

Name: _____

Directions: This exam contains six problems worth a total of 100 points. For each computational problem, you must first write the formula to be used and present all your subsequent work in order to receive full or partial credit. Circle your final answers.

1. Thirty percent of the cars imported from Germany are silver. You will observe 12 German cars on the road. Assume that these 12 cars constitute a random sample.
 - (a) Compute the probability that less than 6 of the 12 cars will be silver. (6 pts.)

 - (b) Compute the probability that between 3 and 7 (inclusive) of the 12 cars will be silver. (6 pts.)

 - (c) Compute the probability that more than 7 of the 12 cars will be in any color other than silver. (6 pts.)

2. Systolic blood pressures were measured using two sphygmomanometers (Type 1; Type 2) for seven adults.

Type 1 (x)	148	137	122	119	120	137	127
Type 2 (y)	146	134	123	120	118	137	129

- (a) Use your calculator's built-in function to compute the Pearson correlation coefficient between the two sets of blood-pressure readings. (6 pts.)

- (b) Based on the observation in (a), what would you say about the reliability of the two sphygmomanometers? (6 pts.)

For (a), if you prefer, you may perform computation by hand. Take as given:

$$\sum x = 910; \sum y = 907; \sum x^2 = 119016; \sum y^2 = 118135; \sum xy = 118564$$

Show your work on the backside of page 3.

3. An urn contains three balls, one of which is red and the other two are white. You and two other people are in line to pick a ball at random without replacement. Compute the probability that you will pick the red ball if you are

(a) the first person in the line. (6 pts.)

(b) the second person in the line. (6 pts.)

(c) the last person in the line. (6 pts.)

4. Seventy-three instructors at a small college are cross-classified according to their rank (Professor; Associate Professor; Assistant Professor) and their salary (high; low). One of the 73 instructors will be Beth's teacher for her math course next semester.

Salary	Rank		
	Professor	Associate	Assistant
High	16	12	5
Low	3	16	21

(a) What is the probability that Beth's teacher will be an Associate Professor, earning a low salary, or both? (8 pts.)

(b) If Beth is told that her teacher will be an Assistant Professor, what is the probability that her teacher will be earning a high salary? (8 pts.)

(c) Are the two events "Beth's teacher is a Professor" and "Beth's teacher earns a high salary" independent? Justify your answer. (8 pts.)

5. Intelligent Quotient (IQ) scores are best characterized as having a normal distribution with mean $\mu = 100$ and standard deviation $\sigma = 15$ in the adult population.
- (a) What percent of the adults have IQs higher than 135? (8 pts.)
- (b) An adult has an IQ that is at the 67th percentile. What is his or her actual IQ? (8 pts.)
6. Credit score ($538 \leq y \leq 794$) was analyzed as a function of age ($20 \leq x \leq 52$) for a sample of 20 people using a linear regression. The obtained regression equation was $\hat{y} = 632.108 + 1.257x$.
- (a) One person in the sample was 35 years old and had a credit score of 619. Using the regression equation, compute the predicted credit score and the residual value for this person. (6 pts.)
- (b) Featured below is the residual plot for the regression analysis. Comment on the fit of the model. (6 pts.)

Figure 1. Regression residual plot for Problem 6.

