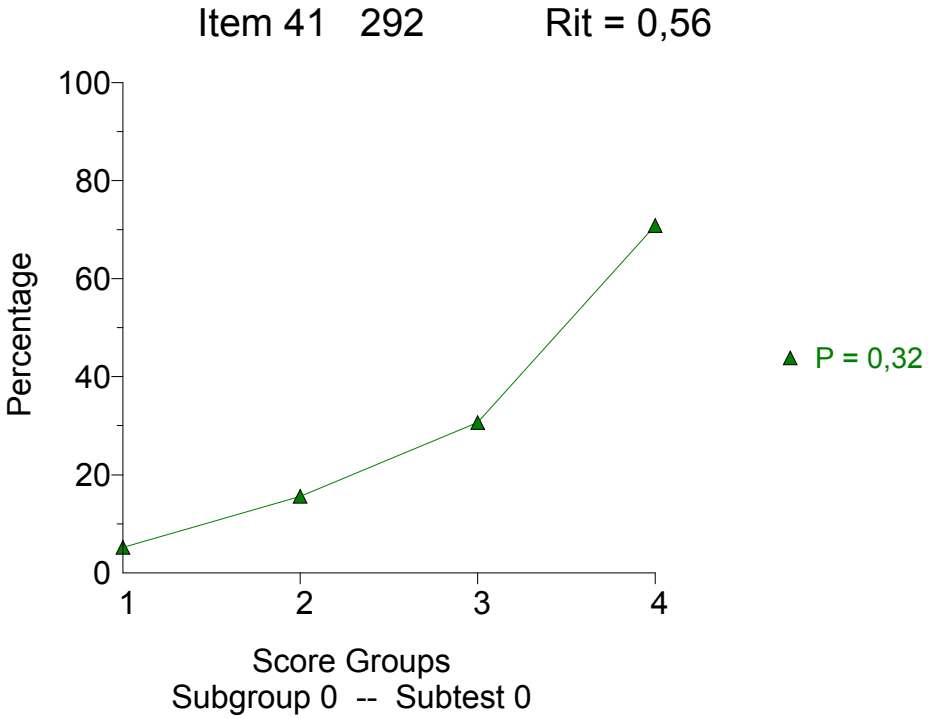




29.2. Na intervalu [0,6π] nacrtajte graf funkcije $f(x) = 3\sin\frac{x}{2}$

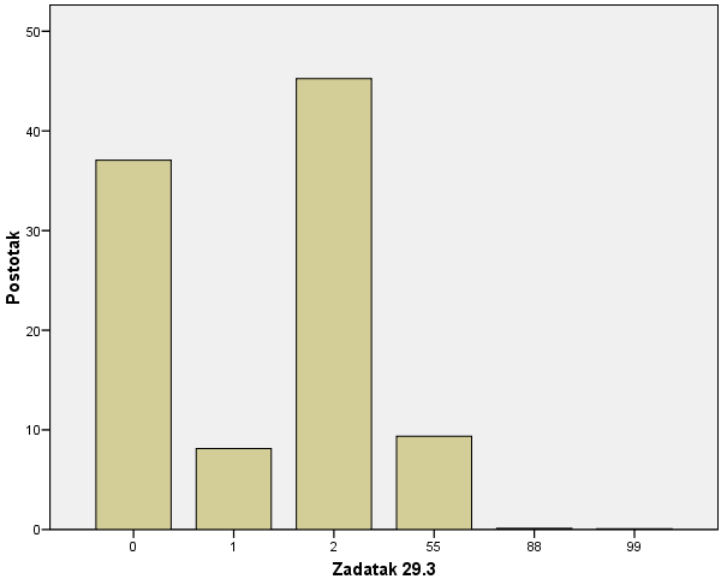
M	0,32
M (O)	
ID	0,54

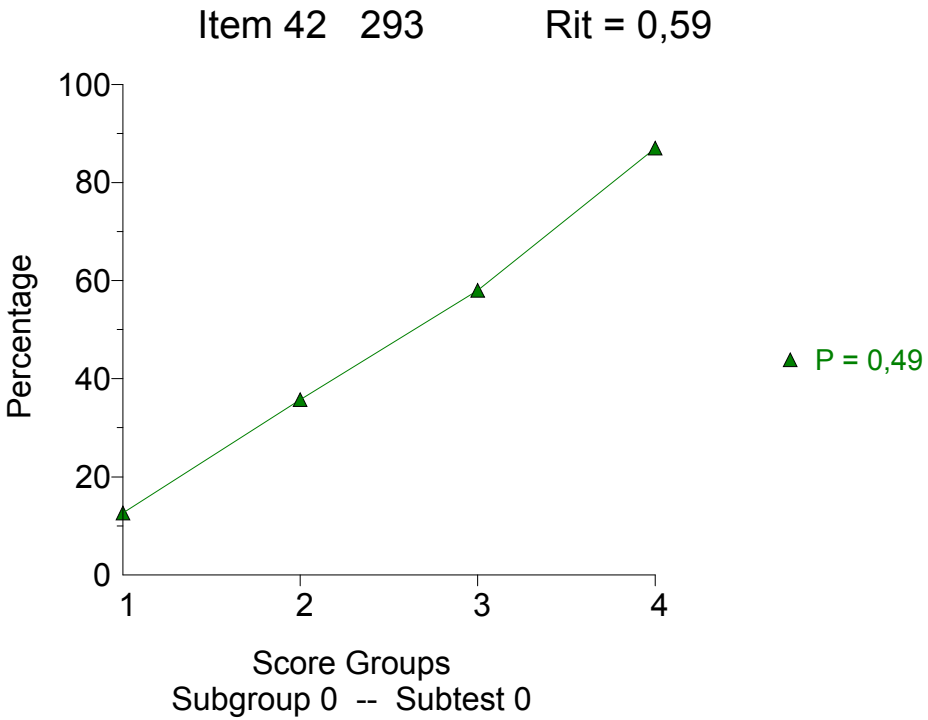




29.3. Na brojevnoj kružnici označite sve točke E(t) za koje je sin $t = \frac{1}{2}$

