

1016-345-01

Probability and Statistics for Engineers

Problem Set 3

Assigned 2010 December 14

Due 2011 January 4

Show your work on all problems!

- 1 Devore Chapter 3, Problem 86
- 2 Devore Chapter 3, Problem 88
- 3 Devore Chapter 4, Problem 8
- 4 Devore Chapter 4, Problem 20
- 5 Computational Exercise (Extra Credit)

Consider the pmf from Chapter 3, Problem 12 for the number Y of ticketed passengers, out of 55, who show up for a flight.

y	45	46	47	48	49	50	51	52	53	54	55
$p_Y(y)$.05	.10	.12	.14	.25	.17	.06	.05	.03	.02	.01

A reasonable supposition is that each passenger has an independent probability p of showing up, in which case the number of passengers showing up would be a binomial random variable $X \sim \text{Bin}(55, p)$. (Obviously, that's not exactly the situation described in the problem, since $p_Y(y) = 0$ for $y < 45$, which won't be the case for $p_X(x)$.)

- a. Calculate $E(Y)$ from the pmf.
- b. Find the value of p such that $E(X) = E(Y)$.
- c. Using this value for p , make a table of the values of $p_X(x)$ for $45 \leq x \leq 55$ to two decimal places (*not* two significant figures), and compare the results to the table above.
- d. Calculate $F_X(44) = P(X < 45)$ to two decimal places. (Note that $F_Y(44) = P(Y < 45) = 0$.)