

# MA205 – LSN 25

## Functions of Several Variables



*"Whatever the case, I know I benefited from this prolonged immersion in math. The study of mathematics, basically a study of logic, stimulates one's thinking and greatly improves one's power of reasoning. In later years, when I was faced with infinitely complex problems, mathematics helped me think more clearly and logically."*

- Omar N. Bradley, General of the Army  
[USMA Class of 1915](#)  
Instructor of Mathematics, USMA, 1920-24



# Admin

WPR I					
	1	2	3	4	Total
Average	87.09%	84.91%	76.68%	73.82%	80.30%
High	59	60	55	74	239
Low	39	10	0	25	143
Points	60	60	55	75	250

•Course Projects

Selection Process  
Peer Evaluation

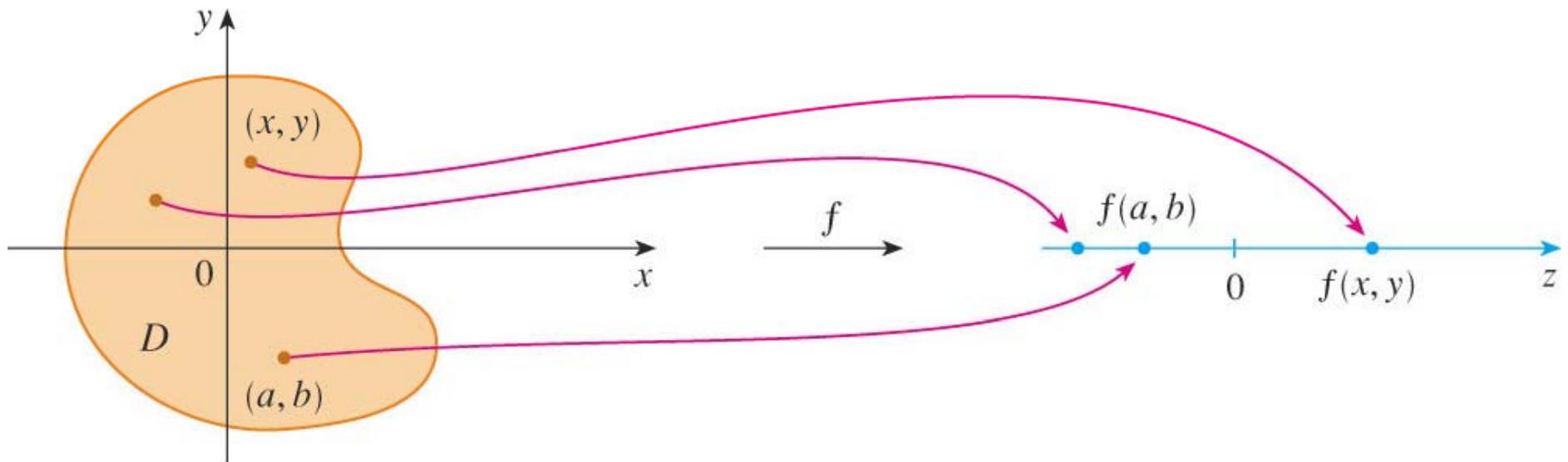
# Block II Objectives

- **Develop mathematical model based on something changing in two dimensions**
- **Understand  $\Sigma$  and  $\Delta$  notation with more than one independent variable**
- **Understand definition of Iterated Integral**
- **Become familiar with Polar coordinates**
- **Apply Iterated Integrals**

