

Barem de corectare CMAA 2024 Clasa a X-a – Filiera tehnologică

P1

a) $E(x) = 1 - \left(x^{-\frac{1}{3}}\right)^3$	2p
$E(x) = \frac{x-1}{x} \in Q$ pentru orice $x \in Q^*$.	2p
b) $E(2 - \sqrt{3}) = \frac{1 - \sqrt{3}}{2 - \sqrt{3}}$	1p
$E(2 - \sqrt{3}) = -1 - \sqrt{3}$	2p

P2

a) $a = \log_{45} 5$, $b = \log_{45} 3$	2p
b) $1 - a - b = \log_{45} 3$	2p
$1 - a = \log_{45} 9$	1p
$\frac{1 - a - b}{1 - a} = \frac{1}{2}$	1p
$16^{\frac{1 - a - b}{1 - a}} = 4$	1p

P3

a) $z_2 = \left(\frac{19 + 7i}{9 - i}\right)^2 + \left(\frac{20 + 5i}{7 + 6i}\right)^2$	1p
$z_2 = \left(\frac{164 + 82i}{82}\right)^2 + \left(\frac{170 - 85i}{85}\right)^2$	1p
$z_2 = 6 \Rightarrow 2 \mid z_2$	1p
b) $z_n = (2 + i)^n + (2 - i)^n$	1p
$z_{n+2} - 4z_{n+1} + 5z_n = (2 + i)^n \left[(2 + i)^2 - 4(2 + i) + 5\right] + (2 - i)^n \left[(2 - i)^2 - 4(2 - i) + 5\right]$	2p
$z_{n+2} - 4z_{n+1} + 5z_n = 0 \Rightarrow z_{n+2} = 4z_{n+1} - 5z_n$	1p

P4

16 h 40 minute = 1000 minute	1p
$f(1000) = 200 \cdot e^{-0,014 \cdot 1000}$	2p
$f(1000) = 200 \cdot e^{-14}$	1p
$200 \cdot e^{-14} < 200 \cdot 2^{-14} < 2^8 \cdot 2^{-14}$	2p
$f(1000) < 2^{-6} \text{ mg}$	1p