Множества

U - universal.

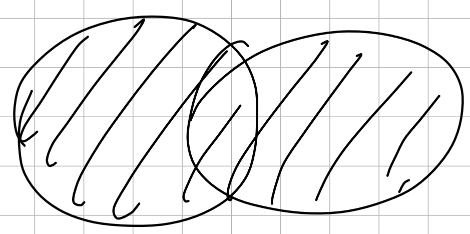
$A \subseteq U$ (A - подмножество U)

$f_A : U \to \{0;1\}$ → логическая функция f_A

$\forall x \in U \quad f_A(x) = \begin{cases} 1, x \in A \\ 0, x \notin A \end{cases}$ — индикаторная функция.

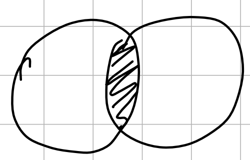
$[x \in A] = f_A(x)$

$A \vee B$:



$f_{A \vee B} = f_A(x) \vee f_B(x)$

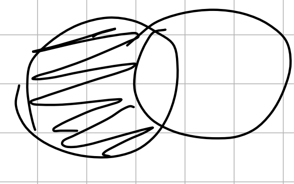
$A \wedge B$:



$f_{A \wedge B} = f_A(x) \wedge f_B(x)$

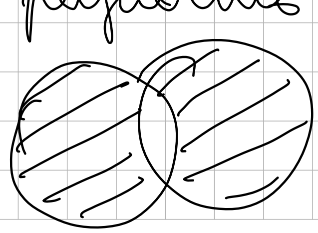
$A \setminus B$ — разность множеств.

$f_{A \setminus B} = f_A(x) \wedge \overline{f_B}(x)$



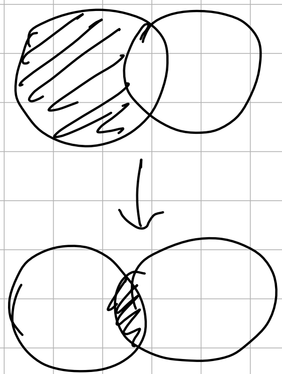
$A \Delta B$ — симметрическая разность

$f_{A \Delta B} = f_A(x) \oplus f_B(x)$



$$A\setminus(A\setminus B) = A\wedge B$$

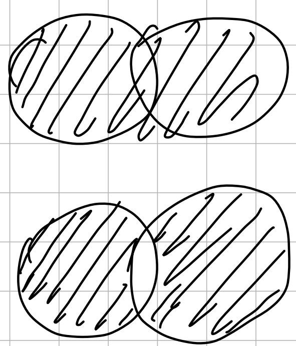
$$A\setminus(A\setminus B)$$

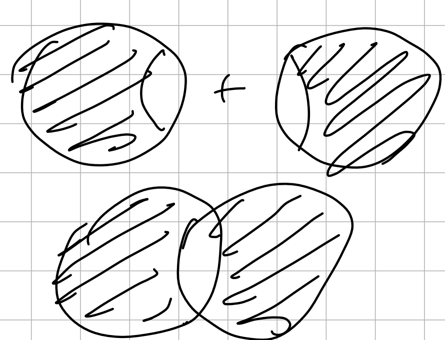


$$f_{A\setminus(A\setminus B)} = f_A(x)\cdot\overline{f_{A\setminus B}(x)} = f_A(x)\,\overline{f_A(x)\,\overline{f_B}(x)} =$$

$$= \underbrace{\underbrace{f_A(x)\left(\overline{f_A}(x)\right.}_{0} \vee f_B(x)\left.\right)}_{f_A(x)\cdot f_B(x)} = f_A(x)\cdot f_B(x) = f_{A\wedge B}(x)$$

$$(A\vee B)\setminus(A\wedge B) = (A\setminus B)\vee(B\setminus A)$$





$$f_{(A\vee B)\setminus(A\wedge B)}(x) = f_{(A\vee B)}(x)\,\overline{f_{(A\wedge B)}}(x) = \left(f_A(x)\vee f_B(x)\right)\overline{f_A(x)\,f_B(x)} =$$

$$= \left(f_A(x) \vee f_B(x)\right)\left(\overline{f_A(x)} \vee \overline{f_B(x)}\right) = f_A(x)\overline{f_B(x)} \vee f_B(x)\overline{f_A(x)}$$

№5.

$$f = ((x \in A) \to (x \in P)) \vee (x \in Q)$$

$$P = [2; 10]; \quad Q = [6, 14]$$

$f = 1$ при $x \in [6, 14]$

$f = 1$ при $x \in A = 0$ → найти A

$f = 1$ при $x \in P = [2; 10]$

от A $f = 1$ не зависит на отрезке $[2; 14]$

из ответов: отрезок $[3; 11]$.

$$\forall x \; f_A(x) \to f_B(x) = 1 \iff \left[\begin{array}{l} f(x) = 0 \\ \begin{cases} f_A(x) = 1 \\ f_B(x) = 1 \end{cases} \end{array}\right.$$

$$f_{(A_1 \wedge A_2 \dots \wedge A_n) \Delta (B_1 \wedge B_2 \dots B_n)}(x) \to f_{(A_1 \Delta B_1) \cup (A_2 \Delta B_2) \dots}(x) = 0$$

и

$$f_{(A_1 \wedge A_2 \dots)} \oplus f_{B_1 \wedge B_2 \dots}(x)$$

правило вывода.

$$(A_1 \wedge A_2 \wedge \dots A_n) \to B = 1$$ (всегда 1)

тавтология

$$(A \wedge (A \to B)) \to B = 1$$

1.) $B = 1 \to$ True

2.) $B = 0$

$$(A \wedge (A \to 0)) \to 0 = \overline{A \wedge \overline{A}} = \overline{0} = 1.$$

if $\overline{A} \to B$ and $B = 0$,
то $A =$ True.