Tut 2

1. Let the closed intervals $X = Y = [0, 6]$ be the universes of discourse. Let

$$A = \int_X \frac{1}{1+(x-3)^2} - \frac{1}{10} / x$$

$$B = \int_X 1 - \frac{|x-3|}{3} / x$$

$$C = \int_Y 1 - \frac{|y-3|}{3} / y$$

be fuzzy sets over X and Y respectively.

(a) Determine the membership functions of $A \cup B$ and $A \cap B$ respectively.
(b) Let D be the Cartesian product of A and C. Determine the membership function of D, and the membership functions of the projections of D on X and Y respectively.

2. Given two universes X and Y, let $y = f(x) = (x-2)^2$. Let A be a fuzzy set on X, whose membership function is defined as follows:

$$\mu_A(x) = \begin{cases} x-1 & if\ 1 \le x \le 2 \\ -0.5(x-4) & if\ 2 < x \le 4 \\ 0 & otherwise \end{cases}$$

Please determine the membership function of B, which is induced by f.

3. Show the weak distribution over intersection $R \circ (S \cap T) \subseteq (R \circ S) \cap (R \circ T)$ with max-min composition, and min for intersection.