18. Exercise: Second generation offspring

Exercise: Second generation offspring

2/2 points (graded)

Every person has a random number of children, drawn from a common distribution with mean 3 and variance 2. The numbers of children of each person are independent. Let M be the number of grandchildren of a certain person. Then:

$\mathbf{E}[M] =$ 9 ✔ **Answer:** 9

$\mathbf{Var}(M) =$ 24 ✔ **Answer:** 24

Solution:

Let N be the number of children and let X_i be the number of children of the ith chld. Then, $M = X_1 + \cdots + X_N$. It follows that $\mathbf{E}[M] = \mathbf{E}[N] \cdot \mathbf{E}[X] = 3 \cdot 3 = 9$. Furthermore,

$$\mathbf{Var}(M) = \mathbf{E}[N]\mathbf{Var}(X) + \big(\mathbf{E}[X]\big)^2\mathbf{Var}(N) = 3 \cdot 2 + 9 \cdot 2 = 24.$$

提交 You have used 1 of 3 attempts

ℹ Answers are displayed within the problem

讨论

显示讨论

Topic: Unit 6 / Lec. 13 / 18. Exercise: Second generation offspring