① ZAOKRUŽITI PRSTEN KOJI NIJE POLJE

~~a)~~ $(\mathbb{N},+,\cdot)$ - NEMA N.E. ZA $(\mathbb{N},+)$

~~b)~~ $(\mathbb{Z}\setminus\{0\},+,\cdot)$ - NEMA N.E. ZA $(\mathbb{Z}\setminus\{0\},+)$

~~c)~~ $(\mathbb{R},+,\cdot)$ - JE POLJE

~~d)~~ $(\mathbb{R}\setminus\{0\},+,\cdot)$ - NEMA N.E. ZA $(\mathbb{R}\setminus\{0\},+)$

e) $(\mathbb{Z},+,\cdot)$

~~f)~~ $(\{-1,1\},+,\cdot)$ $1+1=2$

~~g)~~ $(\{-1,0,1\},+,\cdot)$ $1+1=2$

$(\mathbb{N},+,\cdot)$ PRSTEN ?

1. $(\mathbb{N},+)$ - A.G. — NIJE NEMA N.E.
2. $(\mathbb{N},\cdot)$ - POLUGRUPA
3. DISTRIBUTIVNOST $\cdot$ PREMA $+$

$(\mathbb{Z}\setminus\{0\},+,\cdot)$ - PRSTEN ?

$\cancel{(\mathbb{Z}\setminus\{0\},+)}$ - A.G ? - NIJE NEMA N.E.

$(G\setminus\{0\},+)$

$(\mathbb{Z},+)$

$(\mathbb{Z},\cdot)$

$(\mathbb{Z},+,\cdot)$ JE PRSTEN

$(\mathbb{Z}\setminus\{0\},\cdot)$ - NEMA I.N. SVAKI EL.

NIJE POLJE

$(A, +, \circ)$ - PRSTEN

1, $(A, +)$ - ABELOVA GRUPA

2, $(A, \circ)$ - POLUGRUPA (ASOCIJATIVAN GRUPOID)

3, $\circ$ PREMA $+$ TREBA DA JE DISTRIBUTIVNO

$\forall x, y, z \in A$ $\quad x \cdot (y+z) = xy + xz$

$(y+z)x = yx + zx$

$(A, +, \circ)$ - POLJE

1, $(A, +, \cdot)$ - PRSTEN

2, $(A \setminus \{0\}, \cdot)$ - ABELOVA GRUPA

$(A \setminus \{0\}, +)$ - NIJE GRUPA

$(A, \cdot)$ $0 \in A$ - NIJE GRUPA

JER 0 NIKAD NEMA INVERZNI

$(\mathbb{R}, \cdot)$, $(\mathbb{Q}, \cdot)$

$([0, \infty), \cdot)$

(1) GRUPOVNE

*	e	a	b
e	e	a	b
a	a		
b	b	a	a

e - N.E.

NE MOŽE e

NEMA I.E.

*	e	a	b	c
e	e	a	b	c
a	a			e
b	b	e		
c	c		e	

NEMA I.E.

