OLIMPIADA DE MATEMATICĂ A SATELOR DIN ROMÂNIA

BAREM CORECTARE - ETAPA JUDEȚEANĂ

CLASA a VIII-a 7.03.2020

Problema 1 (7 puncte)

a) $a \cdot b = \frac{\sqrt{(11-4\sqrt{7})(11+4\sqrt{7})}}{3} = 1$ ..... **(4p)**

b) $a \cdot b = 1 \Rightarrow b = \frac{1}{a},\ a^2 + \frac{1}{a^2} \geq 2 \Rightarrow a^4 - 2a^2 + 1 \geq 0 \Rightarrow (a^2-1)^2 \geq 0$

sau calcul..... **(3p)**

Problema 2 (7 puncte)

a) $E(x) = x$..... **(2p)**

b) $F(x) = \frac{x(x^2+1)}{(x^2+1)(x-1)} \cdot \frac{(x-1)(x+1)}{(x+1)} = x$ ..... **(3p)**

c) $A(x) = x + x = 2x \Rightarrow A(n) + A(n^2) = 2n(n+1)$ ..... **(1p)**

$n(n+1) \vdots 2 \Rightarrow 2n(n+1) \vdots 4$..... **(1p)**

Problema 3 (7 puncte)

Desen corect..... **(1p)**

a) $\left.\begin{matrix} OM \parallel BC,\ BC \perp (DCG) \\ HC \subset (DCG) \end{matrix}\right\} \Rightarrow MO \perp HC \Rightarrow m(\sphericalangle(MO;HC)) = 90°$..... **(2p)**

b) $\left.\begin{matrix} MN \parallel AC,\ AC \subset (ACF) \\ MP \parallel AF,\ AF \subset (ACF) \end{matrix}\right\} \Rightarrow (MNP) \parallel (ACF)$..... **(2p)**

c) $\left.\begin{matrix} (EDM) \cap (ABC) = DM \\ AS \perp DM,\ AS \subset (ABC) \\ T3 \perp \Rightarrow ES \perp DM,\ ES \subset (DEM) \end{matrix}\right\} \Rightarrow m(\sphericalangle(EDM),(ABC)) = m(\sphericalangle(ASE))$..... **(1p)**

$AS = 3\sqrt{2} \Rightarrow tg(\sphericalangle(ASE)) = \sqrt{3} \Rightarrow m(\sphericalangle(ASE)) = 60°$..... **(1p)**

Problema 4 (7 puncte)

Desen corect..... **(1p)**

a) $AO = 8\sqrt{3} \Rightarrow tg(\sphericalangle(VAO)) = \sqrt{2} = \frac{VO}{AO} \Rightarrow VO = 8\sqrt{6}\ cm$..... **(2p)**

b) Fie D mijlocul laturii BC.

$\left.\begin{matrix} BC \perp AD \\ BC \perp VD \end{matrix}\right\} \Rightarrow BC \perp (VAD)$..... **(1p)**

$VA \subset (VAD) \Rightarrow BC \perp VA$..... **(1p)**

c) $VT = x \Rightarrow TO = 8\sqrt{6} - x$..... **(1p)**

$\Delta TOA \Rightarrow x^2 = (8\sqrt{6} - x)^2 + (8\sqrt{3})^2 \Rightarrow x = 6\sqrt{6}$ cm..... **(1p)**

„Binele ce-l faci la oarecine, ţi-l întoarce vremea care vine”
Anton Pann

Felicitări!