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Пр №7 Дис 2

$f(x,y) = x^3 + 6x^2y + 12xy^2 - 8y^3 - 12x + 6y$

$f'(x) = 3x^2 + 12xy + 12y^2 - 12$

$f'(y) = 6x^2 + 24xy - 6y^2 + 6$

$\left.\begin{array}{l} f'(x)=0 \\ f'(y)=0 \end{array}\right\} \Rightarrow$

$x_1 = 0 \quad y_1 = -1 \quad T.A_1(0,-1)$

$x_2 = 0 \quad y_2 = 1 \quad T.A_2(0,1)$

$x_3 = 4 \quad y_3 = -1 \quad T.A_3(4,-1)$

$x_4 = -4 \quad y_4 = 1 \quad T.A_4(-4,1)$

$f''_{xx} = 6x + 12y$

$f''_{yy} = 24x - 12y$

$f''_{xy} = 12x + 24y$

$\Delta_1 = |f''_{xx}| = f''_{xx} = 6x + 12y$

$\Delta_2 = \begin{vmatrix} f''_{xx} & f''_{xy} \\ f''_{yx} & f''_{yy} \end{vmatrix} = f''_{xx} f''_{yy} - (f''_{xy})^2 =$

$= (6x + 12y)(24x - 12y) - (12x + 24y)^2 = -360xy - 720y^2$

$T.A_1(0,-1) \rightarrow \Delta_1 < 0, \Delta_2 < 0$ } седлова точка

$T.A_2(0,1) \rightarrow \Delta_1 > 0, \Delta_2 < 0$ }

$T.A_3(4,-1) \rightarrow \Delta_1 > 0, \Delta_2 > 0 \Rightarrow$ Min сорг

$T.A_4(-4,1) \rightarrow \Delta_1 < 0, \Delta_2 > 0 \Rightarrow$ сорг. Max.