MAU11S02 Group A1 Quiz 09 9am 3/4/19

Rules and procedures.
1. Answers must be handed up at the end of the tutorial, no other time. **2.** Attempt 3 questions. Only *your first three answers* will be marked. **3.** Each question carries 10 marks, so the maximum quiz mark is 30. **4.** Marked quizzes will be returned, and answers published, the following week. **5.** If a particular method of solution is stipulated, you get no marks if you don't use it. **6.** The (9) quizzes will contribute 20% to your overall mark. **7.** You are allowed to collaborate and compare answers during the tutorial. **8.** ***Show all work.*** No marks will be given for answers which do not show the calculations.

Question 1. There are 4 numbered balls in a bag, numbered $1 \ldots 4$. A ball is chosen at random, its number i noted, and returned to the bag. A second time, a ball is chosen at random, its number j is noted, and it is returned to the bag. (Same as last week).

Calculate the mean and variance of the distribution of k, where $k = i + j$ $(2 \leq k \leq 8)$.

Question 2. Calculate the sample mean, sample variance (remember $n - 1$)) and sample standard deviation of

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1.49 8.23 5.61 4.89 9.85 0.91 5.53 8.09 0.73
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Question 3. With the sample data in Question 2, derive a 90% symmetric confidence interval for the mean, using Student's t-distribution.

Question 4. With the sample data in Question 2, derive a 90% 2-sided confidence interval for the variance, and the standard deviation, using the chi-squared distribution. (For the standard deviation, take square roots.)

Question 5. There are 4 numbered balls in a bag, numbered $1 \ldots 4$. A ball is chosen at random and its number i noted, but it is ***not*** returned to the bag. A second time, another ball is chosen at random, and its number j is noted.

Calculate the probabilities $i + j = k$, $3 \leq k \leq 7$. Calculate the mean and variance of this probability distribution.