

MAT 1272 Exam I Sample Spg 2014: you may bring a hand-written sheet (front-only) w/ formulae

1. (5 pts) Give two meanings for the word “statistics.”
2. (5 pts) Briefly describe the areas of statistics: descriptive and inferential.
3. (5 pts) Circle any of the following which constitute a population (as opposed to a sample).
 - a. Incomes for the 532 resident families in a village of New York
 - b. Salaries of all full-time employees of a company
 - c. Number of absences during the semester for each of the students in a class
 - d. Number of cars owned by each of 100 families selected randomly via phone calls
 - e. Color of hair of the first 25 girls who pass the entrance doorway to a school cafeteria.
4. (5 pts) List 3 reasons why a sample survey is often preferable to conducting a census.
5. (5 pts) The following table gives data for 5 students in a statistics course

Name	Age	Class-standing	Year-entered
Bill	19	S	2012
Dawn	27	F	2013
Sharmon	23	J	2010
Joe	31	F	2011
Connie	21	F	2014

The data set consists of ordered quadruples (name, age, class-standing, year-entered). Describe each variable as nominal, ordinal, interval or ratio.

6. (5 pts) Describe each variable as nominal, ordinal, interval or ratio.
 - a. Color of eyes of people (blue or brown)
 - b. Number of births on a day in a hospital
 - c. Model of a car
 - d. Commuting time from home to work
 - e. Low temperature in Celsius for 20 locations on one day
7. (10 pts) The ages of five employees of a company are 47, 28, 55, 41, and 52 years. Find:
 - a. Σx
 - b. $\Sigma(x - 6)$
 - c. $(\Sigma x)^2$
 - d. Σx^2
 - e. mean
 - f. median
 - g. sample standard deviation
8. (10 pts) A researcher asks 24 primary caregivers, who work outside their homes, whether or not they would work outside their homes if without working they had enough money to live comfortably. The following are the responses of these 24 caregivers. (N stands for no, Y represents yes, and D means does not know.)

N	D	Y	D	N	Y	N	N	D	N	N	Y
N	N	D	Y	Y	Y	N	N	N	D	Y	D

 - a. Construct a frequency table.
 - b. Calculate the relative frequencies as a percentage for all categories.
 - c. Draw a bar graph for the frequencies.
 - d. Draw a pie chart for the percentages (use a protractor, up to 10 degree error allowed)

9. (10 pts) The following table gives the frequency distribution of the weights (in pounds).

Weight (in pounds)	f	midpoints	$f \cdot \text{mid}$	cummulative f
90 - 109	8			
110 - 129	17			
130 - 149	21			
150 - 169	24			
170 - 189	19			
190 - 209	11			
sums				

- Fill out the table above.
- Do all classes have the same width? If yes, what is that width?
- Use the table to estimate the average weight.
- Draw an ogive (line graph for the cumulative frequencies).

10. (10 pts) The following data give the annual earnings (in thousands of dollars) of 20 low to moderate income families.

32.5 29.7 49.0 17.4 31.7 67.9 27.4
 43.7 53.4 59.5 37.0 22.7 15.8 43.2
 19.5 24.0 44.5 62.7 47.5 54.7

- Order the data and create a table with columns x and x^2 . Find their sums
- Find the mean and median incomes (include units) and use them to comment on any skewing of this data.
- Use the table to find the sample variance and standard deviation. Write the latter using units.

11. (10 pts) The following data give the commuting time (in minutes) from home to school for 30 high school students.

22 16 11 12 23 51 42 6 31 10
 19 8 21 28 15 43 5 19 7 14
 36 27 8 23 37 18 13 29 17 9

- Order the data.
- Prepare an ordered stem-and-leaf display. Make sure to use a key.
- Is the data set symmetric, skewed to the right or skewed to the left?**

12. (10 pts) The following data give the speeds (in miles per hour) of 12 cars traveling on a highway.

67 71 57 54 69 74 77 62 61 59 58 63

- Order the data.
- Calculate the values of the three quartiles.
- Find the (approximate) value of the 40th percentile.
- Find the percentile rank of 62.
- Construct a box-and-whisker plot.
- Is the data set symmetric, skewed to the right or skewed to the left?**

13. (10 pts) Roll a pair of 4 sided-dice (one is a green die and the other is red).

- Use a tree to find all the possible outcomes.
- Write the sample space as a set (you may use 13 to denote the ordered pair (1,3), green=1, red=3).
- Write the event $A = \text{"green die is 1"}$ as a set and find its probability.
- Without listing the event as a set, describe the complement of the event A in words and find its probability.
- Write the event $B = \text{"sum is 2 or 3"}$ as a set and find its probability.
- Without listing the event as a set, describe the complement of the event B in words and find its probability.

Bonus: Describe the law of large numbers and why it makes possible the empirical approach to finding probabilities.