Barem de corectare CMAA a XI-a Filiera tehnologică 2017

1. a) $l_s(1)=1+2a$ .... **(1p)**

$l_d(1)=\sqrt{1+a^3}$ .... **(1p)**

$l_s(1)=l_d(1) \rightarrow 1+2a=\sqrt{1+a^3} \rightarrow a^3-4a^2-4a=0 \rightarrow a_1=0,\ a_2=2+2\sqrt{2},\ a_3=2-2\sqrt{2}$ **(1p)**

$a\in Q \rightarrow a=0$ .... **(1p)**

b) $m=\lim\limits_{x\to+\infty}\frac{f(x)}{x}=\lim\limits_{x\to+\infty}\frac{\sqrt{x^2+1}}{x}=1$ .... **(1p)**

$n=\lim\limits_{x\to+\infty}[f(x)-mx]=\lim\limits_{x\to+\infty}\left(\sqrt{x^2+1}-x\right)=0$ .... **(1p)**

Deci, $y=x$ este asimptota oblică spre $+\infty$ .... **(1p)**

(1p)

2. a) $(A+B)^2=A^2+AB+BA+B^2=A^2+B^2$ .... **(1p)**

$det(A+B)^2=(det(A+B))^2=0$ .... **(1p)**

$det(A+B)^2=det(A^2+B^2)=0$ .... **(1p)**

b) Presupunem prin absurd că există $k\in N^*$ astfel încât $A^k=I_3$ .... **(1p)**

$det(A^k)=1 \rightarrow (det(A))^k=1 \rightarrow \begin{cases} det(A)=\pm 1, & k\ par \\ det(A)=1, & k\ impar \end{cases}$ .... **(2p)**

Contradicție cu faptul că $det(A)=0$. Deci, $A^n\neq I_3$ pentru orice $n\in N^*$ .... **(1p)**

3. $aria[A_x A_{x+1} A_{x+2}]=\frac{|\Delta|}{2},\quad \Delta=\begin{vmatrix} x & f(x) & 1 \\ x+1 & f(x+1) & 1 \\ x+2 & f(x+2) & 1 \end{vmatrix}=2a$ .... **(3p)**

$\lim\limits_{x\to\infty}\frac{f(x)\cdot aria[A_x A_{x+1} A_{x+2}]}{x^2+1}=\lim\limits_{x\to\infty}\frac{(ax^2+bx+c)\cdot a}{x^2+1}=a^2$ .... **(2p)**

$a^2=8 \rightarrow a_{1,2}=\pm 2\sqrt{2}$ .... **(1p)**

$a>0 \rightarrow a=2\sqrt{2}$ .... **(1p)**

4. $A^2(a)=\begin{pmatrix} a^2+a & 2a+1 & a^2+a+2 \\ 2 & 3 & 4 \\ a+1 & 3 & a+3 \end{pmatrix}$ .... **(2p)**

$A^2(a)-(a+2)\cdot A(a)+det(A(a))\cdot I_3=\begin{pmatrix} -3a+2 & a-1 & -a+2 \\ 2 & -3a+3 & -2a \\ -1 & -a+1 & -2a+3 \end{pmatrix}$ .... **(3p)**

$\begin{pmatrix} -3a+2 & a-1 & -a+2 \\ 2 & -3a+3 & -2a \\ -1 & -a+1 & -2a+3 \end{pmatrix}=\begin{pmatrix} 2 & -1 & 2 \\ 2 & 3 & 0 \\ -1 & 1 & 3 \end{pmatrix}$ .... **(1p)**

$a=0$ .... **(1p)**