

Math 130: Introductory Statistics

Exam 1

Name (29 points):

1. Use the following sample of 10 observations:

Data: 6 7 8 8 9 10 10 11 12 13

$$\sum x_i = 94, \sum x_i^2 = 928$$

- (a) (4 points) What is the mean, median, and mode?

- (b) (4 points) What is the variance and standard deviation?

- (c) (4 points) What is the coefficient of variation?

- (d) (4 points) In the following table, fill in the frequency distribution using a first lower class limit of 5 and a class width of 2.
- (e) (4 points) In the next column, fill in the relative frequency distribution.
- (f) (4 points) In the last column, fill in the cummulative frequency distribution.

Class	Frequency	Relative Frequency	Cummulative Frequency

2. Suppose for some sample $\bar{x} = 15$ and $s^2 = 5$, and the data was shown to be normally distributed.

(a) (3 points) What is the z-score for $x_i = 12$?

(b) (2 points) What is the probability of an observation having a value of 12 or below?

(c) (3 points) What is the z-score for $x_i = 22$?

(d) (2 points) What is the probability of an observation having a value of 22 or below?

(e) (3 points) What is the z-score for $x_i = 15$?

(f) (2 points) What is the probability of an observation having a value of 15 or below?

3. (5 points) Suppose the average income for a group of people is \$30,000 and the standard deviation is \$3,500. The data is shown to *not have a normal distribution*. What proportion of people must earn between \$23,000 and \$37,000?
4. Suppose there are two events, A and B, $P(A) = 0.5$, $P(B) = 0.6$, and $P(A \cap B) = 0.3$.
- (a) (3 points) What is $P(A \cup B)$?
- (b) (3 points) What is $P(A|B)$?
- (c) (3 points) What is $P(B|A)$?
- (d) (2 points) Are events A and B independent? Why or why not?
- (e) (3 points) What is $P(A' \cap B')$? Big hint: use your answer to part (a) to help you get this answer. I'm too nice :-)

5. (5 points) What is the difference between Chebyshev's rule and the empirical rule? When should you use one over the other?
6. (5 points) Multiple choice: Suppose for a given sample, the mean is equal to 56.5, the variance is equal to 145.2, and the median is equal to 43.2. A histogram of this sample will show the distribution is
- (a) skewed to the left.
 - (b) skewed to the right.
 - (c) skewed upward.
 - (d) skewed downward.
7. Let events A and B be defined as follows:
- Event A: You are not pregnant.
 - Event B: A pregnancy test you took came out negative.

For each probability below, describe what they mean in single plain and concise sentence using plain English.

(a) (4 points) $P(A|B)$

(b) (4 points) $P(B|A)$