Math 151, Spring 2011
Jo Hardin, HW #14

Homework due on THURSDAY, APRIL 28^{th}, START OF CLASS.

If you need to calculate Poisson or normal probabilities, use the functions ppois, dpois, qpois, pnorm, dnorm, qnorm (to find help, type `?pnorm`). Note that "d" always means pdf and "p" always means cdf. 21"

1. DeGroot (3^{rd} or 4^{th} ed.), section 5.4: # 1, 2, 7, 9, 15 (Hint for #9: given $N = n > 0$, $X \sim \text{Bin}(n, p)$)
2. DeGroot (3^{rd} ed. or 4^{th} ed.), section 5.6: # 3, 6, 9, 14
3. A company buys a policy to insure its revenue in the event of major snowstorms that shut down business. The policy pays nothing for the first such snowstorm of the year and 10,000 for each one thereafter, until the end of the year. The number of major snowstorms per year that shut down business is assumed to have a Poisson distribution with mean 1.5. What is the expected amount paid to the company under this policy during a one-year period?
4. Let $X \sim N(10, 4^2)$ and $Y \sim N(15, 3^2)$, independently. Using moment generating functions (not the theorems), find the distribution of $W = 2X + 0.5Y$.
5. Suppose heights in a large population are approximately normally distributed with a mean of 5 feet 10 inches and a SD of 2 inches. Suppose a group of 100 people is picked at random from this population.
   (a) What is the probability that the tallest person in this group is over 6 foot 4 inches tall?
   (b) What is the probability that the average height of people in the group is over 5 feet 10.5 inches?
   (c) Suppose instead that the distribution of heights in the population was not normally distributed, but come from some other distribution with the given mean and SD. To which of the problems a). (tallest) and b). (average) would the answer still be approximately the same? Explain carefully.