**Concursul Naţional de Matematică Aplicată „ADOLF HAIMOVICI”**

**Etapa locală – 14 februarie 2015**

 **BAREM cls IX**

**Subiectul I**

Condiţia $\left[3x\right]=\frac{x+x+1}{2}$ (**1p**) $⟺\left\{\begin{array}{c}\frac{2x+1}{2}\leq 3x<\frac{2x+1}{2}+1\\\frac{2x+1}{2}\in Z\end{array}\right.$ (**1p**)

$\frac{2x+1}{2}=k\in Z⟹x=\frac{2k-1}{2}$ (**1p**)

Din $k\leq \frac{6k-3}{2}<k+1 $ rezultă $\frac{3}{4}\leq k<\frac{5}{4}$ şi $k=1$ (**3p**)

Soluţia $x=\frac{1}{2}$. (**1p**)

**Subiectul II**

Verificăm dacă P(0) este adevărată. **(1p)**

Presupunem P(k) „A”: $3∙5^{2k+1}+2^{3k+1}\vdots 17$ (**1p**) $=> 2^{3k+1}=17q-3∙5^{2k+1}$ (**2p**)

Dem. că P(k+1) „A”: $3∙5^{2\left(k+1\right)+1}+2^{3\left(k+1\right)+1}\vdots 17$ (**1p**)

$3∙5^{2k+3}+2^{3k+4}=3∙25∙5^{2k+1}+8\left(17q-3∙5^{2k+1}\right)=17\left(3∙5^{2k+1}-8q\right)\vdots 17$ (**2p**)

**Subiectul III**

$2015=5∙13∙31$ **(1p)**

$a^{2}-b^{2}=2015⟺\left(a+b\right)\left(a-b\right)=2015$ (**1p**)

Cazuri convenabile $\left\{\begin{array}{c}a+b=2015\\a-b=1\end{array}\right., \left\{\begin{array}{c}a+b=403\\a-b=5\end{array}\right., \left\{\begin{array}{c}a+b=155\\a-b=13\end{array}\right., \left\{\begin{array}{c}a+b=65\\a-b=31\end{array}\right.$ (**2p**)

$S=\left\{\left(1008, 1007\right),\left(204, 199\right),\left(84, 71\right),\left(48, 17\right)\right\}$ (**3p**).

**Subiectul IV**

a) Fie AG$∩$BC={D}$⇒$D mijlocul $\left[BC\right]$

Atunci $\vec{GD}=\frac{1}{2}\left(\vec{GB}+\vec{GC}\right)⇒\vec{GB}+\vec{GC}=2\vec{GD}$……………………………………………1p

$\vec{AG}=2\vec{GD}⇒\vec{GB}+\vec{GC}=\vec{AG}$………………………………………………………………1p

$\vec{GB}+\vec{GC}-\vec{AG}=\vec{0}⇒$ cerinta………………………………………………………………1p

$b) \vec{AD}=\frac{1}{2}\left(\vec{AB}+\vec{AC}\right)$……………………………………………………………………….1p

$\vec{AG}=\frac{2}{3}\vec{AD}⇒\vec{AD}=\frac{3}{2}\vec{AG}$……………………………………………………………...........1p

Finalizare……………………………………………………………………………………..2p