<u>Barem simulare bacalaureat matematica, filiera tehnologica,M2, 26.03.2013, GORJ.</u>

SUBIECTUL I

1. $x^2-2x-3=0$ **(2pct);** $\Delta=16$ **(1pct);** $x_1=3$ **(1pct);** $x_2=-2$ **(1pct)**

2. $(2+\sqrt{5})^2=9+4\sqrt{5}$ **(2pct);** $E=9+4\sqrt{5}-4(2+\sqrt{5})-2$ **(1pct);** $E=-1$ **(2pct)**

3. $\cos 120^\circ=-\frac{1}{2}$ **(2pct);** $\sin^2 60^\circ=\frac{3}{4}$ **(2pct); finalizare** $\frac{1}{4}$ **(1pct).**

4. $f(x)=0$ **(1pct);** $x^2-2x-3=0$ **(1pct);** $x_1=3, x_2=-1$ **(2pct); intersecţiile sunt** $A(3,0), B(-1,0)$ **(1pct).**

5. **Forma ecuaţiei (2pct); înlocuiri, răspunsul** $x-y-3=0$ **(3pct).**

6. $\log_2 8=3$ **(1pct);** $C_7^2=21$ **(1pct);** $a_4=57$ **(3pct).**

SUBIECTUL II

1. a) $\det A=1$ **(5pct)**

b) $B=\begin{pmatrix}0&0&0\\1&0&0\\0&1&0\end{pmatrix}$ **(2pct);** $B^2=\begin{pmatrix}0&0&0\\0&0&0\\1&0&0\end{pmatrix}$ **(3pct)**

c) $\det A\neq 0\Rightarrow \exists A^{-1}$ **(1pct);** $A^t=\begin{pmatrix}1&1&0\\0&1&1\\0&0&1\end{pmatrix}$ **(1pct);**

$A^*=\begin{pmatrix}1&0&0\\-1&1&0\\1&-1&1\end{pmatrix}$ **(2pct)** $A^{-1}=A^*$ **(1pct)**

2. a) verificarea: (5pct);

b) $\begin{matrix}(x\circ y)\circ z=(x\circ y-2)\circ(z-2)=(x-2)(y-2)(z-2)\\ x\circ(y\circ z)=(x-2)\circ(y\circ z-2)=(x-2)(y-2)(z-2)\end{matrix}$ **(2pct+2pct)**

finalizare (1pct).

c) $x\circ x=(x-2)^2+2$ **(1pct); presupunem** $\underbrace{x\circ x\circ\ldots\circ x}_{k ori}=(x-2)^k+2$ **;**

$\underbrace{x\circ x\circ\ldots\circ x}_{k+1 ori}=(\underbrace{x\circ x\circ\ldots\circ x}_{k ori})\circ x=(x-2)^{k+1}+2$**, deci** $\underbrace{x\circ x\circ\ldots\circ x}_{n ori}=(x-2)^n+2$ **(2pct);**

($\underbrace{x\circ x\circ\ldots\circ x}_{2013 ori}=(x-2)^{2013}+2$ **(1pct);** $(x-2)^{2013}+2=3$ **deci** $(x-2)^{2013}=1$ **deci**

$x-2=1, x=3$ **(1pct).**

SUBIECTUL III

1. a) $f'(x)=2x+3+\frac{1}{x}$ **(2pct+2pct+1pct)**

b) $\lim_{x\to2}\frac{f(x)-f(2)}{x-2}=f'(2)$ **(2pct);** $=4+3+\frac{1}{2}$ **(2pct);** $=\frac{15}{2}$ **(1pct).**

c) $f''(x)=2-\frac{1}{x^2}=\frac{2x^2-1}{x^2}$ **(1pct);** $f''(x)=0\Leftrightarrow 2x^2-1=0$ **deci** $x=\frac{\sqrt{2}}{2}$ **(2pct); pe intervalul** $(0,\frac{\sqrt{2}}{2})$ **este concavă, iar pe intervalul** $(\frac{\sqrt{2}}{2},\infty)$ **este convexă (2pct).**

2. a) $\int_0^1 f(x)dx=I_1+I_2+I_3$ **;**

$I_1=\int_0^1 x^2e^xdx=\int_0^1 x^2(e^x)'dx=x^2e^x\,|_0^1-\int_0^1(x^2)'e^xdx=e-2\int_0^1 xe^xdx$ **(1,5pct);**

$=e-2\int_0^1 x(e^x)'dx=e-2[xe^x\,|_0^1-\int_0^1 e^xdx]=e-2$ **(1,5pct);** $I_2=\frac{x^2}{2}\,|_0^1=\frac{1}{2}$ **si**

$I_3=x\,|_0^1=1$ **(1pct);** $\int_0^1 f(x)dx=e-2+\frac{1}{2}+1=\frac{2e-1}{2}$ **(1pct).**

b) $f(x)-x^2e^x=x+1$ **(1pct);** $g(x)=(x+1)^4$ **(1pct); primitivele sunt**

$G(x)=\int(x+1)^4dx=\frac{(x+1)^5}{5}+C$ **(3pct).**

c) $\int f(x)dx=x^2e^x-2xe^x+2e^x+\frac{x^2}{2}+x+C$ **(2pct);** $2x=t$ **deci**

$\int_0^1 f(2x)dx=\frac{1}{2}\int_0^2 f(t)dt=2e^2+2$ **(3pct)**

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