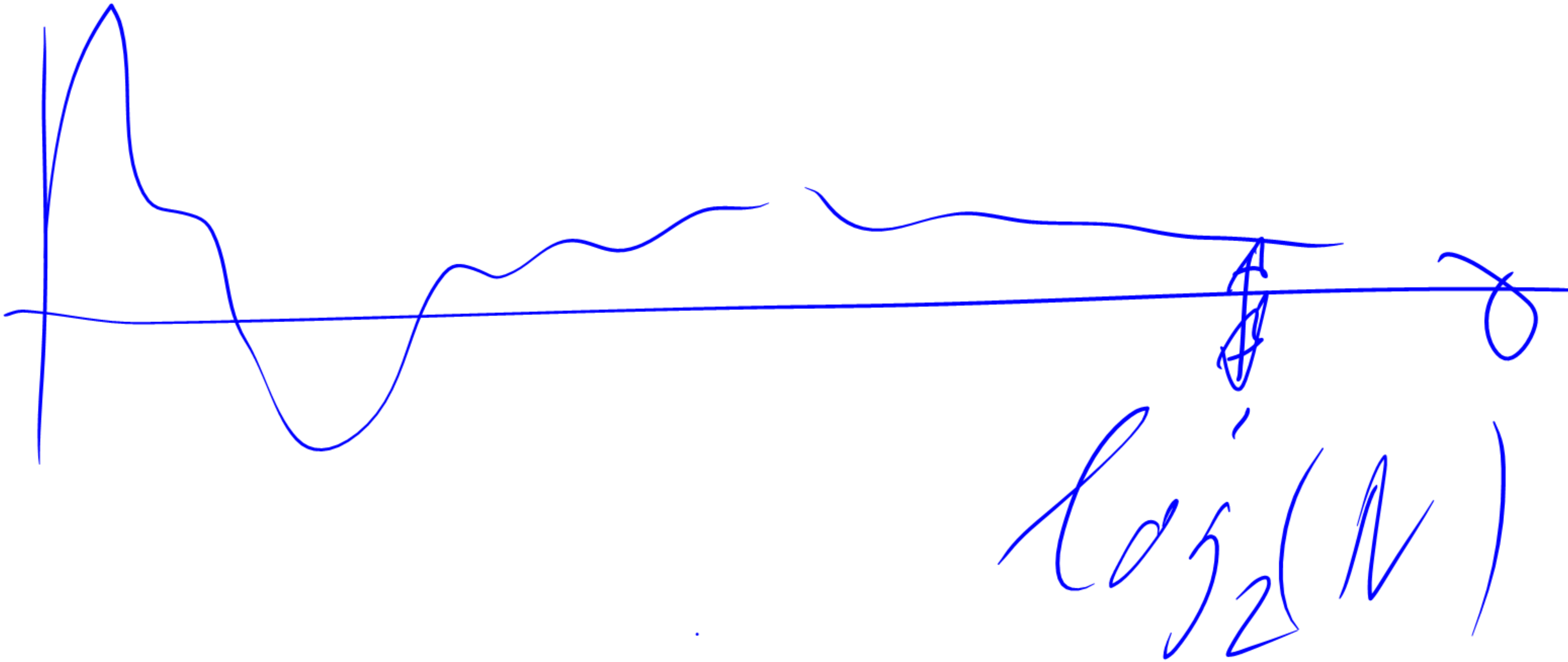