1. N.E. U SVAKOJ VRSTI / KOLONI
2. N.E U SVAKOJ
3. SAMO JEDNO
4. SIMETRIČNO RASPOREĐEN U ODNOSU NA GLAVNU DIJAGONALU

② $a, b \in \mathbb{R}$ $\qquad f : \mathbb{R} \to \mathbb{R}$

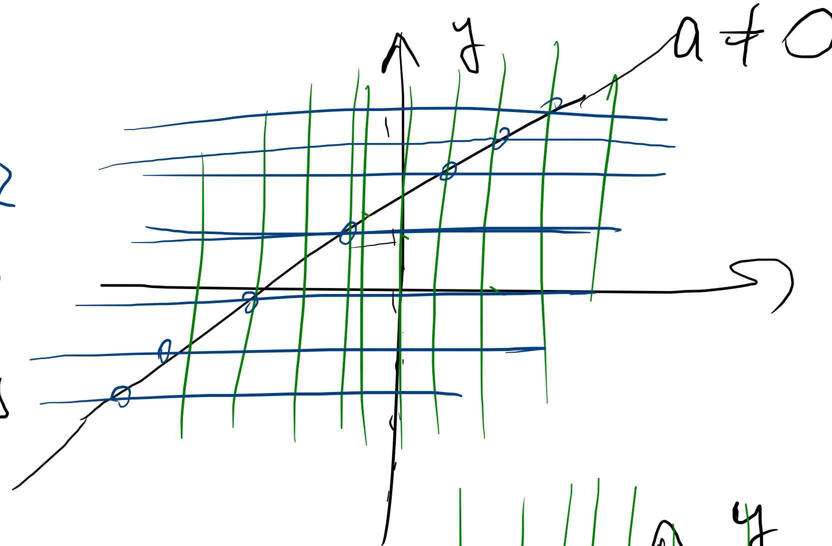
$f(x) = ax + b$

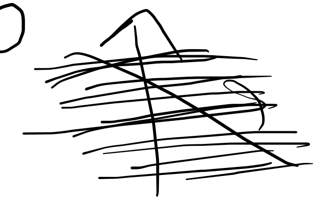
1, FUNKCIJU , $a, b \in \mathbb{R}$

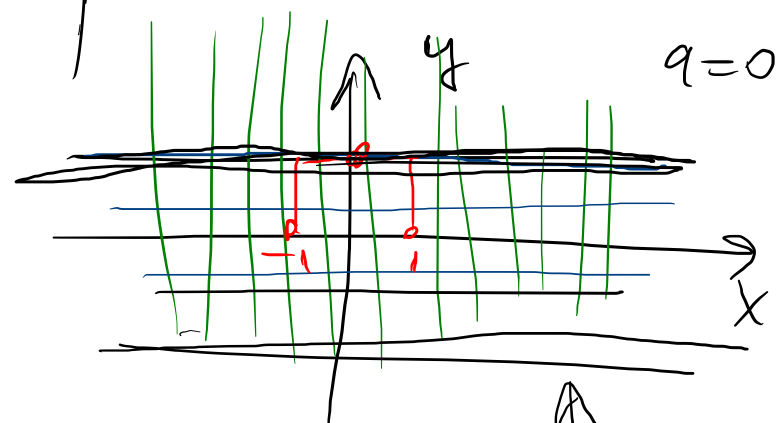
2, f - 1-1 $\quad a \in \mathbb{R} \setminus \{0\}, b \in \mathbb{R}$

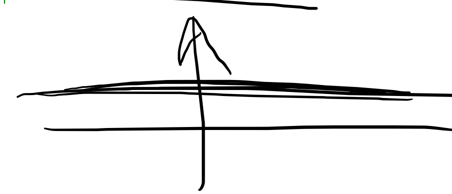
3, f - NA $\quad a \in \mathbb{R} \setminus \{0\}, b \in \mathbb{R}$

4, f - BIJEKTIVNA $\quad a \in \mathbb{R} \setminus \{0\}$ $b \in \mathbb{R}$





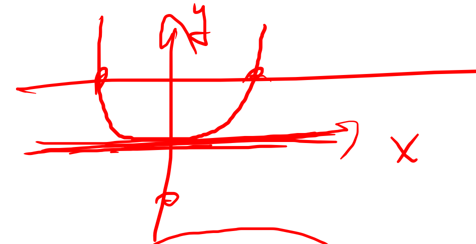




③ Заокружити тачан одговор

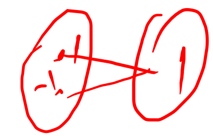
$f: \mathbb{R} \to \mathbb{R}, \quad f(x) = x^2$

$g: \mathbb{R} \to \mathbb{R}, \quad g(x) = 2x + 3$



$f(1) = 1$

$f(-1) = 1$

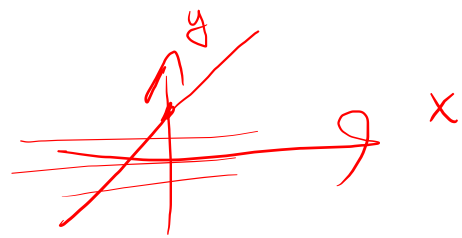


~~a)~~ f је „1–1"

~~b)~~ f је „на"

c) g је „1–1"

d) g је „на"



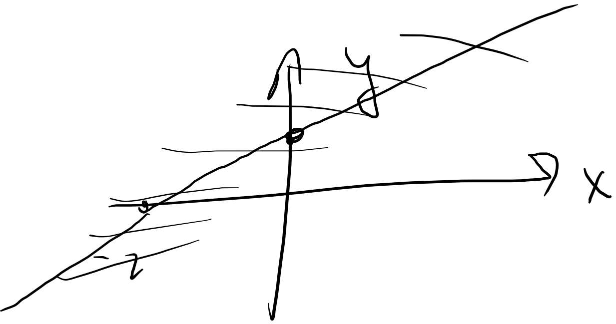
$f(x) = x^2$

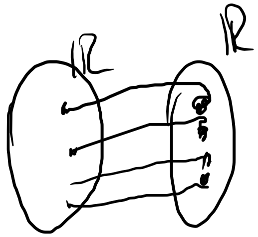
$f: \mathbb{R}^+ \cup \{0\} \to \mathbb{R}^+ \cup \{0\}$

4 $\quad f^{-1} \qquad f:\mathbb{R}\to\mathbb{R}$

$$f(x) = 1-3x$$

Да би $f:\mathbb{R}\to\mathbb{R}$ имало инверзну мора бити бијекција.





