Homework 4: Due Wednesday 2nd of march

1. If $X \overset{d}{=} \text{No}(\theta, \theta)$ derive the form of the likelihood ratio test of $H_0 : \theta = \theta_0$ against $H_1 : \theta = \theta_1$ based upon a random sample of n observations on X.

2. Buddy Jeff was interested in seeing if he drank more beer on weekdays or weekends. To test this, he observed the following data for the amount in (ml) he would drink on a particular day.

Weekday	160	720	732	683	757	429	545	110	997	434
Weekend	928	343	155	939	1079	392	810	697	765	485

   (a) Using a contingency table, test the hypothesis that the median amount he drinks does not vary by the type of day.

   (b) Test the same hypothesis but using a rank test.

3. Researchers were interested in whether there is a relationship between the number of bananas (B) a person eats and the number of meals (M) they eat in a day. They collected data and collated it in the following manner.

	$B = 0$	$B = 1$	$B \geq 2$
$M = 2$	58	52	43
$M = 3$	46	55	65

   Perform a χ^2 test to examine if M and B are independent.

4. Problems from the textbook: 6.3.8, 6.3.9, 4.7.3, 4.7.4, 4.7.9, 10.2.3.