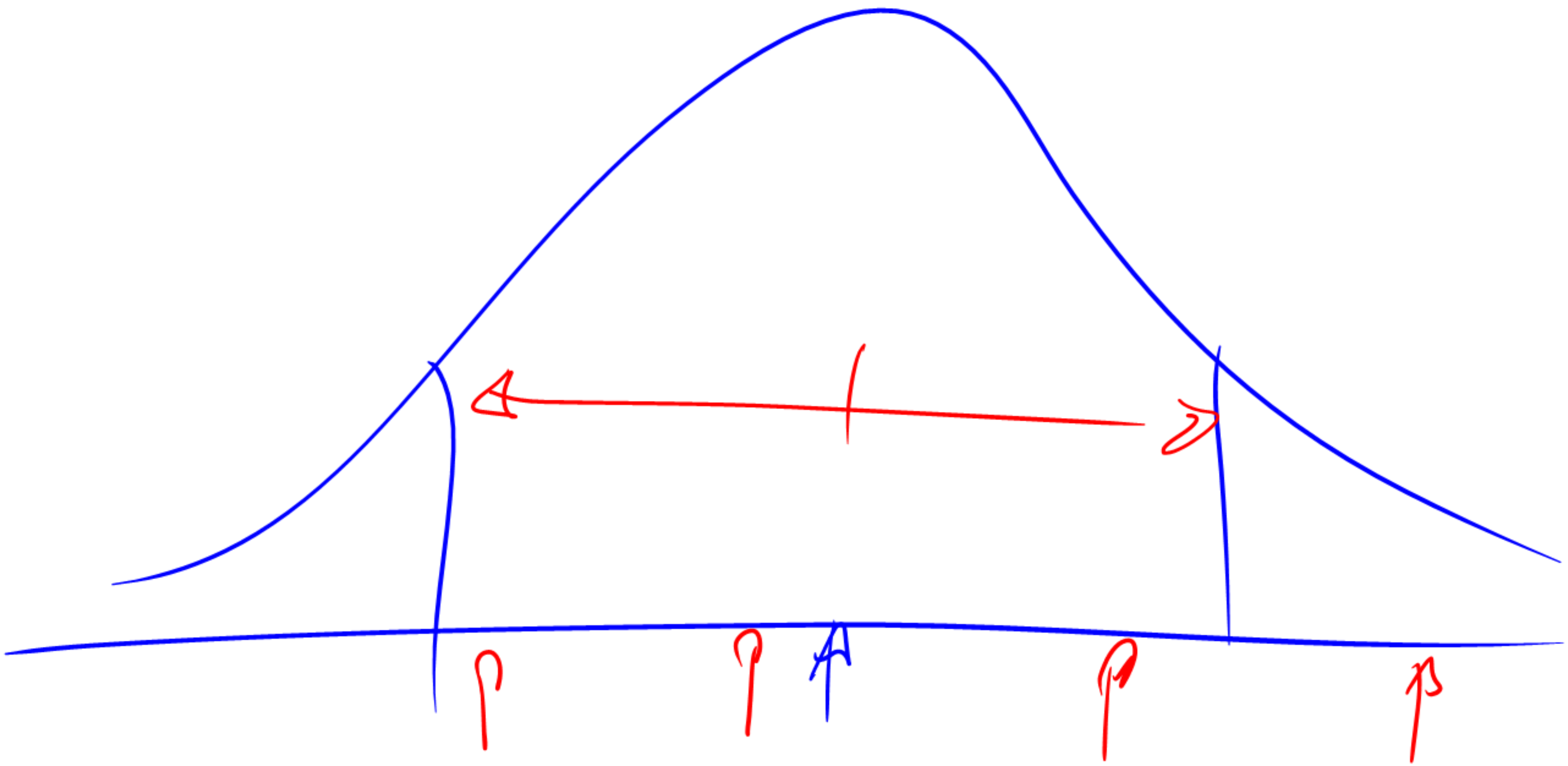
