

**Mathematics 170B – HW2 – Due Tuesday, April 10, 2012.**

Problems 8,9,10,12 on pages 246–247.

$B_1$ . Toss a biased coin with probability  $p$  of heads repeatedly. Let  $N$  be a random variable that is independent of the tosses, and has a Poisson distribution with parameter  $\lambda$ . Let  $X$  be the number of heads obtained in the first  $N$  tosses. What is the distribution of  $X$ ? (You should do a computation, not just give an answer.)

$B_2$ . Suppose  $X$  and  $Y$  are independent random variables with the exponential distribution with parameter 1. Let  $U = \max(X, Y)$  and  $V = \min(X, Y)$ .

- (a) Compute  $P(U \leq u, V \geq v)$  for  $0 \leq v \leq u$ .
- (b) Compute the joint PDF  $f(u, v)$  of  $(U, V)$ .