CLASA a X-a
BAREM

(1) $\overline{z_1+z_2+z_3}=0$ (3p) $\frac{1}{z_1}+\frac{1}{z_2}+\frac{1}{z_3}=0$ (2p)

$z_1^2+z_2^2+z_3^2=(z_1+z_2+z_3)^2-2z_1z_2z_3\left(\frac{1}{z_1}+\frac{1}{z_2}+\frac{1}{z_3}\right)=0$ (2p)

Cazul $|z_1|=\dots=0$ (1p)

(2) $A=[\lg 1]+\dots+[\lg 9]$
$+[\lg 10]+\dots+[\lg 99]$ (4p)
$=9\times 0+90\times 1=90$ (3p)

(3) $\frac{\left(x^{1+\frac{1}{2}}\right)^{\frac{1}{4}}-\frac{\left(\left(x^{1+\frac{1}{2}}\right)^{\frac{1}{2}}+1\right)^{\frac{1}{7}}}{\left(x^{1+\frac{1}{2}}\right)^{\frac{1}{12}}}}{x^{\frac{1}{8}}}$ (2p)

$=x^{\frac{3}{8}}-\frac{x^{\frac{1}{4}}}{x^{\frac{1}{8}}}$ (2p) $=x^{\frac{3}{8}}-x^{\frac{1}{8}}$ (1p)

$t=x^{1/8}\Rightarrow t^3-t=6$ (1p) $\Rightarrow t=2, x=256$ (1p)

(4) f nu e inj (3p); f nu e surj (4p) astfel:

a) $f(1)=0$ (1p); $f(4)=0$ (2p)

b) P.c. $\exists\, n\in\mathbb{N}^*$ a.î. $f(n)=\frac{1}{3}$.

$k-\log_2 n-\log_4 n=\frac{1}{3}$, $k=[\log_2 n]+[\log_4 n]$ (1p)

$k-\frac{3}{2}\log_2 n=\frac{1}{3}$ (1p) $\log_2 n=\frac{2}{3}\left(k-\frac{1}{3}\right)$ (1p)

$2^{\frac{2}{3}\left(k-\frac{1}{3}\right)}=n\Rightarrow 2^{\frac{2(3k-1)}{9}}=n$, (F), unul nu e CUB (1p)

Obs. Nu există nicio funcție surjectivă $f:\mathbb{N}^*\to[0,2)$, deoarece $\mathbb{N}^*$ este numărabilă iar $[0,2)$ este de putere continuului.