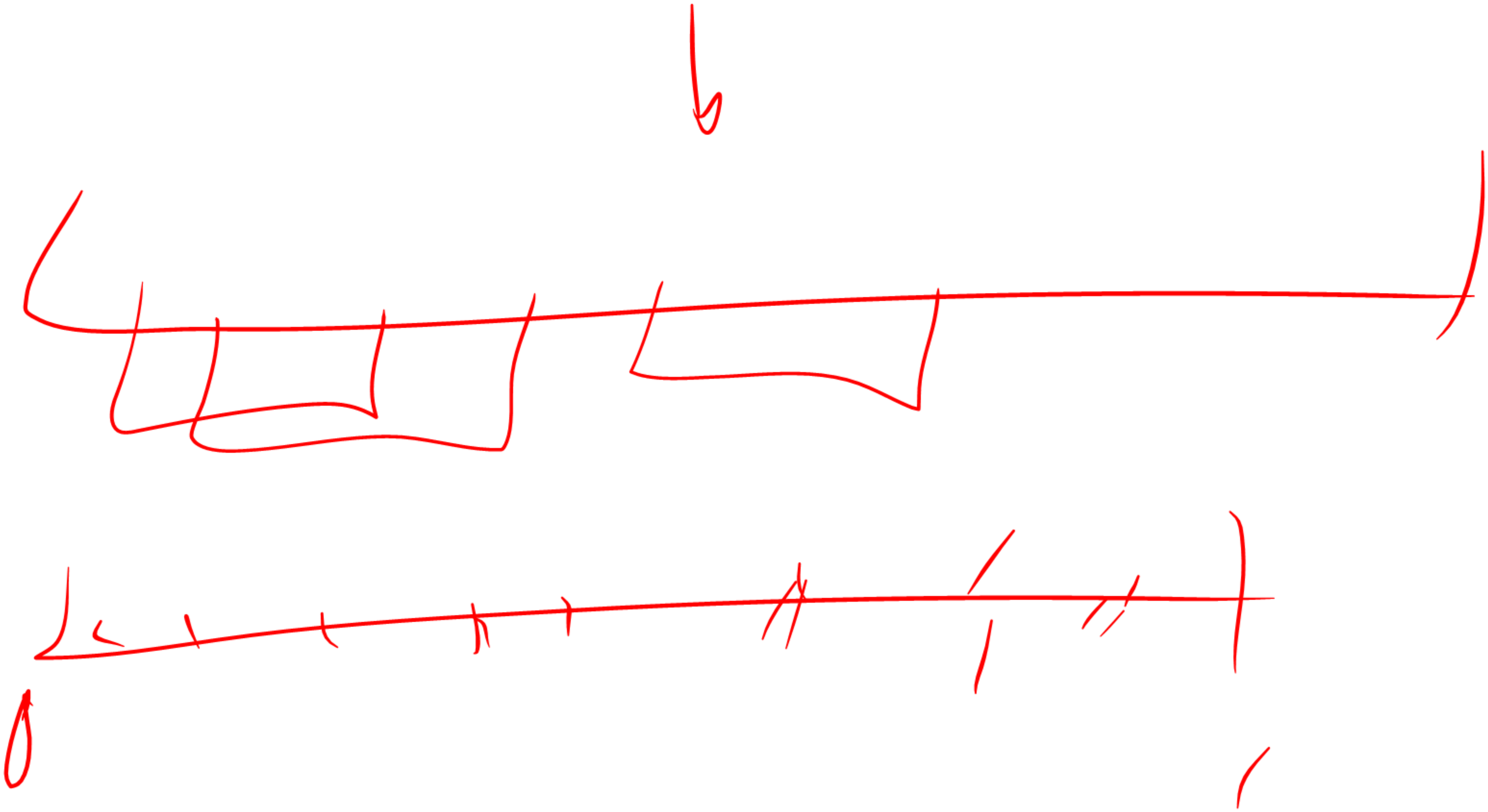