M	0,99 (0,49)
M (O)	
ID	0,53

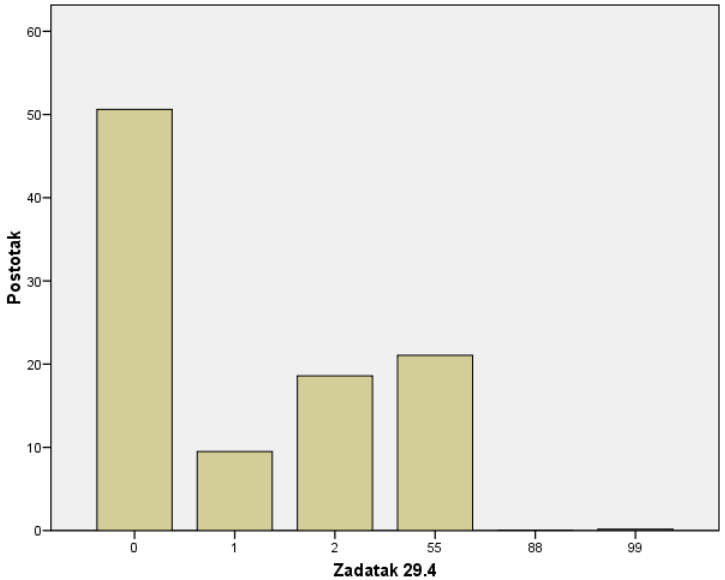


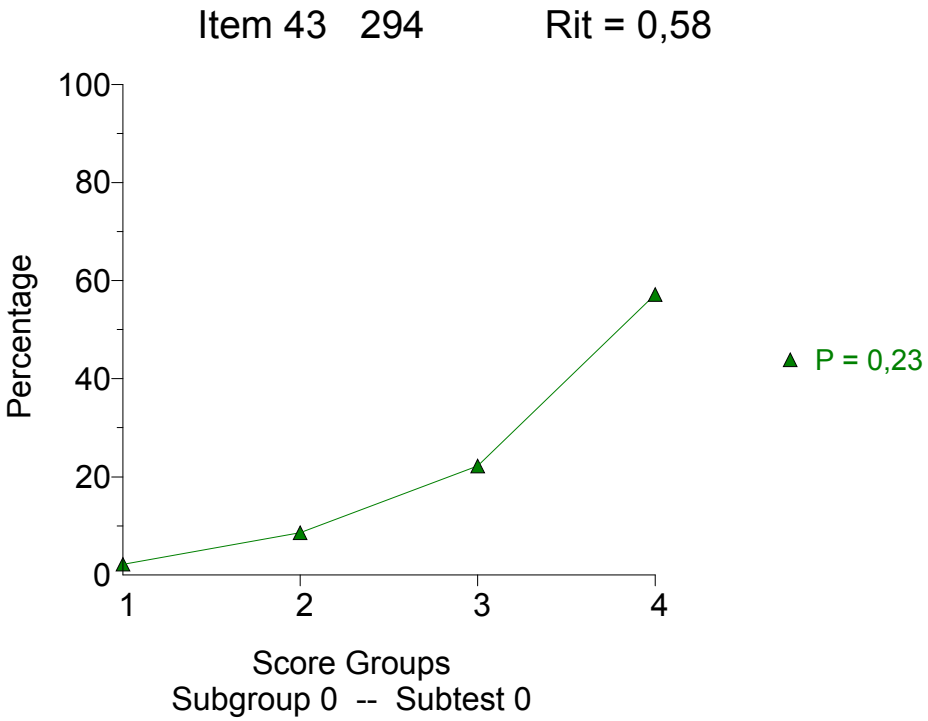


NACIONALNI CENTAR ZA VANJSKO VREDNOVANJE OBRAZOVANJA

29.4. Neka je sin t = 0.6, i $t \in \left(\frac{3\pi}{2}\right)$. Koliko je sin 2t.

M	0,47 (0,23)
