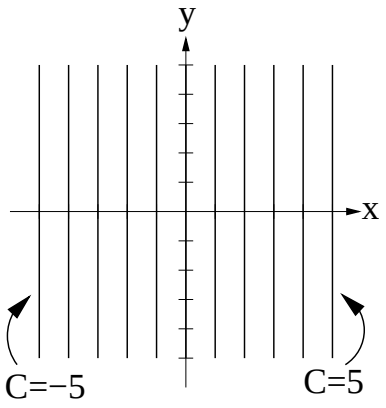
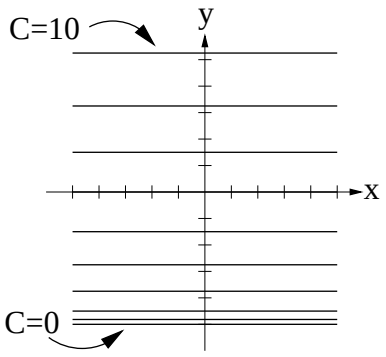
Partial Differentiation
Functions of more than one variable

Question
For the given families of level curves ($f(x, y) = C$) describe the associated graphs of the function $f(x, y)$.
(It can be assumed that families correspond to values of C that are equally spaced. The behaviour of the given family is representative of all families of the function.)

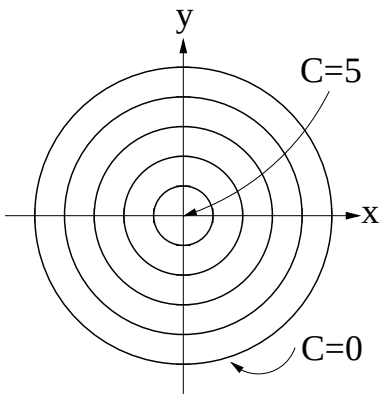
(a)



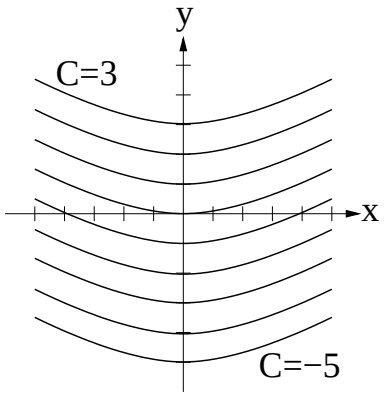
(b)



(c)



(d)



Answer

(a) The graph is a plate containing the y-axis, sloping uphill towards the right. It is similar to a function of the form $f(x, y) = y$.

(b) The graph is a cylinder parallel to the x-axis, rising from zero height, steeply to begin with, but more and more slowly as y increases. It is similar to a function of the form $f(x, y) = \sqrt{y + 5}$.

(c) The graph is an inverted circular cone with its vertex at height 5 on the z-axis and base circle in the xy-plane. It is similar to a function of the form $f(x, y) = 5 - \sqrt{x^2 + y^2}$.

(d) The graph is a cylinder (possible parabolic) with its axis in the yz-plane, and sloping upwards in the direction of increasing y. It is similar to a function of the form $f(x, y) = y - x^2$.