# LSN 25 Objectives

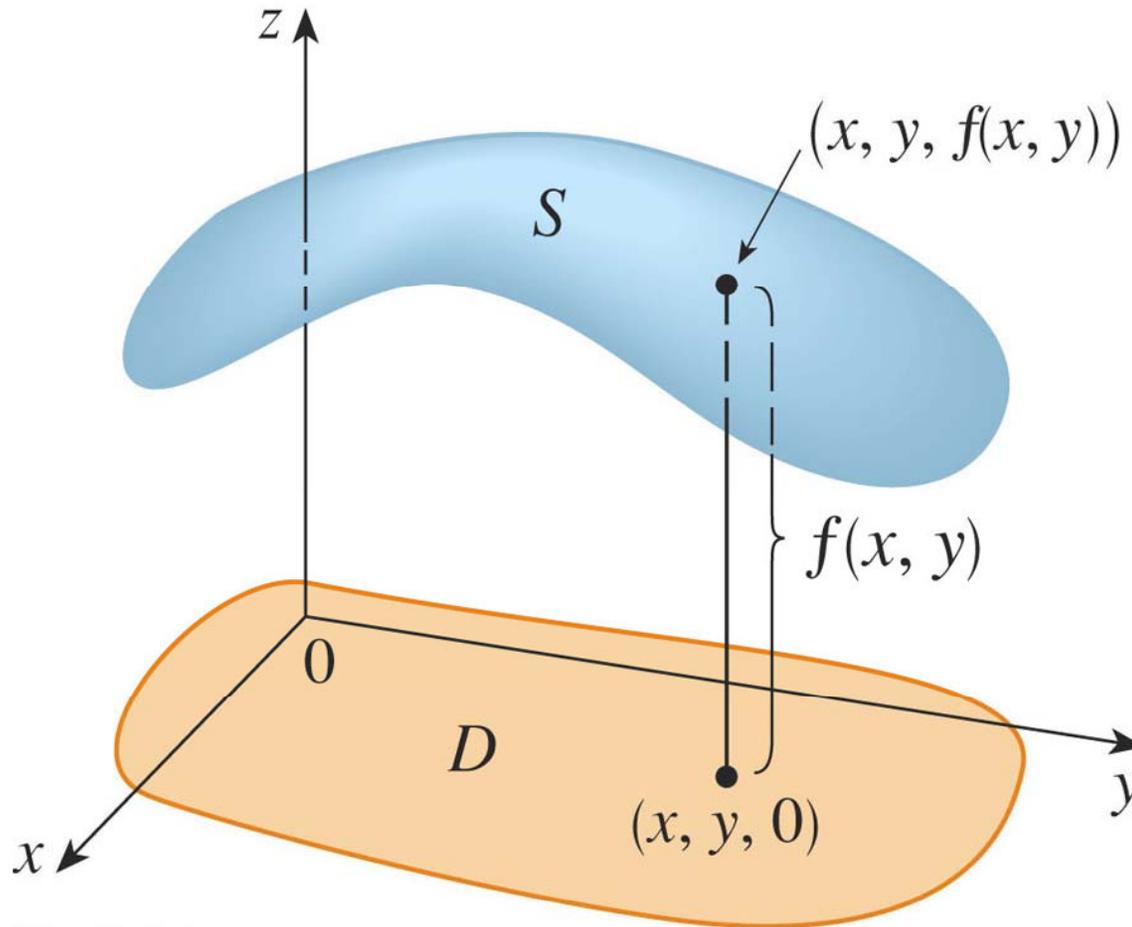
- **Determine the domain and range of a function of more than one variable.**
- **Understand how to use level curves.**
- **Understand how to use tabular data to represent a function of more than one variable.**
- **Plot a 3D function in Mathematica.**

**DEFINITION** A **function of two variables** is a rule that assigns to each ordered pair of real numbers  $(x, y)$  in a set  $D$  a unique real number denoted by  $f(x, y)$ . The set  $D$  is the **domain** of  $f$  and its range is the set of values that  $f$  takes on, that is,  $\{f(x, y) \mid (x, y) \in D\}$ .



