Homewok # 9

1. Problem 2, page 242 Meerschaert

2. Problem 6a,b,c page 243

3. Problem 7a-c page 242. For part (c), Let X_n be the state's income from the n^{th} ticket sold. It is a random variable. Since the tickets cost \$1 and the payout is \$499 (as you have to buy a ticket to win), you can compute the expected profit for each ticket sold, μ and also the variance σ^2. The total that the state will get in any given week is $X_1 + \ldots X_n$. Use the central limit theorem to get bounds on the likely variation given 1000000 tickets are sold.

4. Problem 12 page 246 a,b. Hints (a) What is the probability that a randomly selected channel is busy? Given that when transmitting, it does so between 30 and 70% (we'll say about 50%), what is the chance of detecting a signal? On average how many channels do we have to scan to get a signal? How many seconds does it take, then to detect a signal and then get a location fix. This gives the rate. (b) How many busy channels will we visit out of how many scans? (Note that there are 25 that are scanned 10x and 75 that are only scanned once) Use this to get the probability of detecting a signal at any given time (as in (a)) an from this get the detection rate in detections per second.

5. Problem 14 p 247.