Assignment 5
Due date: 6 December 2023
TA: 鄒冠勳 E814

1. (30%) Consider a mixture of two Gaussian distributions

$$0.4\mathcal{N}\left(\begin{bmatrix} 10 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\right) + 0.6\mathcal{N}\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 8.4 & 2.0 \\ 2.0 & 1.7 \end{bmatrix}\right).$$

   compute the marginal distributions of each dimension.

2. (30%) Consider the following example. Compute the conditional distributions $p(x \mid Y = y_1)$ and $p(y \mid X = x_3)$.

Y \ X	x_1	x_2	x_3	x_4	x_5
y_1	0.01	0.02	0.03	0.1	0.1
y_2	0.05	0.1	0.05	0.07	0.2
y_3	0.1	0.05	0.03	0.05	0.04

3. (40%) Exercise in the slides.