Barem de corectare OLM 2025 Clasa a VIII-a

P1 – autor Ion Neață (GM 9/2024)

$\frac{3x^2+60x+57}{21x^2+28x+7}-\left[\frac{3x^2+60x+57}{21x^2+28x+7}\right]=\frac{1}{7}\Rightarrow\frac{3x^2+60x+57}{3x^2+4x+1}-7\left[\frac{3x^2+60x+57}{21x^2+28x+7}\right]=1$	2p
$\frac{3x^2+60x+57}{3x^2+4x+1}\in Z\Rightarrow\frac{3x+57}{3x+1}\in M_7+1\Rightarrow\frac{56}{3x+1}\in M_7\Rightarrow\frac{8}{3x+1}\in Z\Rightarrow x\in\{-3,0,1\}$	2p
Din cealaltă fracție $\Rightarrow\frac{3}{2x+1}\in Z\Rightarrow x\in\{-2,0,1\}$	2p
Deci $x\in\{0,1\}$	1p
OBS: Se acordă 2p dacă elevul determină soluțiile prin încercări.	

P2

$\frac{a+b}{2}\ge\sqrt{ab}$; $\frac{b+c}{2}\ge\sqrt{bc}$; $\frac{c+a}{2}+\sqrt{ca}$	3p
$\frac{a+b}{2}+\frac{b+c}{2}+\frac{c+a}{2}\ge\sqrt{ab}+\sqrt{bc}+\sqrt{ca}\Rightarrow a+b+c\ge\sqrt{ab}+\sqrt{bc}+\sqrt{ca}$	2p
$a+b+c\ge\sqrt{\frac{1}{c}}+\sqrt{\frac{1}{a}}+\sqrt{\frac{1}{b}}\Rightarrow a+b+c\ge\frac{\sqrt{a}}{a}+\frac{\sqrt{b}}{b}+\frac{\sqrt{c}}{c}$	2p

P3

a) În $\Delta ABC\overset{\text{T. bis.}}{\Rightarrow}\frac{AD}{DB}=\frac{AC}{BC}=\frac{2}{3}\Rightarrow AD=2\text{ cm}$ și $DB=3\text{ cm}$	1p
$A'M\parallel AD, A'M\equiv AD\Rightarrow ADMA'$ paralelogram $\Rightarrow DM\parallel AA'$	1p
Dar $AA'\subset(ACC')\Rightarrow DM\parallel(ACC')$	1p
b) $A'B'\parallel AB\Rightarrow\sphericalangle(A'B',AC)=\sphericalangle(AD,AC)=\sphericalangle(AB,AC)=\sphericalangle BAC$	1p
$A_{\Delta ABC}=\sqrt{p(p-AB)(p-BC)(p-CA)}=\frac{15\sqrt{7}}{4}\text{ cm}^2$	1p
$A_{\Delta ABC}=\frac{AB\cdot AC\cdot sin\sphericalangle BAC}{2}=10\cdot sin\sphericalangle BAC$	1p
$\Rightarrow sin\sphericalangle BAC=\frac{3\sqrt{7}}{8}$	1p

P4

a) $\Delta PDC\equiv\Delta MCB(C.C.)$	1p
$\Rightarrow\sphericalangle DCP\equiv\sphericalangle CBM$ Dar $\sphericalangle CBM+\sphericalangle CMB=90^0$	1p
$\Rightarrow\sphericalangle CEM=90^0\Rightarrow BM\perp CP$	1p
b) $NP\perp(ABC), PE\perp BM, PE, BM\subset(ABC)\overset{T3\perp}{\Rightarrow}NE\perp BM\Rightarrow NE=d(N,BM)$	2p
ΔMCB dr. în $C\Rightarrow BM=25\text{ cm}$, $CE=12\text{ cm}$ $CP=25\text{ cm}\Rightarrow PE=13\text{ cm}$	1p
$NP\perp(ABC), PE\subset(ABC)\Rightarrow NP\perp PE\Rightarrow\Delta NPE$ dr. în $P\Rightarrow NE=26\text{ cm}$	1p

Autori: Constantin Corina, Lăstun Otilia-Bogdana, Luca Lucian, Săuchea Cristian