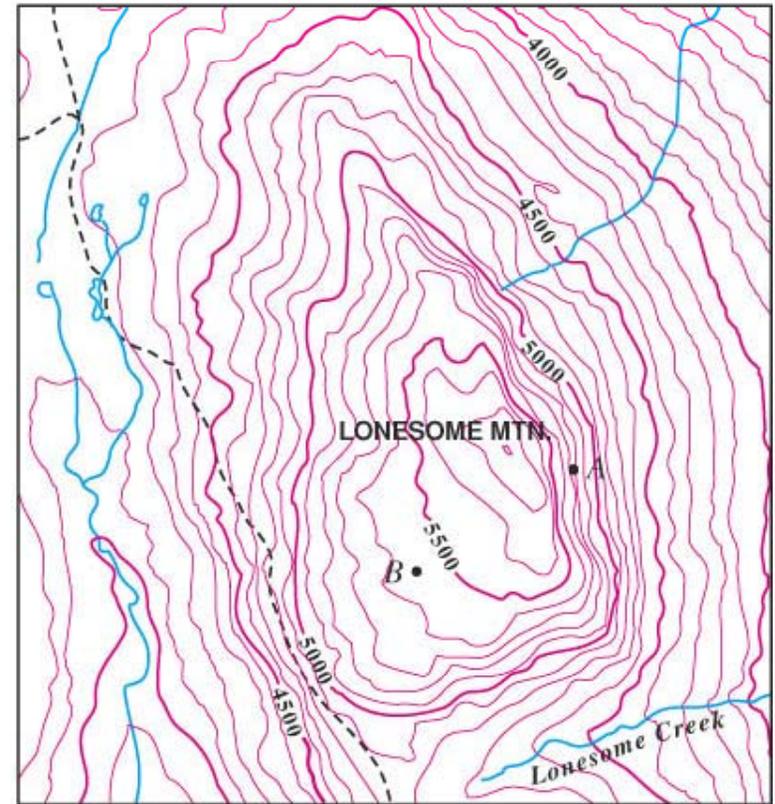
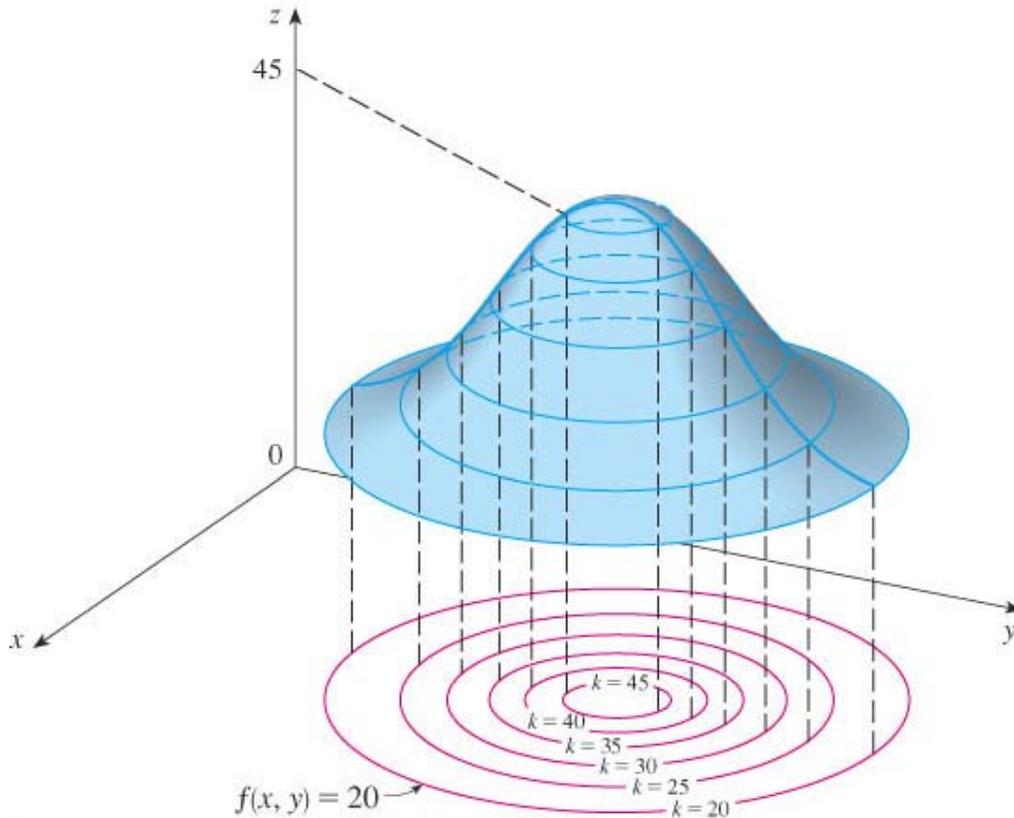
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**DEFINITION** If  $f$  is a function of two variables with domain  $D$ , then the graph of  $f$  is the set of all points  $(x, y, z)$  in  $\mathbb{R}^3$  such that  $z = f(x, y)$  and  $(x, y)$  is in  $D$ .



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**DEFINITION** The level curves of a function  $f$  of two variables are the curves with equations  $f(x, y) = k$ , where  $k$  is a constant (in the range of  $f$ ).



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