„1-1": $f(x)=f(y) \Rightarrow x=y$? ✓

$$f(x)=f(y) \Rightarrow \cancel{1}-3x=\cancel{1}-3y \Rightarrow -\cancel{3}x=-\cancel{3}y$$
$$\Rightarrow x=y$$

✓ „NA": $\forall y\in\mathbb{R}, \exists x\in\mathbb{R}, f(x)=y$?

$$f(x)=y$$
$$1-3x=y$$
$$-3x=y-1$$
$$\boxed{x=\frac{y-1}{-3}}$$

јесте „на"

$\Rightarrow f$ је бијекција

$$f^{-1}(f(x))=x$$
$$f^{-1}(\underbrace{1-3x}_{t})=x$$

$$1-3x=t$$
$$-3x=t-1$$
$$x=\frac{t-1}{-3}$$

$$f^{-1}(t)=\frac{t-1}{-3}$$
$$f^{-1}(x)=\frac{x-1}{-3}$$

(5) $f = \begin{pmatrix} a & b & c \\ c & a & b \end{pmatrix}$ $\quad f^{-1} = \begin{pmatrix} a & b & c \\ b & c & a \end{pmatrix}$

$g = \begin{pmatrix} a & b & c \\ b & c & a \end{pmatrix}$

$h = \begin{pmatrix} a & b & c \\ a & b & c \end{pmatrix}$

$(\{f, g, h\}, \circ) \to G$?

$\circ$	f	g	h
f	g	h	f
g	h	f	g
h	f	g	h

$f^{-1} = g$

$g^{-1} = f$

$h^{-1} = h$

$h \circ f = \begin{pmatrix} a & b & c \\ c & a & b \end{pmatrix} = f$

$f \circ f = \begin{pmatrix} a & b & c \\ b & c & a \end{pmatrix} = g$

$f \circ g = \begin{pmatrix} a & b & c \\ a & b & c \end{pmatrix} = h$

$f \circ h = \begin{pmatrix} a & b & c \\ c & a & b \end{pmatrix} = f$

$g \circ f = \begin{pmatrix} a & b & c \\ a & b & c \end{pmatrix} = h$

$g \circ g = \begin{pmatrix} a & b & c \\ c & a & b \end{pmatrix} = f$

$g \circ h = \begin{pmatrix} a & b & c \\ b & c & a \end{pmatrix} = g$

e – N.E.

$x \circ \boxed{\underline{e}} = e$

$\uparrow$

I.E. ZA. e

$x' \circ x = e$

$\underline{\underline{e}} \circ e = e$

$a \circ e = a$

6

$(\mathbb{N}, +, \cdot)$ ~~PRSTEN~~ ~~D.I.~~ ~~POLJE~~

$(\mathbb{N}, +)$ - ~~ABELOVA GRUPA~~

0

$$-a + a = 0$$

$$\frac{1}{a} \cdot a = 1$$

GRUPE

A

$(\mathbb{Z}, +)$, $(\mathbb{R}\setminus\{0\}, \cdot)$, $(\mathbb{R}, +)$, $(\{-1, 1\}, \cdot)$

$\cancel{(\mathbb{Z}\setminus\{0\}, +)}$, $(\{f \mid f : A \xrightarrow[\text{NA}]{1-1} A\}, \circ)$, $\cancel{(\mathbb{R}, \cdot)}$

$f : A \to A$

$g : A \to A$

$f \circ g : A \to A$

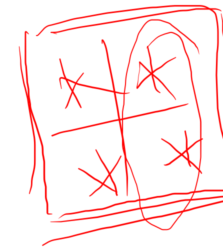
$id(x) = x$

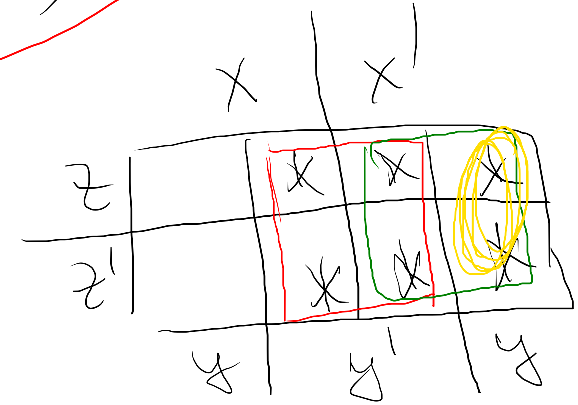
$(\mathbb{R}, +)$

~~$(\mathbb{R}\setminus\{0\}, +)$~~ NEMA N.E

$(\mathbb{R}, \cdot)$ → NEMA I.E.

$(\mathbb{R}\setminus\{0\}, \cdot)$





$$f = (x\cdot y)' + (x+y')'\cdot z + x'z$$

$$= x' + y' + x'\cdot y\cdot z + x'z \quad \leftarrow \text{DNF}$$

$$= x'(y+y')(z+z') + y'(x+x')(z+z') + x'yz + x'(y+y')z$$

$$= x'yz + x'yz' + x'y'z + x'y'z' + y'xz + y'xz' + \cancel{y'x'z} + \cancel{y'x'z'}$$

$$+ \cancel{x'yz} + \cancel{x'yz} + \cancel{x'yz}$$

PI: y', x'

$$\text{MDNF}(f) = y' + x'$$