

Partial Differentiation
Functions of more than one variable

Question

If $y = (x - C)^2$, are the curves level curves of a function $f(x, y)$?

To be the family of level curves of a function, what property must a family of curves have in a given region of the xy -plane?

Answer

The curves $y = (x - C)^2$ are all horizontally shifted versions of the parabola $y = x^2$, and they all lie in the half plane $y \geq 0$. Since each of these curves intersects all of the others, they cannot be level curves of a function $f(x, y)$ defined in $y \geq 0$. To be a family of level curves, the curves must not intersect in the given region.