Ch 14. Partial Derivatives

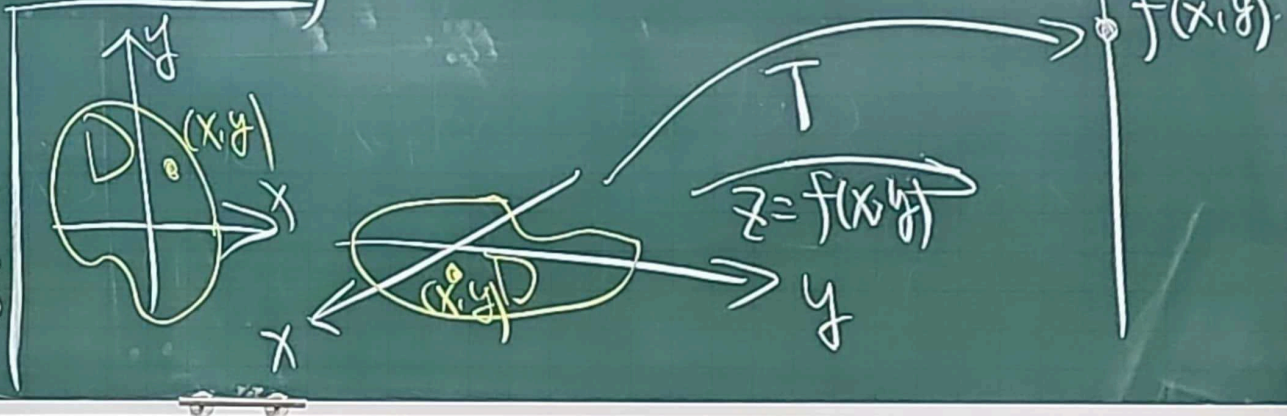
§ 14.1. Fns of Several Variables

Four ways of defining fns of two variables (several)

(1) by description in words
(2) by a table of values
(3) by an explicit formula
(4) by a graph or level curves

<Ex> $T = f(x, y)$ Temperature at (x, y)

$V = \pi r^2 h$ Volume of cylinder
$= g(r, h)$



<Ex> Find domain and range of $g(x,y)=\sqrt{9-x^2-y^2}$

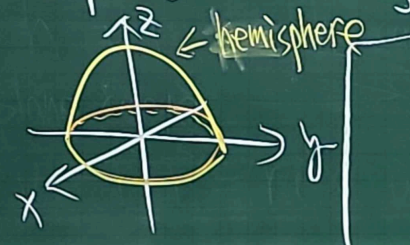
Def: Graph of $f: D \to \mathbb{R}$

$= \{(x,y,z) \in \mathbb{R}^3 \mid z=f(x,y), (x,y) \in D\}$

<Ex> Graph

$z=\sqrt{9-x^2-y^2}$

≥ 0



Def: Level curves of a fn of two variables are the curves

$f(x,y)=k$ (constant in range)

k = temperature
height
pressure