Unit 4 – Bernoulli and Binomial Distributions
Week #6 -Practice Problems

~~**Due: Monday October 27, 2008**~~
Revised Due Date: Monday November 3, 2008

1. ***Before you begin:*** ***This exercise gives you practice in calculating "number of ways to choose". See notes pp 11-13 and/or text pp 90-94. Need more? Here are a few resources on the web, too:***

   http://www.shodor.org/interactivate/discussions/TablesAndCombinatori/
   http://mathforum.org/dr.math/faq/faq.comb.perm.html

   Suppose that my 2008 BE540 class that meets "in class" in Worcester, MA has 10 students.

   a. I wish to pair up students to work on homework together. How many pairs of 2 students could I form?
   b. Next, I wish to form project groups of size 5. How many groups of 5 students could I form?

2. ***Before you begin:*** ***This exercise is a straightforward application of a binomial probability calculation. See notes pp 14-18 and/or text pp 94-95. Just in case, here are two nice resources for the binomial:***

   http://stattrek.com/Lesson2/Binomial.aspx?Tutorial=Stat
   http://wiki.stat.ucla.edu/socr/index.php/AP_Statistics_Curriculum_2007_Distrib_Binomial

   A die will be rolled six times. What are the chances that, over all six rolls, the die lands neither ace nor deuce exactly 2 times?

3. ***This is also an application of a binomial probability calculation.***
   Suppose that, in the general population, there is a 2% chance that a child will be born with a genetic anomaly. What is the probability that no congenital anomaly will be found among four random births?

4. ***This is a slightly harder application of a binomial probability calculation.***
   Suppose it is known that, for a given couple, there is a 25% chance that a child of theirs will have a particular recessive disease. If they have three children, what are the chances that at least one of them will be affected?

5. ***This exercise is the most involved. Just try it.***
   Suppose a quiz contains 20 true/false questions. You know the correct answer to the first 10 questions. You have no idea of the correct answer to questions 11 through 20 and decide to answer each using the coin toss method. Calculate the probability of obtaining a total quiz score of at least 85%.