$\log_2(N)$





$f(x) \; : \quad x \sim N(0,1) \qquad E[X(T)]$

$x \to \underline{\alpha} + \beta \cdot x$

$x(0) \quad g(x(t_{n+1})) = f(X(t_n))$

$dx = f(x)\,dt$

$x(t_{n+1}) \simeq x(t_n) + \Delta X(t_n)$

$$f \sim \alpha + \beta \cdot z \quad , \quad z \sim N(0,1)$$

$$E_N[f] = \frac{1}{N}\sum_{i=1}^{N} (\alpha + \beta \cdot z_i) = me_N$$

$$\underline{E[me_N^2]} = E\left[\frac{1}{N^2}\sum_{i=1}\sum_{j=1} (\alpha+\beta z_i)(\alpha+\beta z_j)\right]$$

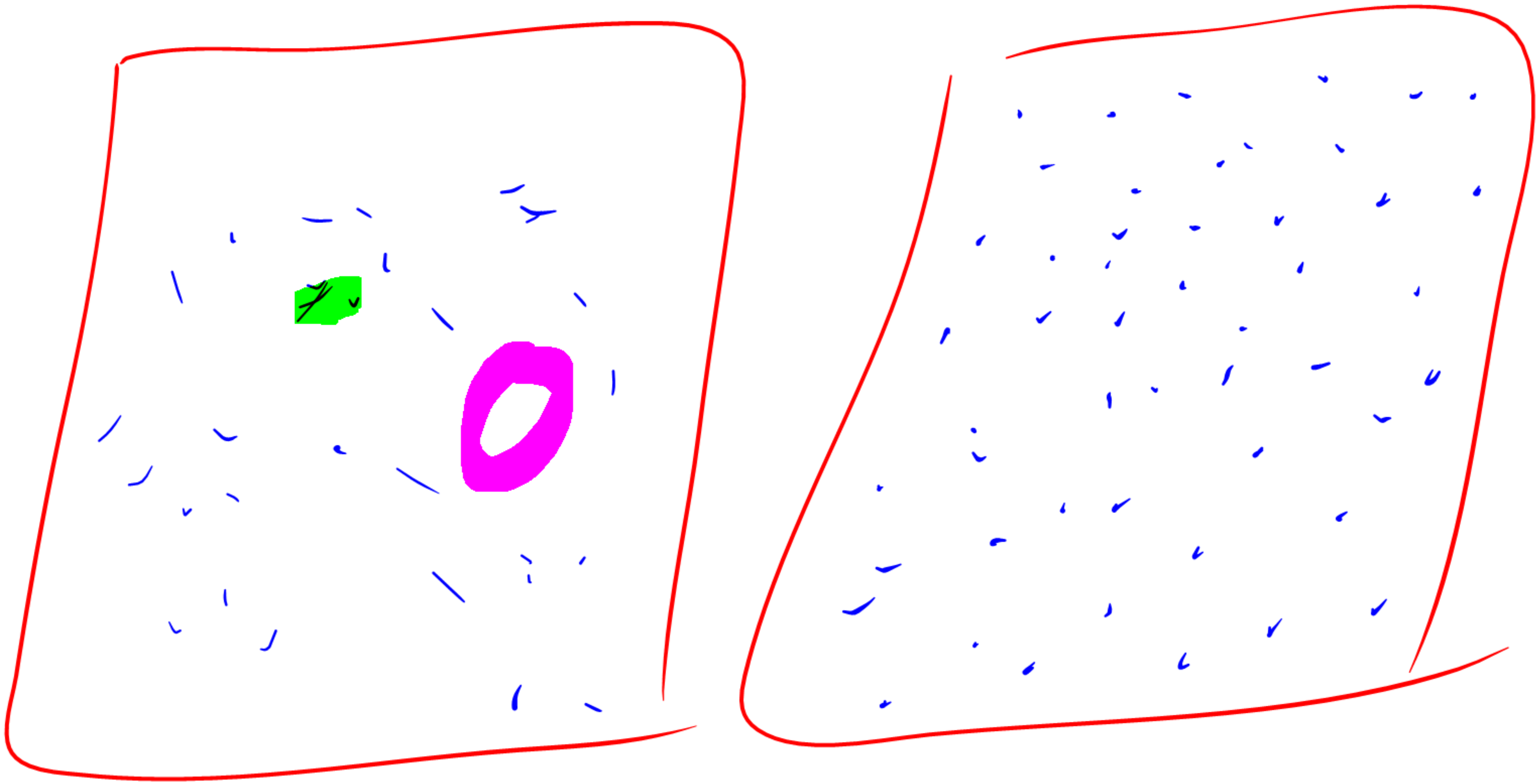
$$= \frac{1}{N^2} E\left[\sum_i (\alpha+\beta z_i)^2 + 2\sum_{i=1}^{N}\sum_{j=1}^{i-1} (\alpha+\beta z_i)(\alpha+\beta z_j)\right]$$

$$\left(\overline{(\alpha^2+\beta^2)} + 2\alpha^2\right)$$

$$V = \underbrace{\frac{1}{N}\left(\cancel{\alpha^2}+\beta^2\right) + \underbrace{\frac{1}{N^2}\cdot \cancel{N}\cdot (N-1)\cdot \cancel{\alpha^2}}_{}}_{E[m e_n^2]} - \underbrace{E[m e_n]^2}_{\cancel{\alpha^2}}$$

