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# 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  $\text{Binom}(50, 0.5)$  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  $\text{Var}(XY) = \text{Var}(X) \text{Var}(Y)$ ?

If it can, when?

SOLUTION. ■