1016-351-01
Probability

Problem Set 3

Assigned 2011 September 20
Due 2011 September 27

Show your work on all problems! If you use a computer to assist with numerical computations, turn in your source code as well.

1 Devore Chapter 3, Problem 12

2 Devore Chapter 3, Problem 18

3 Devore Chapter 3, Problem 32

4 Devore Chapter 3, Problem 46

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 $F_Y(44) = P(Y < 45) = 0$.)