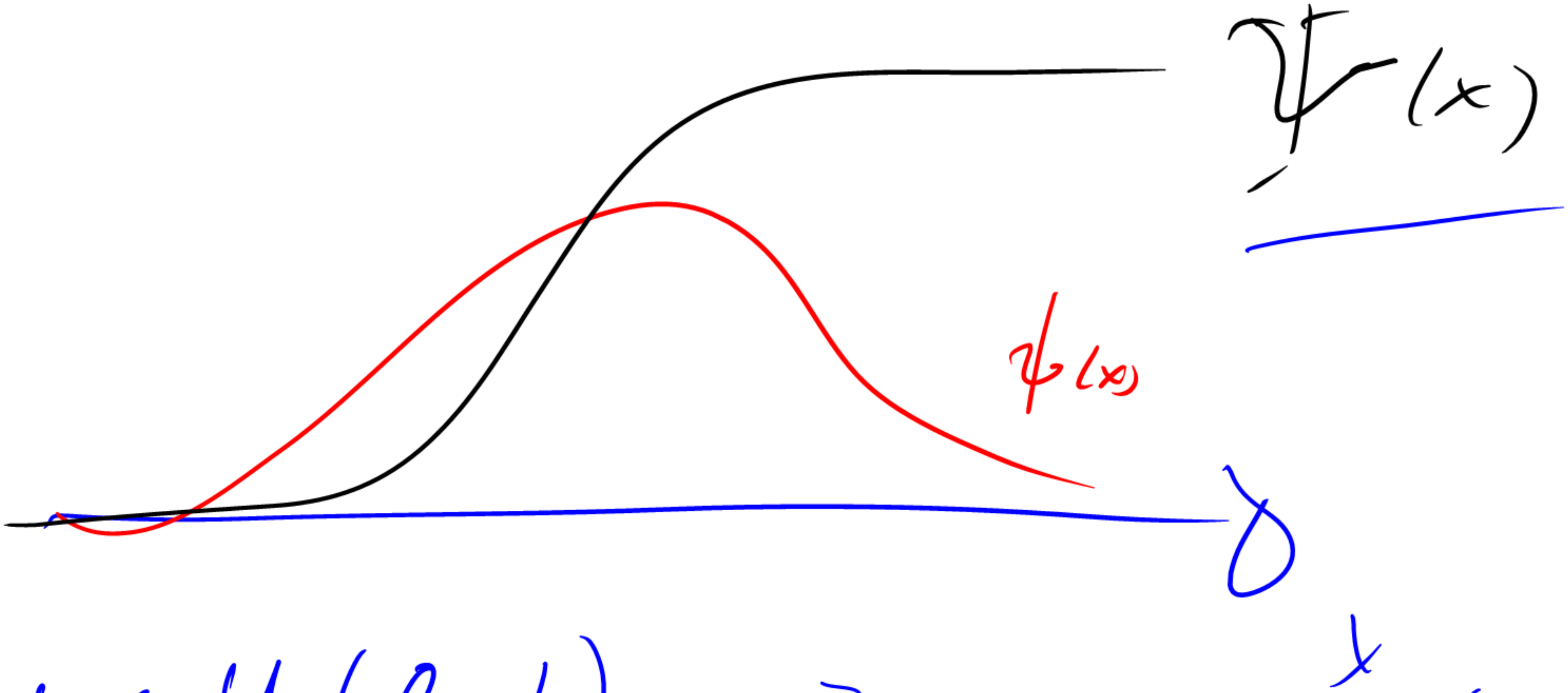
$$\cancel{=}\ \alpha^2 - \frac{\alpha^2}{N}$$

