Inspectoratul Şcolar Judeţean Prahova
Simulare Bacalaureat -24 aprilie 2013
Proba Ec)
Matematică M_mate-info
BAREM DE EVALUARE ŞI DE NOTARE

Var 01

SUBIECTUL I **(30 de puncte)**

1.	$x_V = 3, f(x_V) = 1$ $f(2) = f(4) = 0$ Finalizare $f([2;4]) = [0;1]$	**2p** **2p** **1p**
2.	$\lvert z\rvert = \left\lvert \left(\frac{2-i}{1+2i}\right)^{2013} \right\rvert = \left\lvert \left(\frac{2-i}{1+2i}\right) \right\rvert^{2013} =$ $\left\lvert \frac{2-i}{1+2i} \right\rvert = 1 \Rightarrow$ $\lvert z\rvert = 1$	**2p** **2p** **1p**
3.	$T_{k+1} = C_{13}^k \left(\sqrt{x}\right)^{13-k} \left(\frac{1}{\sqrt[3]{x^2}}\right)^k \Rightarrow$ $\Rightarrow \frac{13-k}{2} - \frac{2k}{3} = 3 \Rightarrow$ $k = 3$	**1p** **2p** **2p**
4.	$A_6^3 - A_5^2 =$ $= 6 \cdot 5 \cdot 4 - 5 \cdot 4 = 100$	**3p** **2p**
5.	$m_{AB} = \frac{y_A - y_B}{x_A - x_B} = \frac{1}{3} \Rightarrow$ $m_d = -\frac{1}{m_{AB}} = -3$ Ecuaţia lui $d: y - y_C = m_d(x - x_C) \Rightarrow y + 4 = -3x$.	**1p** **2p** **2p**
6.	$\cos 165^\circ + \sin 75^\circ = \cos(180^\circ - 15^\circ) + \sin 75^\circ =$ $= -\cos 15^\circ + \sin 75^\circ =$ $= -\sin 75^\circ + \sin 75^\circ = 0$	**2p** **2p** **1p**

SUBIECTUL II **(30 de puncte)**

1.a.	$a = 0 \Rightarrow I_3 \in G$ $a_{22} = 1 \neq 0$ oricare ar fi $a > -1 \Rightarrow O_3 \notin G$	**2p** **3p**
b.	$\begin{pmatrix} 1+a & 0 & 0 \\ 0 & 1 & 0 \\ ka & 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1+b & 0 & 0 \\ 0 & 1 & 0 \\ kb & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1+a+b+ab & 0 & 0 \\ 0 & 1 & 0 \\ ka+kb+kab & 0 & 1 \end{pmatrix}$ $\begin{pmatrix} 1+b & 0 & 0 \\ 0 & 1 & 0 \\ kb & 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1+a & 0 & 0 \\ 0 & 1 & 0 \\ ka & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1+b+a+ba & 0 & 0 \\ 0 & 1 & 0 \\ kb+ka+kba & 0 & 1 \end{pmatrix}$ Finalizare	**2p** **2p** **1p**
c.	$P(n): A^n(a) = A\left((a+1)^n - 1\right)$, oricare ar fi n natural nenul. Verificare pentru $n = 1$	**2p**

	$A^{n+1}(a)=A^n(a)\cdot A(a)$ Finalizare	**3p**
2.a.	$x*y=xy-\frac{1}{2}(x+y)+\frac{3}{4}=x\left(y-\frac{1}{2}\right)-\frac{1}{2}\left(y-\frac{1}{2}\right)+\frac{1}{2}=$ $=\left(x-\frac{1}{2}\right)\cdot\left(y-\frac{1}{2}\right)+\frac{1}{2}$	**2p** **3p**
b.	Exista $e\in G$, astfel incat $x*e=e*x=x$ pentru orice $x\in G$ $x*e=x\Rightarrow\left(x-\frac{1}{2}\right)\cdot\left(e-\frac{1}{2}\right)+\frac{1}{2}=x\Rightarrow$ $\Rightarrow e=\frac{3}{2}.$	**1p** **2p** **2p**
c.	$x*x*x*x=\frac{9}{16}\Leftrightarrow\left(x-\frac{1}{2}\right)^4+\frac{1}{2}=\frac{9}{16}$ Finalizare: $x=1$	**3p** **2p**

SUBIECTUL III **(30 de puncte)**

1.a.	$\lim\limits_{x\to1}f(x)=\lim\limits_{x\to1}\frac{\ln x}{x-1}\overset{x-1=y}{=}\lim\limits_{y\to0}\frac{\ln(y+1)}{y}=1$ f continuă în 1 f continuă pe $(0,1)\cup(1,\infty)$ Finalizare	**3p** **1p** **1p**
b.	$\lim\limits_{x\to1}\frac{f(x)-1}{x-1}=\lim\limits_{x\to1}\frac{\ln x-x+1}{x-1}\overset{l'H}{=}$ $=\lim\limits_{x\to1}\frac{1-x}{2x(x-1)}=-\frac{1}{2}$	**2p** **3p**
c.	$f'(x)=\begin{cases}\frac{x-1-x\ln x}{x(x-1)^2},\ x\in(0,1)\cup(1,\infty)\\ -\frac{1}{2},\ x=1\end{cases}$ $h(x)=x-1-x\ln x<0$ Finalizare	**2p** **2p** **1p**
2.a.	$\int 2x\cdot f_n^2(x)dx=\int\frac{2x}{2x+5n}dx=\int1-\frac{5n}{2x+5n}dx=$ $=x-\frac{5n}{2}\ln(2x+5n)+\mathbb{C}$	**2p** **3p**
b.	$\int\frac{1}{\sqrt{2x+5}}dx=\int\left(\sqrt{2x+5}\right)'dx=$ $=\sqrt{2x+5}\Big\vert_0^1=\sqrt{7}-\sqrt{5}$	**3p** **2p**

c.	$\lim\limits_{n\to\infty}\frac{1}{\sqrt{n}}\left(f_n(1)+f_n(2)+\ldots+f_n(n)\right)=\lim\limits_{n\to\infty}\frac{1}{n}\sum\limits_{k=1}^{n}\frac{1}{\sqrt{2\frac{k}{n}+5}}=$	**3p**
	$=\int_0^1\frac{1}{\sqrt{2x+5}}dx=\sqrt{7}-\sqrt{5}$	**2p**