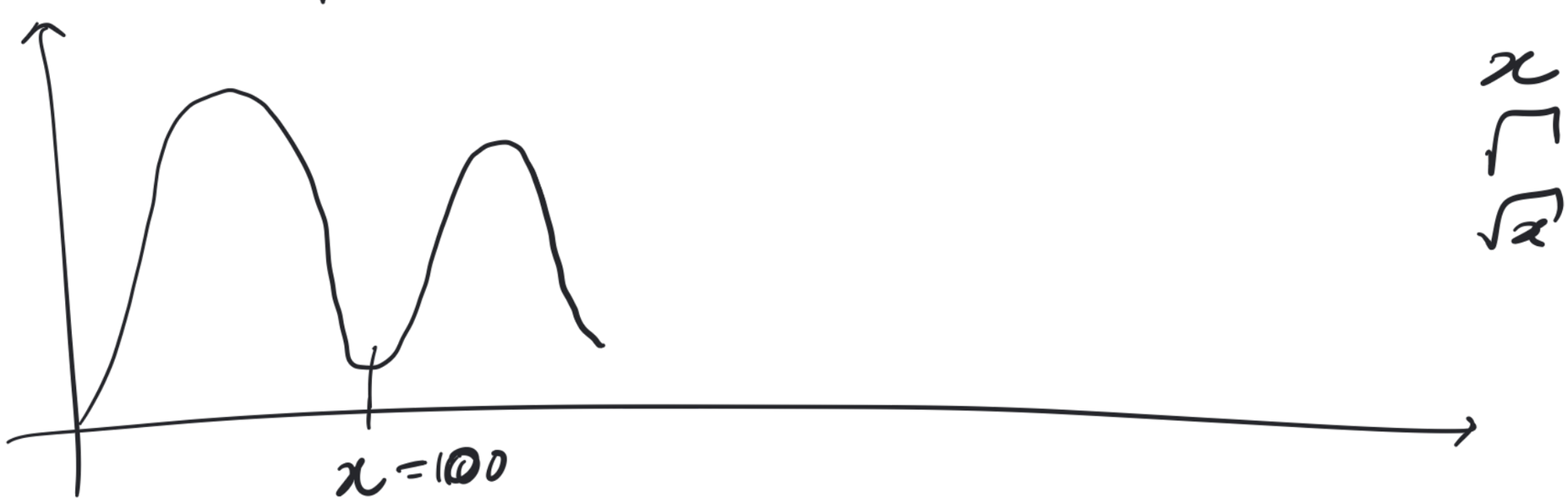
EXTRA CREDIT

7 1 0 4 8



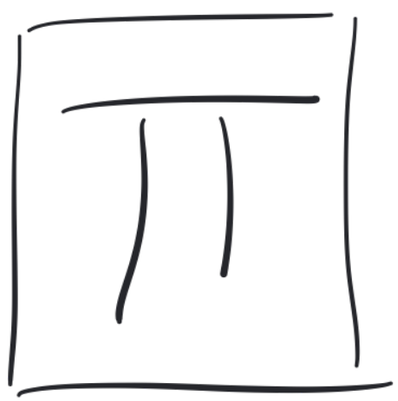
x

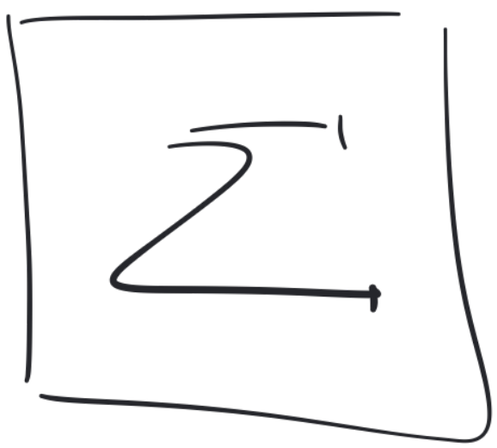
$\sqrt{}$

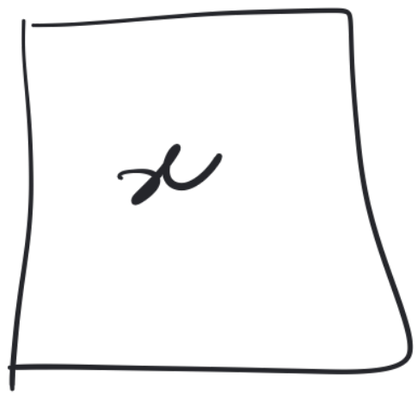
$\sqrt{x}$

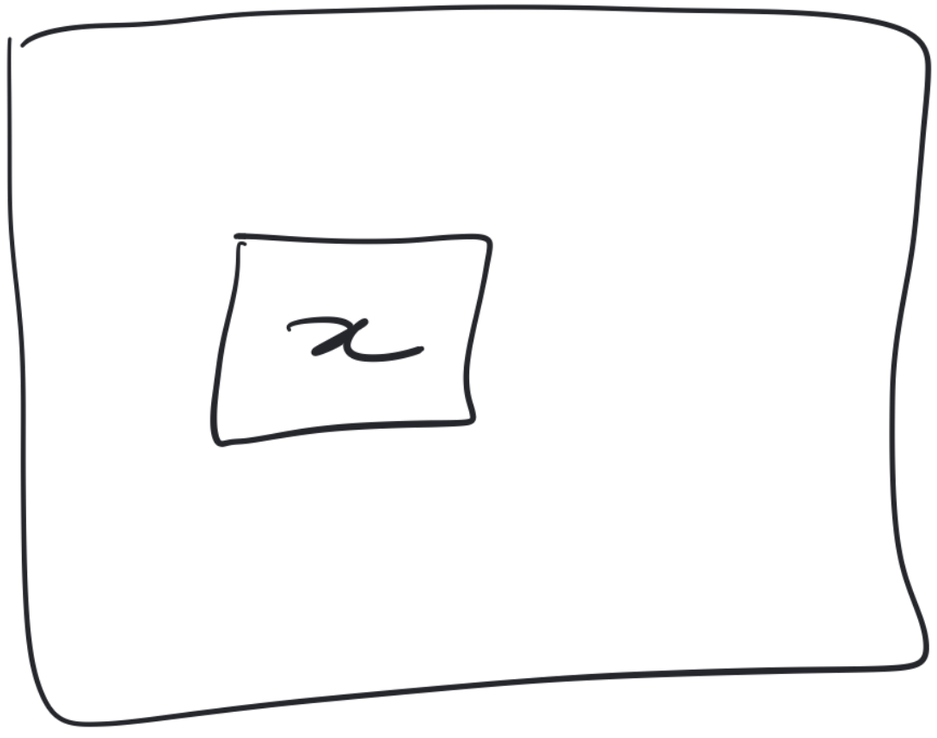
7 1 0 4 4

$$\prod \sqrt{\ } x = 0$$



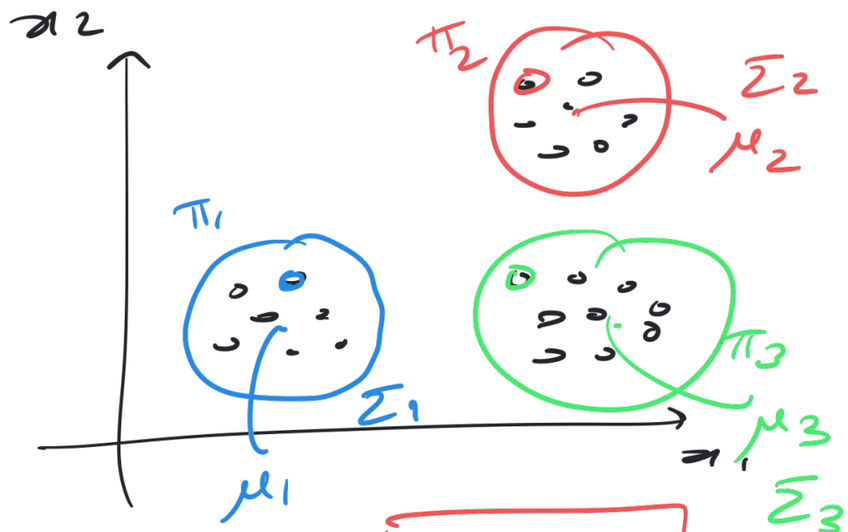






Mixture Model

DATASET: $\{(x_i, t_i)\}_{i=1}^{N}$



K = 3

Hyperparameter

For each label t_i, we design a data likelihood:

$$P(x|\theta) = \sum_{k=1}^{K} \pi_k \cdot P(x|\theta_k)$$

$\theta \equiv$ set of parameters of probabilistic model $P(x|\theta)$

where $\sum_{k=1}^{K} \pi_k = 1$ and $0 \leq \pi_k \leq 1$

Gaussian Mixture Model

$$P(x|\theta) = \sum_{k=1}^{K} \pi_k \cdot \mathcal{N}(x|\mu_k, \Sigma_k)$$

$$\theta = \{\pi_k, \mu_k, \Sigma_k\}_{k=1}^{K}$$

$$\mathcal{L} = \prod_{i=1}^{N} P(x_i|\theta)$$

$$= \prod_{i=1}^{N} \sum_{k=1}^{K} \pi_k \cdot \mathcal{N}(x_i|\mu_k, \Sigma_k)$$