AP Statistics Midterm Review Project

Name: _____
Period: _____

For all the questions below, show all work, all graphs, all calculator input and anything else you do.

Below you will find a set of Math and English 2012 proficiency data. The blanks are to be filled in with digits from your own student id number. The first blank is your first digit, second blank = your second digit, third blank = your third digit, and so on until you run out of digits, then start over with your first digit.

Student ID #	Gender	Reading Score	Math Score
1	Male	298	1__ __
2	Male	3__6	200
3	Male	289	25__
4	Male	316	225
5	Male	243	200
6	Female	298	1__ __
7	Male	294	14_
8	Male	30__	22__
9	Male	30__	270
10	Male	334	156
11	Male	280	16__
12	Female	31__	191
13	Male	230	225

Student ID #	Gender	Reading Score	Math Score
14	Male	275	225
15	Male	294	18__
16	Male	32__	286
17	Female	312	2__ __
18	Male	26__	125
19	Female	294	200
20	Female	294	264
21	Male	330	16__
22	Female	28__	275
23	Female	289	141
24	Female	25__	141
25	Female	290	225

1. Describe the 3 variables completely, including types of variable, appropriate graphs of the values and complete description of the distributions, including all appropriate statistics. ☺ 😐 ☹
2. A passing score on the math test is a 242, while for the reading test a 300 is required. Is passing the proficiency exam in either math or reading independent of gender? Construct appropriate graphs to help explain why or why not. ☺ 😐 ☹
3. Create a bar chart of reading and math scores broken down by gender. Explain what the graph says about the pass rates of males and females. ☺ 😐 ☹
4. Construct a graph of English scores vs. Math scores. Is there an association between English and Math scores? Is there a correlation? Provide all graphs including residual plots, equations, r and r^2 values. Describe the slope and y-intercept in context and explain why or why not this entire question was appropriate. ☺ 😐 ☹
5. From the entire data set, the probability of passing the Math exam is 36% and the probability of passing the English exam is 43%. Show all work and calculator input for the following questions:
    a. Mrs. Lafoon is telling learners whether they passed or not. What is the probability that the first person who fails the Reading exam is the 5^{th} person she talks to? ☺ 😐 ☹
    b. What is the probability the first person who passes the Math exam is the 7^{th} person she talks to? ☺ 😐 ☹

c. In a class of 30 seniors in a math proficiency class, what is the probability that at least 13 learners passed the exam? ☺ 😐 ☹
d. In the same proficiency class, what is the probability that no more than 19 learners passed the exam? ☺ 😐 ☹

6. The school was given a huge multiyear grant and we have effectively unlimited funds to help remediate and teach the proficiency math. One of the requirements for the grant is to have an experiment to decide the best method of remediation. Design a scientifically valid experiment to determine if Packet A or Packet B, and / or class sizes of 15 20, or 25 is the best method of remediation. ☺ 😐 ☹
   a. Be sure to identify levels, factors and treatments. ☺ 😐 ☹
   b. A diagram and short paragraph explanation is required. ☺ 😐 ☹
7. It is determined that the design created in 5 will be too costly, so the administration decides to survey the school to determine how the learners want the remediation. Design a survey using the following methods:
   a. Simple Random Sample ☺ 😐 ☹
   b. Systematic ☺ 😐 ☹
   c. Cluster ☺ 😐 ☹
   d. Stratified ☺ 😐 ☹
   e. Convenience ☺ 😐 ☹
   f. Voluntary response ☺ 😐 ☹
8. Pick one of the survey methods above for each of the biases below, and explain how you reduced the type of bias. Explain fully how you reduced the bias.
   a. Undercoverage ☺ 😐 ☹
   b. Response ☺ 😐 ☹
   c. Nonresponse ☺ 😐 ☹
9. Finally, the administration was convinced by Mr. Waddell that a survey would not be the best way and they asked you to run some simulations to see how effective the methods will be. If a class has 15 learners in it, and the method has a 45% chance of being effective, run 5 trials to see what the outcomes would be. Explain FULLY how you completed the simulations, including what line number you started with on the random number table at the back of the book. ☺ 😐 ☹
10. After analyzing 3 years' worth of data, we have calculated the average math score to be 229 with a standard deviation of 21 or N(229, 21). Use this information to answer the following questions.
    a. If John Doe scored a 187, how many standard deviations below the mean was he? ☺ 😐 ☹
    b. If Jane Doe scored a 282, what was her z-score? ☺ 😐 ☹
    c. What percent of learners score above a 290? ☺ 😐 ☹
    d. What percent of learners score below a 260? ☺ 😐 ☹
    e. What percent of learners score between 180 and 276? ☺ 😐 ☹
    f. What score would be in the top 15% of all test takers? ☺ 😐 ☹