

Stat 345 Solutions - Section 4.4 (2nd ed.)/3.4 (3rd ed.)

Problem 4-32/3-38

$$\mu = E(X) = \sum_x xf(x) = 0\left(\frac{2}{6}\right) + 1.5\left(\frac{2}{6}\right) + 2\left(\frac{1}{6}\right) + 3\left(\frac{1}{6}\right) = 1.3333$$

$$E(X^2) = \sum_x x^2f(x) = (0^2)\left(\frac{2}{6}\right) + (1.5^2)\left(\frac{2}{6}\right) + (2^2)\left(\frac{1}{6}\right) + (3^2)\left(\frac{1}{6}\right) = 2.9167$$

$$\sigma^2 = \text{Var}(X) = E(X^2) - E(X)^2 = 2.9167 - (1.3333)^2 = 1.1390$$

Problem 4-33/3-39

$$\mu = E(X) = \sum_x xf(x) = -2\left(\frac{1}{8}\right) + (-1)\left(\frac{2}{8}\right) + 0\left(\frac{2}{8}\right) + 1\left(\frac{2}{8}\right) + 2\left(\frac{1}{8}\right) = 0$$

$$E(X^2) = \sum_x x^2f(x) = (-2^2)\left(\frac{1}{8}\right) + (-1^2)\left(\frac{2}{8}\right) + (0^2)\left(\frac{2}{8}\right) + (1^2)\left(\frac{2}{8}\right) + (2^2)\left(\frac{1}{8}\right) = 1.5$$

$$\sigma^2 = \text{Var}(X) = E(X^2) - E(X)^2 = 1.5 - 0^2 = 1.5$$

Problem 4-37/3-45

The pmf of X is

x	0	1	2	3	x
$f(x)$	0.2	0.2	0.2	0.2	0.2

We are given that $E(X) = 6$.

$$\begin{aligned} E(X) &= \sum_x xf(x) = 0(0.2) + 1(0.2) + 2(0.2) + 3(0.2) + x(0.2) \\ &= 0.2 * (0 + 1 + 2 + 3 + x) \\ &= 0.2 * (6 + x) \end{aligned}$$

So

$$\begin{aligned} 0.2 * (6 + x) &= 6 \\ 6 + x &= 30 \\ x &= 24 \end{aligned}$$