$$f(x_1, x_2, x_3) = 5x_1^2 - 2x_1 x_3 +$$
$$+ 2x_2^2 + 4x_2 x_3 + 6x_3^2 - 10x_1 - 6x_2$$
$$- 2x_3 + 35$$

$$f'_{x_1} = 10x_1 - 2x_3 - 10$$

$$f'_{x_2} = 4x_2 + 4x_3 - 6$$

$$f'_{x_3} = -2x_1 + 4x_2 + 12x_3 - 2$$

$$A = \begin{pmatrix} 10 & 0 & -2 \\ 0 & 4 & 4 \\ -2 & 4 & 12 \end{pmatrix}$$

$$\Delta_1 = 10$$

$$\Delta_2 = 40$$

$$\Delta_3 = 480 - 16 - 160 = 304$$

$$\Delta_i > \quad i = 1,2,3 \quad \Rightarrow A > 0 \Rightarrow$$

$$\exists \text{ abs min}$$

$$\nabla f = 0$$

$$\begin{pmatrix} 10 & 0 & -2 & | & 10 \\ 0 & 4 & 4 & | & 6 \\ -2 & 4 & 12 & | & 2 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & 0 & | & \frac{18}{19} \\ 0 & 1 & 0 & | & \frac{67}{38} \\ 0 & 0 & 1 & | & -\frac{5}{19} \end{pmatrix}$$

$$x^* = \left(\frac{18}{19}, \frac{67}{38}, -\frac{5}{19} \right)$$

$$f(x^*) = 25{,}23684211$$