Chapter 2 Probability Distributions

1 Exercise 2.1

By Bernulli distribution defination, we have

$$\sum_{x_i=0,1} p(x_i|\mu) = \mu + (1-\mu) = 1 \tag{1}$$

By expectation defination, we have

$$E[x] = \sum_{x_i=0,1} x_i p(x_i|\mu) = 0 * (1-\mu) + 1 * \mu = \mu \tag{2}$$

By varance defination, we have

$$\begin{aligned} Var[x] &= \sum_{x_i=0,1} (x_i - E[x])^2 p(x_i|\mu) && (3)\\ &= \mu^2(1-\mu) + (1-\mu)^2\mu && (4)\\ &= \mu(1-\mu) && (5) \end{aligned}$$

2 Exercise 2.2

By expectation defination, we have

$$E[x] = \sum_{x_i=0,1} x_i p(x_i|\mu) = 0 * (1-\mu) + 1 * \mu = \mu \tag{1}$$

By varance defination, we have