Use online tools like GeoGebra to graph functions of $x, y$

Optimization

See local extrema from $f_x = f_y = 0$

but need to check concavity in both directions

$A = f_{xx}$, $B = f_{xy}$, $C = f_{yy}$

$AC - B^2 > 0 \Rightarrow \epsilon_{\text{max}}$

$AC - B^2 < 0 \Rightarrow \text{saddle}$

$AC - B^2 = 0 \Rightarrow \text{inconclusive}$
Ex 1) \( x^2 + y^2 = f(x, y) \)

2) \( \sqrt{16 - x^2 - y^2} = f(x, y) \)

3) \( f(x, y) = x^2 - y^2 \)

4) \( f(x, y) = x^3 + y^3 - 6xy \)

5) \( f(x, y) = xe^y + x^2y^4 + 1 \)