

Unit 6 – Bernoulli and Binomial Distributions

Homework

Due: Monday October 23, 2017

Last submission date for credit: Monday October 30, 2017

1. **This exercise gives you practice in calculating “number of ways to choose”. See Unit 6 notes, pages 14-16. 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 2017 BIOSTATS 540 class that meets “in class” in Worcester, MA has just 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. **This exercise gives you practice in calculating a binomial distribution probability. See Unit 6 notes, pages 18-19 and pages 21-22. Also, 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 (one dot showing) nor deuce (two dots showing) exactly 2 times?

3. **This exercise also gives you practice in calculating a binomial distribution probability.** 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 exercise is a slightly harder 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%.