$f(x,y) = -x^3y - xy^3 + 4xy$

$f_x = -3x^2y - y^3 + 4y$ & $f_y = -x^3 - 3xy^2 + 4x$

$f_x = 0$ & $f_y = 0$ gives

$y(-3x^2 - y^2 + 4) = 0$ | $x(-x^2 - 3y^2 + 4) = 0$

$y = 0$, $y = \pm\sqrt{4 - 3x^2}$ | $x = 0$, $x = \sqrt{4 - 3y^2}$

$y = \sqrt{4 - 3(4 - 3y^2)} = \sqrt{4 - 12 + 9y^2}$

$y = \pm 1 \Rightarrow x = \pm 1$

Critical points are - $(1,1), (1,-1), (-1,1), (-1,-1), (0,2), (0,-2), (2,0), (-2,0)$

Since $|x| < 3/2$ & $|y| < 3/2$

So critical $\rightarrow$ $(1,1), (1,-1), (-1,1), (-1,-1)$

$f_{xy} = -3x^2 - 3y^2 + 4$

$\Rightarrow f_{xx} \cdot f_{yy} - (f_{xy})^2 = (-6xy)(-6xy) - (-3x^2 - 3y^2 + 4)^2$

$= \boxed{36x^2y^2 - (3x^2 + 3y^2 - 4)^2}$

(a) at $(1,1)$ $36 - (3+3-4)^2 \Rightarrow 36 - 4 = 32 > 0$

$f_{xx}(1,1) = -6 < 0 \rightarrow$ maximum

(b) at $(1,-1)$ $36 - (3+3-4)^2 \Rightarrow 32 > 0$

$f_{xx}(1,-1) \Rightarrow 6 > 0 \rightarrow$ minimum

(c) at $(-1,1)$ $36 - (3+3-4)^2 = 32 > 0 \rightarrow$ minimum

$f_{xx}(-1,1) = 6 > 0$

(d) at $(-1,-1)$ maximum

minimum at $(-1,1)$ and $(1,-1)$

$f(1,-1) = -(1)^3(-1) - (1)(-1)^3 + 4(1)(-1) = 1+1-4 \Rightarrow \boxed{-2}$

$f(-1,1) = -(-1)^3(1) - (-1)(1)^3 + 4(-1)(1) = 1+1-4 \Rightarrow \boxed{-2}$

So minimum value is -2 at $(1,-1)$ and $(-1,1)$