Class Activities 1
Activities for the class of January 9 (Tue), 2018.

Main idea of the lecture

- Let $f \subseteq \mathbb{R}^n \times \mathbb{R}^m$ be a relation. f is said to be a **function of n variables** if and only if for each pair $(P_1, W_1), (P_2, W_2)$ such that $P_1, P_2 \in \mathbb{R}^n$ and $W_1, W_2 \in \mathbb{R}^m$, if $P_1 = P_2$, then $W_1 = W_2$.

- If f is a function, f is said to be well-defined.

- The **domain** of f is a set $D_f = \{P \in \mathbb{R}^n | \exists W \in \mathbb{R}^m, (P, W) \in f\}$.

- The **range** of f is a set $R_f = \{W \in \mathbb{R}^m | \exists P \in \mathbb{R}^n, (P, W) \in f\}$

Group Activities

Mathematical Instructions

For each given f, (1) Verify that f is well-defined; (2) Find its domain and range, and draw the region of the domain; (3) Prove its domain and range.

1. $f_1 = \{(x, y, z) \in \mathbb{R}^2 \times \mathbb{R} \mid z = \ln(x^2 + y^2 - 1)\}$

2. $f_2 = \left\{(x, y, z) \in \mathbb{R}^2 \times \mathbb{R} \mid z = \sqrt{6 - (2x + 3y)}\right\}$

3. $f_3 = \left\{(x, y, z) \in \mathbb{R}^2 \times \mathbb{R} \mid z = \dfrac{1}{x^2 + y^2 - 1}\right\}$

Activity Instructions

1. Each group selects **one** function from the given functions randomly. The members discuss each other about the given mathematical instruction.

2. Write a chart paper following the given mathematical instruction (proofs), and stick the chart paper in front of the classroom (MB2213-14) **before 12.45 of January 12 (Fri), 2018.**

3. At 13.00 - 13.10 on January 12 (Fri), 2018, we will have the **joint discussion** (the discussion with other groups).