$$V_{mew} = \frac{\beta^2}{N} \Rightarrow \sigma_N = \sqrt{\frac{\beta^2}{N}}$$

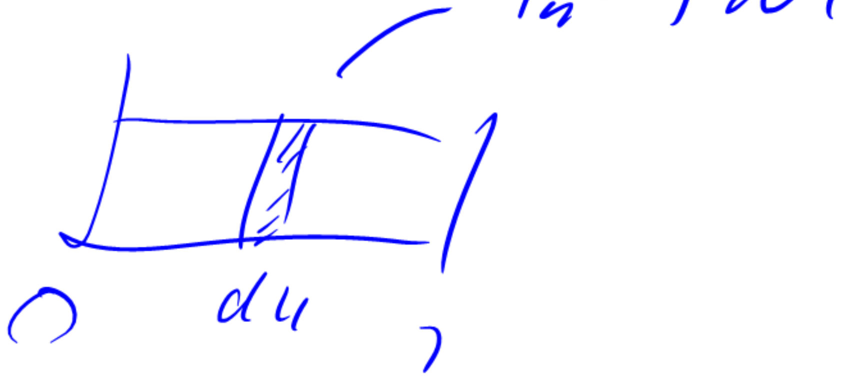


11

10 $\to$ 01



$u \in U(0,1) \longrightarrow$



$u \sim \psi_u(u) = 1$

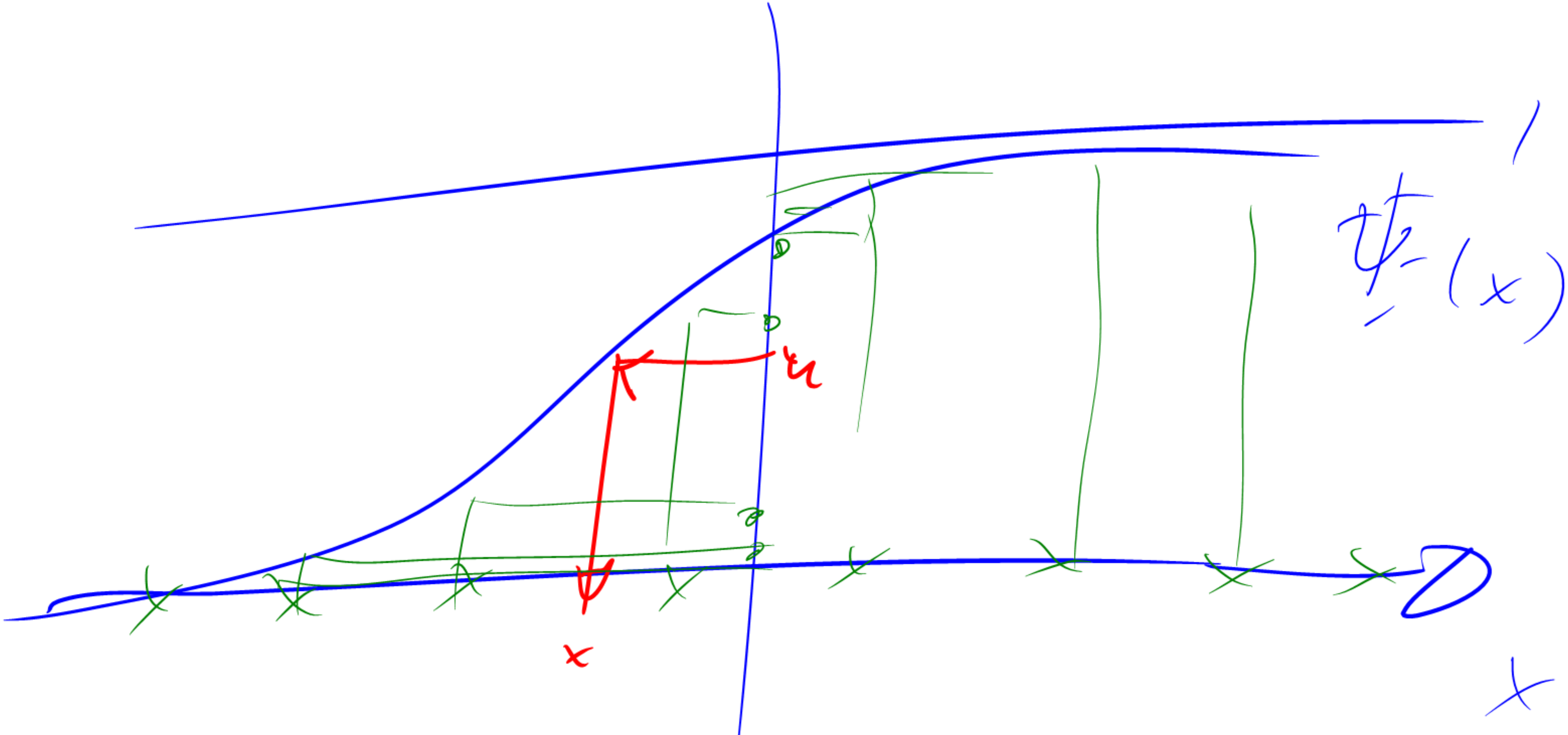
$x = f(u)$ $\quad (\psi_x(x)\,dx) = (\psi_u(u)\,du)$

$$\psi_x(x) = \underline{\psi_u(u)} \cdot \underbrace{\frac{du}{dx}}_{} = \underbrace{\frac{1}{\frac{df(u)}{du}}}_{}$$

$$\underbrace{\Psi_x(x) = u} \qquad x = \Psi^{-1}(u)$$

$$f(u) = \Psi^{-1}(u) \quad \Big| \quad \Psi_x(f) = u$$

$$\frac{df(u)}{du} = \underline{\frac{1}{\psi_x(x)}} \qquad \frac{df}{du} \quad \Big| \quad \psi_x(f) = \frac{du}{df}$$



$x[\,]$, $\rightarrow$ $\Psi(x_i)$: $u[\,]$

$\{u_i, x_i\}$