

## Profil Pedagogic

### BAREM - Clasa a IX a

I. a)  $\frac{1}{13} = 0, (076923)$  ..... 2p

$a_1 = 0, a_2 = 7, a_3 = 6, a_4 = 9, a_5 = 2, a_6 = 3 \Rightarrow a_1 + a_2 + a_3 + a_4 + a_5 + a_6 = 27$  ..... 2p

$2020 : 6 = 336 \text{ rest } 4$  ..... 1p

$a_1 + a_2 + a_3 + \dots + a_{2020} = 336 \cdot 27 + (0 + 7 + 6 + 9) = 9094$  ..... 5p

b)  $|2n - 1| + 3|1 - 2n| \leq 12$  ..... 3p

$4|2n - 1| \leq 12; |2n - 1| \leq 3$  ..... 2p

$-3 \leq 2n - 1 \leq 3 | +1$

$-2 \leq 2n \leq 4 | :2$

$\left. \begin{matrix} -1 \leq n \leq 2 \\ n \in \mathbb{N} \end{matrix} \right\} \Rightarrow n \in \{0; 1; 2\}$  ..... 5p

c)  $2 \left[ \frac{2x-1}{3} \right] = \frac{5x-4}{3}$  ..... 2p

$\left[ \frac{2x-1}{3} \right] = \frac{5x-4}{6}$  ..... 1p

$\frac{5x-4}{6} \in \mathbb{Z}$  ..... 1p

Fie  $\frac{5x-4}{6} = k \in \mathbb{Z} \Rightarrow x = \frac{6k+4}{5}$  ..... 1p

$\left[ \frac{2 \cdot \frac{6k+4}{5} - 1}{3} \right] = k; \left[ \frac{4k+1}{5} \right] = k$  ..... 1p

$k \leq \frac{4k+1}{5} < k+1 | \cdot 5$  ..... 1p

$5k \leq 4k+1 < 5k+5; \left. \begin{matrix} -4 < k \leq 1 \\ k \in \mathbb{Z} \end{matrix} \right\} \Rightarrow k \in \{-3; -2; -1; 0; 1\}$  ..... 2p

$x \in \{-3; -\frac{8}{5}; -\frac{2}{5}; \frac{4}{5}; 2\}$  ..... 1p

II. a)  $1 \in M \Rightarrow 3 \cdot 1 + 1 = 4 \in M \Rightarrow 2 \in M \Rightarrow 3 \cdot 2 + 1 = 7 \in M \Rightarrow \sqrt{7} \in M$  ..... 10p

b)  $4 \in M \Rightarrow 3 \cdot 4 + 1 = 13 \in M$  ..... 10p

c)  $13 \in M \Rightarrow 3 \cdot 13 + 1 = 40 \in M$

$40 \in M \Rightarrow 3 \cdot 40 + 1 = 121 \in M$

$121 \in M \Rightarrow \sqrt{121} = 11 \in M$  ..... 10p

III. a)  $S_{2020} = \frac{(2a_1 + 2019 \cdot r) \cdot 2020}{2}$  ..... 3p

$S_{2020} = (2 \cdot 1 + 2019 \cdot 2) \cdot 1010$  ..... 3p

$S_{2020} = 4080400$  ..... 4p

b)  $S_m = \frac{[2a_1 + (m-1)r]m}{2}$  ..... 1p

$S_n = \frac{[2a_1 + (n-1)r]n}{2}$  ..... 1p

$\frac{S_m}{S_n} = \frac{m^2}{n^2} \Leftrightarrow \frac{2a_1 + (m-1)r}{2a_1 + (n-1)r} = \frac{m}{n}$  ..... 2p

$\Leftrightarrow (m - n)(2a_1 - r) = 0$  ..... 3p

$m \neq n \Rightarrow r = 2a_1$  ..... 1p

$\frac{a_m}{a_n} = \frac{a_1 + (m-1)r}{a_1 + (n-1)r} = \frac{a_1 + (m-1)2a_1}{a_1 + (n-1)2a_1} = \frac{2m-1}{2n-1}$  ..... 2p

c)  $16 \cdot S_m = m^2 \cdot S_4 \Leftrightarrow a_1 \cdot (8 - 2m) = r \cdot (4 - m)$  ..... 3p

Cum  $m > 4 \Rightarrow 2a_1 = r$  ..... 1p

$a_m < 100 \cdot a_4 \Leftrightarrow a_1 \cdot (2m - 1) < 700 \cdot a_1$  ..... 2p

Cum termenii progresiei sunt strict pozitivi  $\Rightarrow a_1 \neq 0$  ..... 1p

Se deduce că  $m < \frac{701}{2}$  ..... 2p

Numărul căutat este  $m = 350$  . ..... 1p

Notă:

\* La orice soluție corectă se acordă punctaj maxim.

Se acordă 10 puncte din oficiu.