Elie Radu (1853-1931)
Pedagog, Academician şi inginer român

Colegiul Tehnic “Elie Radu “, Ploieşti
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Clasa a IX-a

Barem

Subiect	Rezultat	Punctaj
I.1	d) 20	10p
I.2	e) 1012	10p
I.3	b) $\vec{0}$	10p
I.4	c) 2	10p
I.5	b) $a=\frac{5}{7}$	10p
I.6	e) $x+y=\frac{25}{3}$	10p
II.1	Se face desenul. Apoi $\overrightarrow{AP}=\overrightarrow{AN}+\overrightarrow{NP}=5\overrightarrow{NC}+5\overrightarrow{BN}=5\left(\overrightarrow{NC}+\overrightarrow{BN}\right)=5\overrightarrow{BC}$, de unde $\overrightarrow{AP}=5\overrightarrow{BC}$	5p
	$\overrightarrow{AQ}=\overrightarrow{AM}+\overrightarrow{MQ}=5\overrightarrow{MB}+5\overrightarrow{CM}=5\left(\overrightarrow{MB}+\overrightarrow{CM}\right)=5\vec{C}B, de\ unde\ \overrightarrow{AQ}=5\overrightarrow{CB}$	5p
	De aici, $\overrightarrow{AP}=-\overrightarrow{AQ}$ de unde $\overrightarrow{AP}$ coliniar cu $\overrightarrow{AQ}$ de unde punctele A, P, Q coliniare	5p
II.2	Se demonstrează prin inducție P(n):” $\frac{1}{3}+\frac{2}{3^2}+\frac{3}{3^3}+\ldots\ldots+\frac{n}{3^n}=\frac{3^{n+1}-2n-3}{4\,3^n}$,,	3p

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	P(1):"$\frac{1}{3}=\frac{1}{3}$" Adevărat	
	Presupunem P(K) adevărat. Demonstrăm P(k+1) adevărat P(K):" $\frac{1}{3}+\frac{2}{3^2}+\frac{3}{3^3}+\ldots\ldots+\frac{k}{3^k}=\frac{3^{k+1}-2k-3}{4\,3^k}$" Adevărat P(K+1):" $\frac{1}{3}+\frac{2}{3^2}+\frac{3}{3^3}+\ldots\ldots+\frac{k}{3^k}+\frac{k+1}{3^{k+1}}=\frac{3^{k+2}-2k-5}{4\,3^{k+1}}$".	5p
	De arătat că $\frac{3^{k+1}-2k-3}{4\,3^k}+\frac{k+1}{3^{k+1}}=\frac{3^{k+2}-2k-5}{4\,3^{k+1}}$. Se aduce la acelaşi numitor.	4p
	Avem egalitate 3^{k+2}-2 k-5=3^{k+2}-2 k-5. Deci P(n) Adevărat ∀ n∈ IN^*	3p

Se acordă 10p din oficiu.