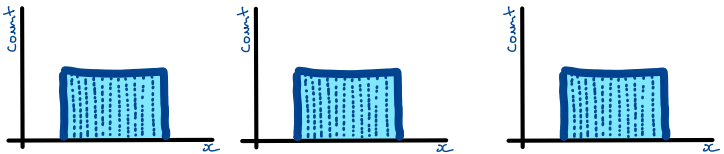
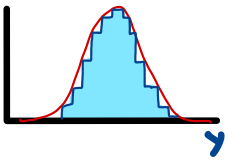
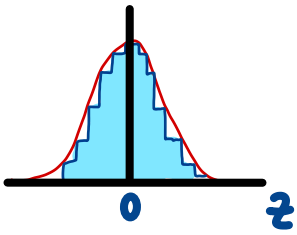


$N(m\mu, m\sigma^2)$



$Z = \frac{Y - m\mu}{\sigma\sqrt{m}}$

$N(0, \sigma^2)$



$$Z = \frac{Y - m\mu}{\sigma\sqrt{m}}$$

$$\begin{bmatrix} \\ \\ \\ \\ \end{bmatrix} + \begin{bmatrix} \\ \\ \\ \\ \end{bmatrix} + \cdots + \begin{bmatrix} \\ \\ \\ \\ \end{bmatrix} = \begin{bmatrix} \\ \\ \\ \\ \end{bmatrix}$$

X_1 X_2 X_m Y

$E[X_1] = \mu$ $V[X_1] = \sigma^2$

$E[X_2] = \mu$ $V[X_2] = \sigma^2$

$E[X_m] = \mu$ $V[X_m] = \sigma^2$

$E[Y] = m\mu$ $E[Y] = m\sigma^2$

$$E[Y] = E[X_1 + X_2 + \cdots + X_m] = E[X_1] + E[X_2] + \cdots + E[X_m] = m\mu$$

$$V[Y] = V[X_1 + X_2 + \cdots + X_m] = V[X_1] + V[X_2] + \cdots + V[X_m] = m\sigma^2$$