Math 210: Dr. Caldwell Due : Thursday, October 22 (4pm)

Instructions: Bring your work finished to class on the due date above. Clearly label each problem and each part of a problem on your paper. Do not print out the data sets, just the session window. Do not submit another student's work!

x	P(x)
2	1/36
3	2/36
4	3/36
5	4/36
6	5/36
7	6/36
8	5/36
9	4/36
10	3/36
11	2/36
12	1/36

1) If you roll a pair of dice, the probability distribution for the sum of the face value of the dice is given in the table on the right.

Note : $\mu = \Sigma\, x\, p(x) = 2(1/36) + 3(2/36) + \ldots + 12(1/36) = 7$; and
$\sigma^2 = \Sigma\, x^2\, P(x) - \mu^2 = 35/6$, so $\sigma = \sqrt{35/6}$.

Use MINITAB to simulate rolling a pair of dice **50000** times.

i) Randomly generate two columns C1, C2 from the appropriate discrete distribution for one die [Calc | Random Data | Integer with minimum=1 and maximum=6]. C1 represents roll on first die and C2 represents roll on second die.

ii) Add C1 and C2 and place the results in C3 [Calc | Row Statistics; sum with input variables "C1 C2" store in "C3"]. C3 represents the sum of the dice.

a) Find the empirical mean and empirical standard deviation for the sum of the pair of dice C3 [Stat | Basic Statistics | Display Descriptive Statistics].

b) **Compare** the empirical results in part (b) to the theoretical values of μ and σ above. Discuss any differences (are the exactly the same, larger smaller? Should they be exactly the same?)

c) Make a table that finds the frequency and relative frequency of the sum of a pair of dice C3 [Stat | Tables | Tally]. Be sure to check both counts and percents.

d) Compare these relative frequencies to the theoretical probabilities P(x) listed in the table above (you will need to convert the exact values in the table above to decimal approximations).

2) Let x follow a binomial distribution with n=263 trials and the probability of success p=0.2009 Use MINITAB to find each of the following. [Calc | Probability Distributions | Binomial; place x in "Integer Constant"]

a) $p(x = 53)$ b) $p(x \leq 53)$ c) $p(x < 53)$ d) $p(x \geq 53)$

Hint: this is a discrete distribution. Use formulas such as P(not A) = 1 – P(A) to find values that Minitab will not give you directly.