

Stat 345 Solutions - Section 4.5 (2nd ed.)/3.5 (3rd ed.)

Problem 4-38/3-46

X is discrete uniform on the interval $0 \leq x \leq 100$. Thus,

$$f(x) = \frac{1}{101}, 0 \leq x \leq 100$$

$$\mu = E(X) = \frac{b+a}{2} = \frac{100+0}{2} = 50$$

$$\sigma^2 = Var(X) = \frac{(b-a+1)^2 - 1}{12} = \frac{(100-0+1)^2 - 1}{12} = 850$$

$$SD(X) = \sqrt{850} = 29.15$$

Problem 4-42/3-51

The pmf of X is

x	590.0	590.1	590.2	590.3	590.4	590.5	590.6	590.7	590.8	590.9
$f(x)$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

$$\begin{aligned}\mu = E(X) &= \sum_x x f(x) \\ &= 590.0\left(\frac{1}{10}\right) + 590.1\left(\frac{1}{10}\right) + \dots + 590.9\left(\frac{1}{10}\right) \\ &= 590.45\end{aligned}$$

$$\sigma^2 = Var(X) = E(X^2) - E(X)^2$$

$$\begin{aligned}E(X^2) &= \sum_x x^2 f(X) \\ &= (590.0)^2\left(\frac{1}{10}\right) + (590.1)^2\left(\frac{1}{10}\right) + \dots + (590.9)^2\left(\frac{1}{10}\right) \\ &= 348,631.285\end{aligned}$$

$$\begin{aligned}\sigma^2 &= 348631.285 - (590.45)^2 \\ &= 0.0825\end{aligned}$$

$$SD(X) = \sqrt{0.0825} = 0.2872$$