Math 210: Dr. Caldwell Due : Monday, October 22

**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 20000 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 $\mu$ and $\sigma$ above. Explain any differences.

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.

2) Let $x$ follow a binomial distribution with $n$=100 trials and the probability of success $p$=0.5324 Use MINITAB to find each of the following. [Calc | Probability Distributions | Binomial; place $x$ in "Integer Constant"]

a) $p(x = 54)$ b) $p(x \leq 56)$ c) $p(x < 54)$ d) $p(x \geq 53)$

Recall p(not A) = 1 – p(A)… you may need this for a couple of these. Also think carefully about what x < 54 means. This distribution is discrete, what values can $x$ take on?