

Soluție:

1. $f(x) = 0 \Leftrightarrow x = 5$. Tabelul de semn.

2. a) $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = a(x - x_1)(x - x_2)$, $a \in \mathbb{R}^*$; din $B(1, 0), C(-2, 0) \in G_f \Rightarrow x_1 = 1, x_2 = -2 \Rightarrow$
 $\Rightarrow f(x) = a(x - 1)(x + 2)$, $f(0) = -2 \Rightarrow a = 1 \Rightarrow f(x) = x^2 + x - 2$.

b) Cu $\begin{cases} x + y = S \\ xy = P \end{cases}$, se obține: $\begin{cases} S^2 - 2P = 13 \\ S = 5 \end{cases} \Leftrightarrow \begin{cases} S = 5 \\ P = 6 \end{cases} \Rightarrow t^2 - 5t + 6 = 0 \Rightarrow (x, y) \in \{(2, 3), (3, 2)\}$.

3. $a = 1 > 0 \Rightarrow f_{\min} = -\frac{\Delta}{4a} = -1$; cum $f(x) \geq f_{\min}, \forall x \in \mathbb{R} \Rightarrow f(x) \geq -1, \forall x \in \mathbb{R}$.

a) $f\left(\frac{7}{3}\right) = \sqrt{3} > f\left(\frac{5}{2}\right) = \sqrt{2}$.

b) $2^{x+1} + 2^{x-1} - 10 = 0 \Leftrightarrow 2^x \left(2 + \frac{1}{2}\right) = 10 \Leftrightarrow 2^x = 4 \Leftrightarrow x = 2$.