Functii - probleme

1) Verificați dacă punctele $A(-1,-3)$, $B(0,-2)$, $C(5,3)$ sunt coliniare.

Considerăm funcția

$f:\mathbb{R}\to\mathbb{R}$, $f(x)=ax+b$ a.î. $A(-1,-3)\in G_f \Rightarrow f(-1)=-3 \Rightarrow a\cdot(-1)+b=-3$

$B(0,-2)\in G_f \Rightarrow f(0)=-2 \Rightarrow a\cdot 0+b=-2$

$\Rightarrow b=-2$

$-a+(-2)=-3$

$-a-2=-3$

$-a=-3+2$

$-a=-1 \mid\cdot(-1) \Rightarrow a=1$

Deci $f:\mathbb{R}\to\mathbb{R}$, $f(x)=x-2$

Verificăm dacă $C(5,3)\in G_f$?

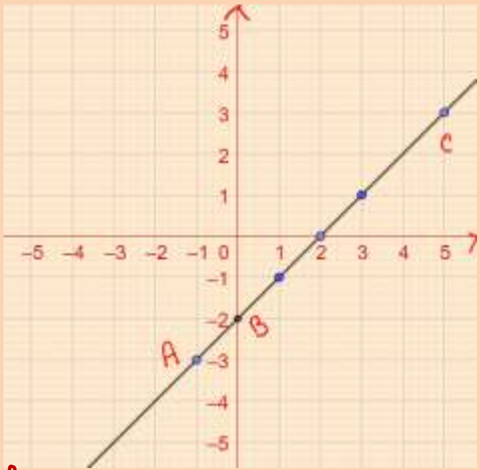
$f(5)=5-2=3 \Rightarrow C(5,3)\in G_f$

Deci: $A,B,C\in G_f \Rightarrow A,B,C$ sunt coliniare

Proba: reprezentăm grafic funcția: $f:\mathbb{R}\to\mathbb{R}$

$f(x)=x-2$

x	3	1	2
$f(x)$	1	-1	0



2) Verificați dacă $A(-3,-1)$, $B(-1,1)$, $C(10000,10002)$ sunt coliniare.

Considerăm $f:\mathbb{R}\to\mathbb{R}$, $f(x)=ax+b$ a.î. $A(-3,-1)\in G_f \Rightarrow f(-3)=-1$

$B(-1,1)\in G_f \Rightarrow f(-1)=1$

$\Rightarrow -3a+b=-1 \mid\cdot(-1)$

$-1\cdot a+b=1$

$3a-b=1$

$-a+b=1$

$2a=2$

$a=2:2$

$a=1$

$-a+b=1$

$-1+b=1$

$b=1+1$

$b=2$

$\Rightarrow f:\mathbb{R}\to\mathbb{R}$

$f(x)=x+2$

Verificăm dacă pct. $C(10000,10002)\in G_f \Rightarrow$

$f(10000)=10000+2=10002 \Rightarrow C\in G_f \Rightarrow$

$A,B,C\in G_f \Rightarrow A,B,C$: coliniare

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3) Fie $f:\mathbb{R}\to\mathbb{R}$, $f(x)=2x-10$ $\Rightarrow$

a) $G_f\cap OX$, $G_f\cap OY$

b) A_Δ determinat de G_f, OX, OY

c) $d(O,G_f)$

d) $tg(\widehat{G_f,OX})$

$G_f\cap OX=\{A(5,0)\}$

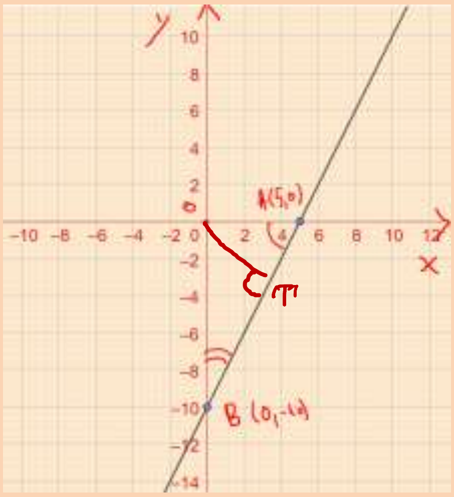
a) $G_f\cap OX=\{A(m,0)\} \Rightarrow A(m,0)\in G_f \Rightarrow f(m)=0 \Rightarrow 2m-10=0 \Rightarrow 2m=10 \Rightarrow m=\frac{10}{2} \Rightarrow m=5$

$G_f\cap OY=\{B(0,n)\} \Rightarrow B(0,n)\in G_f \Rightarrow f(0)=n \Rightarrow n=2\cdot 0-10 \Rightarrow n=-10$

$G_f\cap OY=\{B(0,-10)\}$

b) $Ox \perp Oy \Rightarrow \Delta AOB = \Delta$ dr. în $O \Rightarrow A_{AOB} = \frac{OA \cdot OB}{2} = \frac{\cancel{10}^{5} \cdot 5}{\cancel{2}_{1}}$

$\boxed{A_{AOB} = 25}$



c) ΔAOB dr. în $O \xRightarrow{T.P} AB^2 = OA^2 + OB^2 = 10^2 + 5^2 = 100 + 25 = 125$

$AB = \sqrt{125} = \sqrt{25 \cdot 5} = 5\sqrt{5}$

Fie $OT \perp G_f$, $T \in G_f$ $\Rightarrow d(O, G_f) = OT = \frac{OA \cdot OB}{AB} = \frac{10 \cdot \cancel{5}^{1}}{\cancel{5}_{1}\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$

d) $tg(\widehat{G_f, Ox}) = tg\,\widehat{OAB} = \frac{OB}{OA} = \frac{10}{5} = 2$

https://www.youtube.com/watch?v=GBokUubqoKQ

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