INSTRUCTIONS

There are 10 questions, total point value of 100 points on 10 pages. Do all parts of all questions. Show the work you do to obtain an answer. A calculator and your textbook are allowed. No other books or notes are allowed. Do not share calculators. Put your name in the name box. Make sure your name gets checked off the list as having turned in the exam.
1. (7 pts) In each case state whether the sample is being selected by random, systematic, cluster, stratified or convenience sampling.
(a) A College conducts a study of student drinking by randomly selecting 10 different classes and interviewing all the students in each of those classes.
(b) At a police checkpoint every fifth driver is stopped and interviewed.

2. (7 pts) Birth statistics of babies yield the following 12 birth weights. Make a stemplot of the data. Use the integer part of each number as a stem.

9.1  6.8  5.8  7.1  8.5  6.8  9.7  7.6  9.8  6.9  8.2  8.5
3. (7 pts) For the following numbers compute the mean, median and standard deviation

\[-2 \quad 1 \quad 4 \quad 5 \quad 7 \quad 9\]
4. (7 pts) The highway mileages of 12 sports cars arranged in increasing order are

17 19 20 22 23 23 23 24 25 25 26 28

(a) Compute the 30th percentile $P_{30}$.
(b) Compute the percentile of the data value 24.
5. (12 pts) A shipment of 50 parts including 5 that are defective is sent to an assembly plant. The plant quality control selects 3 parts at random (without replacement). What is the probability that at least one part selected by quality control is defective?
6. (12 pts) A club has 22 members.
(a) In how many ways can they pick 4 people to be on a committee?
(b) In how many ways can they pick a president, vice-president and treasurer?
7. (12 pts) A student takes a test with 8 multiple-choice questions each with 5 possible answers. Because of a heavy social calendar, she is completely unprepared and so chooses to answer each question by random selection. What is the probability she will get right exactly 4 questions?
8. (12 pts) The weight of a certain machine component is normally distributed with mean of 8.92 g and standard deviation of 0.06 g.
(a) Find the probability a randomly chosen component weighs between 8.82 g and 9.00 g.
(b) Find the weight that separates the heaviest 3% of the weights from the rest.
9. (12 pts) Recent data from the National Health and Nutrition Survey shows that weights of men are normally distributed with mean of 172 pounds and standard deviation of 29 pounds. Consider the mean weight of random samples of size 20.

(a) Find the mean of these sample means.
(b) Find the standard deviation of these sample means.
(c) Find the probability that 20 randomly selected men leaving the Archbold Gym will have a mean weight exceeding 180 pounds.
10. (12 pts) Joey lives in DeWitt and wants to know what proportion of DeWitt residents use email. He takes a sample of size 250 and discovers that 180 of them use email. Help him apply his knowledge of MAT 121 to
(a) find the margin of error that corresponds to a 95% confidence level
(b) find the 95% confidence interval estimate of the population proportion of DeWitt households using e-mail
(c) Suzie also lives in DeWitt and has no knowledge of Joey’s work and hence no knowledge of any sample data. Help her to determine how many households she must survey in order to be 95% confident that the sample proportion is in error by no more than 3 percentage points.