M (O)	
ID	0,53

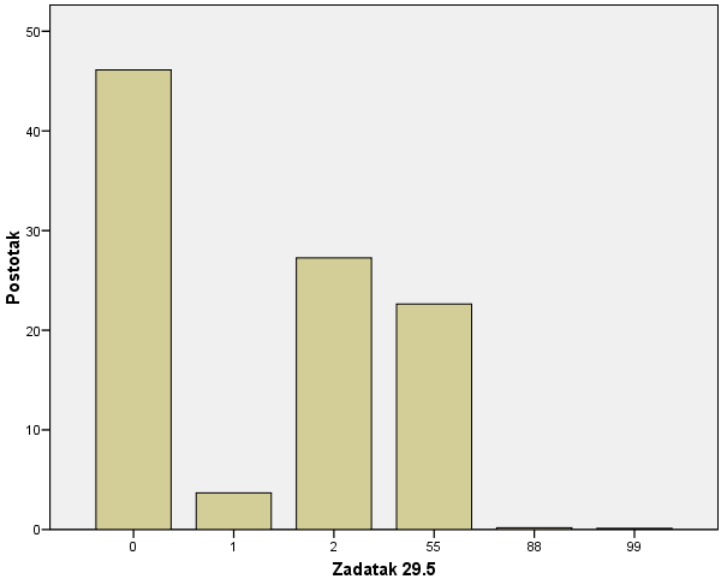


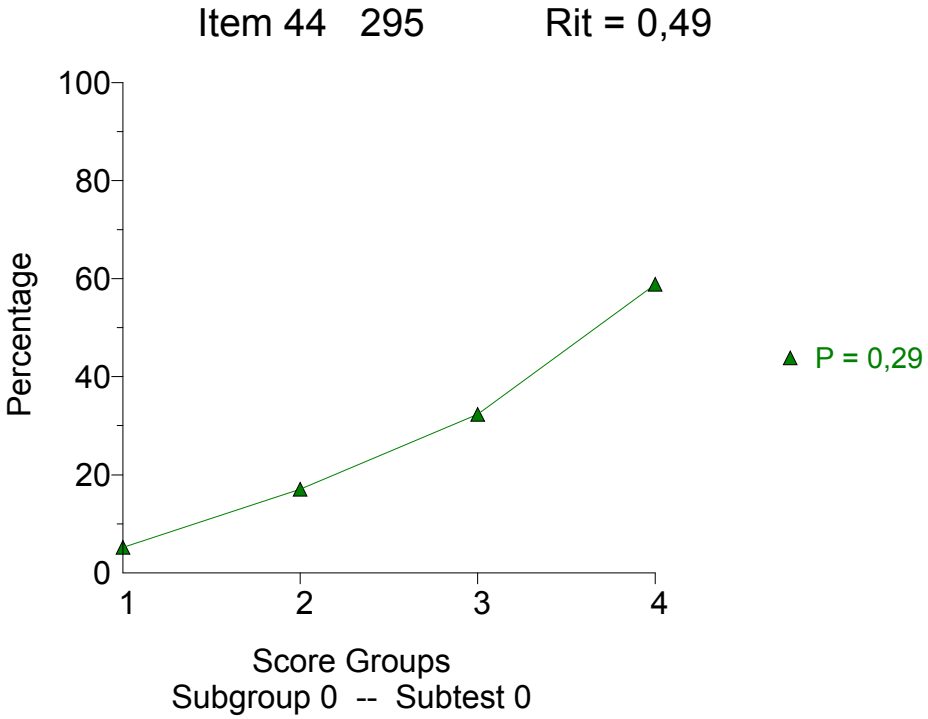


29.5. ako je tgx = a, izračunajte

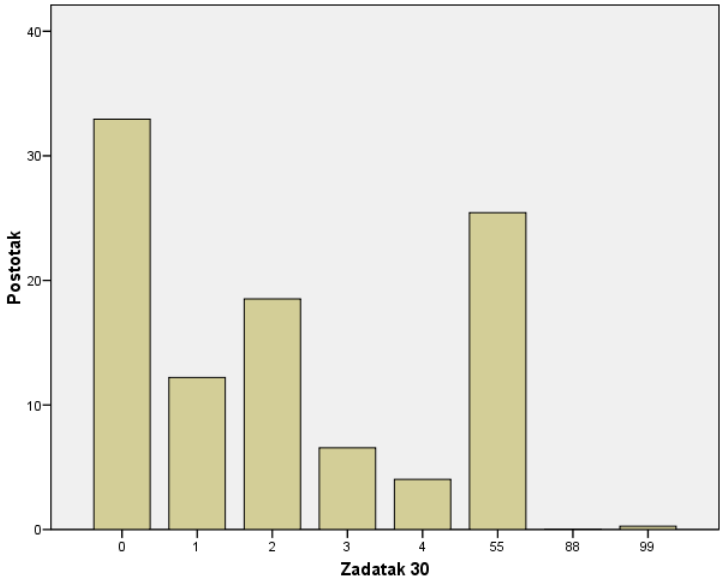
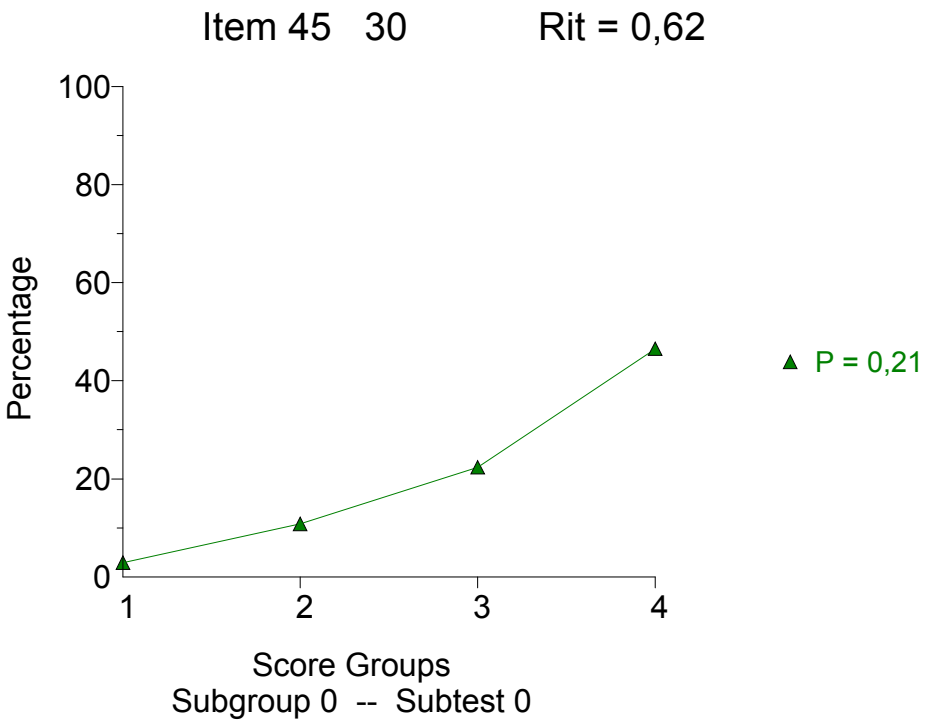
$$\frac{\sin x + \cos x}{\sin x - \cos x}.$$

M	**0,58 (0,29)**
M (O)	
ID	**0,44**





30. POTRES

U koordinatnome sustavu ucrtane su tri seizmološke stanice A, B, C koje su registrirale potres. Epicentar potresa je bio na udaljenosti 193 km od stanice A, 137 km od stanice B i 265 km od stanice C. Odredite koordinate epicentra potresa.

M	0,85 (0,21)
M (O)	
ID	0,56