

Problem statement a) Determine the locations of all extreme points of the function

$$f(x, y) = \frac{1}{1 + x^2 + y^2},$$

and find the type of each (local min or local max). Explain in words what a graph of this function would look like and how that supports your conclusion.

b) Determine the *approximate* location and type of *one* extreme point of the function

$$g(x, y) = \frac{1,000,000}{1 + x^2 + y^2} + 2x \cos(e^x) + (y + 2)(x^4 + 3xy + 17) + \ln(1 + x^2y^2),$$

possibly by thinking about what the graph of g might look like. Explain your reasoning carefully.