MA 519: Homework 6

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Problem 6.1 (Handout 8, # 2)

Identify the parameters n and p for each of the following binomial distributions:

(a) # boys in a family with 5 children;

(b) # correct answers in a multiple choice test if each question has a 5 alternatives, there are 25 questions, and the student is making guesses at random.

Solution. ■

Problem 6.2 (Handout 8, # 10)

A newsboy purchases papers at 20¢ and sells them for 35¢. He cannot return unsold papers. If the daily demand for papers is modeled as a Binom$(50, 0.5)$ random variable, what is the optimum number of papers the newsboy should purchase?

Solution. ■

Problem 6.3 (Handout 8, # 12)

Feller Vol. I, Problem 4, p. 169.

Solution. ■

Problem 6.4 (Handout 8, # 13)

Feller Vol. I, Problem 10, p. 169.

Solution. ■

Problem 6.5 (Handout 8, # 14)

Feller Vol. I, Problem 12, p. 169.

Solution. ■

Problem 6.6 (Handout 8, # 15)

Feller Vol. I, Problem 19, p. 170.

Solution. ■

Problem 6.7 (Handout 8, # 16)

Feller Vol. I, Problem 35, p. 172.

Solution. ■

Problem 6.8 (Handout 9, # 3)

Suppose X, Y, Z are mutually independent random variables, and $E(X) = 0$, $E(Y) = -1$, $E(Z) = 1$, $E(X^2) = 4$, $E(Y^2) = 3$, $E(Z^2) = 10$. Find the variance and the second moment of $2Z - Y/2 + eX$, where e is the number such that $\ln e = 1$.

Solution. ■

Problem 6.9 (Handout 9, # 14)

(*Variance of Product*). Suppose X, Y are independent random variables. Can it ever be true that $\mathrm{Var}(XY) = \mathrm{Var}(X)\,\mathrm{Var}(Y)$?
If it can, when?

Solution. ■