

SUBIECTUL I**(30 de puncte)**

- 1) Intersecția cu axele sau table de valori (3 p) Trasarea graficului (2 p)
- 2) $r=2$ (3 p) $S_n = \frac{2a_1 + (n-1) \cdot r}{2} \cdot n \Rightarrow S_n = 440$ (2 p)
- 3) $x_1 = 1, x_2 = -\frac{1}{4}$ (3 p) $x \in \left[-\frac{1}{4}, 1\right]$ (2 p)
- 4) $D = (-\infty, 0) \cup \left(\frac{3}{2}, \infty\right)$ (2 p) $x_1 = -1, x_2 = \frac{5}{2} \Rightarrow S = \left\{-1, \frac{5}{2}\right\}$ (3 p)
- 5) formula corectă (2 p) $x + 4y - 7 = 0$ (3 p)
- 6) $\cos 135^\circ = -\cos 45^\circ$ (2 p) $\cos 135^\circ + \cos 45^\circ = 0$ (3 p)

SUBIECTUL al II-lea**(30 de puncte)**

- a) $x * 8 = 8$ (5 p)
- b) $(x * y) * z = x * (y * z), \forall x, y, z \in R$ (2 p) Demonstrarea egalității (3 p)
- c) $(-8) * (-7) * \dots * 0 * \dots * 7 * 8 = 8$ (5 p)
- d) $x * y = 8(x-8)(y-8) + 8 \geq 8 \Rightarrow (x-8)(y-8) \geq 0$ (adevărat) (5 p)
- e) $\exists e \in H : x * e = e * x = x, \forall x \in H$ (2 p) $e = \frac{65}{8} \in H$ (3 p)
- f) De ex: $x = \frac{1}{2} \in Q \setminus Z, y = \frac{121}{15} \in Q \setminus Z \Rightarrow x * y = 4 \in Z$ (5 p)

SUBIECTUL al III-lea**(30 de puncte)**

- a) $B + C = \begin{pmatrix} 2 & 10 \\ 3 & -2 \end{pmatrix}$ (3 p) $2 \cdot 10 \cdot 3 \cdot (-2) = -120$ (2 p)
- b) $(B + C)^2 = 34 \cdot I_2 \neq I_2 \Rightarrow (B + C) \notin G$ (5 p)
- c) $\det(B + C) = -34$ (5 p)
- d) $\det B = -1 \Rightarrow \exists B^{-1}$ $B^{-1} = \begin{pmatrix} 1 & 10 \\ 0 & -1 \end{pmatrix} \Rightarrow X = B^{-1} \cdot C = \begin{pmatrix} 31 & -10 \\ -3 & 1 \end{pmatrix}$ (5 p)
- e) $\begin{pmatrix} 1 & 0 \\ n & -1 \end{pmatrix}^2 = I_2; \begin{pmatrix} 1 & 0 \\ n & -1 \end{pmatrix} \in M_2(Z) \Rightarrow \begin{pmatrix} 1 & 0 \\ n & -1 \end{pmatrix} \in G$ (5 p)
- f) $X^2 = \begin{pmatrix} x^2 & 2xy \\ 0 & x^2 \end{pmatrix} = I_2 \Rightarrow \begin{cases} y = 0 \\ x \in \{-1, 1\} \end{cases} \Rightarrow X_1 = I_2, X_2 = -I_2$ (5 p)