MINISTERUL EDUCAȚIEI NAȚIONALE

INSPECTORATUL ȘCOLAR JUDEȚEAN GORJ

Barem de corectare-Olimpiada locala
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Clasa a VII-a

1. a) $\left|\left|2x-1\right|-\sqrt{7}\right|-2,(3)\right|=1\Rightarrow\begin{cases}\left|\left|2x-1\right|-\sqrt{7}\right|=3,(3)\Rightarrow\left|2x-1\right|=3,(3)+\sqrt{7}\\ \left|\left|2x-1\right|-\sqrt{7}\right|=1,(3)\Rightarrow\begin{cases}\left|2x-1\right|=1,(3)+\sqrt{7}\\ \left|2x-1\right|=-1,(3)+\sqrt{7}\end{cases}\end{cases}$

…………………..2p

$x\in\left\{\frac{13}{6}+\frac{\sqrt{7}}{2};-\frac{7}{6}-\frac{\sqrt{7}}{2};\frac{7}{6}+\frac{\sqrt{7}}{2};-\frac{1}{6}-\frac{\sqrt{7}}{2};-\frac{1}{6}+\frac{\sqrt{7}}{2};\frac{7}{6}-\frac{\sqrt{7}}{2}\right\}$……………………………………..1p

b)

$a=\left|1-\sqrt{3}\right|-\left|\sqrt{3}-2\right|-\left|3-2\sqrt{3}\right|-\left|5-3\sqrt{3}\right|-3\left|\sqrt{3}-3\right|$

$a=\left(\sqrt{3}-1\right)-\left(2-\sqrt{3}\right)-\left(2\sqrt{3}-3\right)-\left(3\sqrt{3}-5\right)-3\left(3-\sqrt{3}\right)$

$a=-4$

Discutia modulelor 2 p

Calculul algebric ……………………………………………………………………………… ….2p

2. Fie s_i suma primită de angajații a_i, $i=\overline{1,n}$ în primul caz

$$\frac{s_1}{\frac{1}{1\cdot 2}}=\frac{s_2}{\frac{1}{2\cdot 3}}=\frac{s_3}{\frac{1}{3\cdot 4}}=\ldots=\frac{s_n}{\frac{1}{n\cdot(n+1)}}=\frac{S}{\frac{n}{n+1}}$$ ……………………………………………………………………2p

Fie t_i suma primită de angajații a_i, $i=\overline{1,n}$ în al doilea caz

$$\frac{t_1}{2}=\frac{t_2}{4}=\frac{t_3}{6}=\ldots=\frac{t_n}{2n}=\frac{S}{n\cdot(n+1)}$$ ……………………………………………………………………………2p

$$s_3=\frac{2019^2}{72}\cdot t_3$$

$$\frac{n+1}{3\cdot 4\cdot n}\cdot S=\frac{2019^2}{72}\cdot\frac{6}{n\cdot(n+1)}\cdot S$$ ……………………………………………………………………………2p

$$\left.\begin{array}{r}(n+1)^2=2019\\ n\in \mathbb{N}\end{array}\right\}\Rightarrow n=2018 \text{ ....} 1p$$

3. Fie $NP\cap MQ=\{A\}$, $In\ triunghiul\ APQ$, $din\ unghiuri\ de\ la\ baz$ă $congr.$ $\Rightarrow \Delta QPA - isoscel \Rightarrow QP=PA$ 3p

$$m(\sphericalangle A)=30^0 \Rightarrow MN=\frac{AN}{2}=\frac{NP+QP}{2}=8\ cm \qquad 2p$$

$$QM=\frac{3}{4}MN=6\ cm \qquad 1p$$

$$P_{MNPQ}=8+16+6=30\ cm \qquad 1p$$

4.a) Fie A_2 mijlocul segmentului $[A_1B]\Rightarrow AA_1=A_1A_2=A_2B=\frac{AB}{3}$.

$$\left.\begin{array}{r}[MM_1] \text{ linie mijlocie } \Delta A_1A_2B_1\Rightarrow MM_1\parallel A_2B_1\\ \frac{BA_2}{AB}=\frac{BB_1}{BC}=\frac{1}{3}\overset{R.T.Thales}{\Rightarrow} A_2B_1\parallel AC\end{array}\right\}\Rightarrow MM_1\parallel AC \text{ ....} 3p$$

b) Analog cu punctul a) $PP_1\parallel AC$ 1p

$$\left.\begin{array}{r}[MM_1] \text{ linie mijlocie } \Delta A_1A_2B_1\Rightarrow MM_1=\frac{A_2B_1}{2}\\ \Delta BB_1A_2 \sim \Delta BCA \overset{TFA}{\Rightarrow} A_2B_1=\frac{AC}{3}\end{array}\right\}\Rightarrow MM_1=\frac{AC}{6} \text{ ....} 1p$$

Analog $PP_1=\frac{AC}{6}$ 1p

$$\left.\begin{array}{r}PP_1\parallel AC\parallel MM_1\\ PP_1=MM_1=\frac{AC}{6}\\ MM_1PP_1\ \ convex\end{array}\right\}\Rightarrow MM_1PP_1 \text{ paralelogram} \Rightarrow [P_1M]\equiv[PM_1] \text{ ....} 1p$$