Math13 - Introduction to Statistics (code 40161), Fall 2015

Homework 1; Wednesday, September 9

NAME:

---

1) In a statistical study what is the difference between an individual and a variable?

2) Are data at the nominal level of measurement quantitative or qualitative?
(explain your answer)

3) Numbers are often assigned to data that are categorical in nature. Consider the following number assignments for category items describing electronic ways of communication:

1 = twitter; 2 = email; 3 = text message; 4 = facebook; 5 = blog

Are these numerical assignments at the ordinal data level? *(explain your answer)*

4) Consider the number assignments for category items describing "Usefulness of Customer Service",

1 = not helpful; 2 = somewhat helpful; 3 = very helpful; 4 = extremely helpful

Explain at what level of measurement are these assignments.

5) A national survey asked 1385 U.S. adult fast-food customers which meal (breakfast, lunch, dinner, snack) they ordered.

a. Identify the variable

b. Is the variable quantitative or qualitative?

c. What is the level of measurement of the variable?

d. What is the implied population?

6) Identify the **measurement level** of the following variables:

a. Length of time to complete an exam

b. Time of first class

c. Major field of study

d. Course evaluation: poor, acceptable, good

e. Score on last exam (based on 100 possible points)

f. Overall grade (letters: A, B, C, D, F)

g. Age of student

h. Name of student

i. College year-grade: freshman, sophomore, junior, senior

j. Weight of student

k. Height of student

l. Gender of student

m. Home Address of student

n. Telephone number of student

7) The following table shows the top 10 smartphones in 2008. Identify the type of data provided by the information in each column of the table: for each variable 1) indicate whether it is qualitative or quantitative, and 2) determine the level of measurement (scale).

Rank	Smartphone	Battery (mins)	Internet browser	Weight (oz)
1	Apple iPhone 3G 16GB	300	No	4.7
2	BlackBerry Pearl 8100	210	Yes	3.1
3	Sony Ericsson W810i	480	Yes	3.5
4	HP iPaq 510	390	Yes	3.6
5	Nokia E61i	300	Yes	5.3
6	Samsung Instinct	330	No	4.8
7	BlackBerry Curve 8320	240	No	3.9
8	Motorola Q	240	Yes	4.1
9	Nokia N95	300	No	4.5
10	Apple iPhone 4G	480	Yes	4.8

a. Rank

b. Smartphone

c. Battery

d. Internet browser

e. Weight

8) Label each of the following numerical measures as a **statistic** or a **parameter**:

a. The average score on the GRE for all U.S. students

b. The average score on the GRE for all UCSF applicants

c. The average score on the GRE for a sample of California residents

d. The variance on the GRE Math scores for all applicants to UC Berkeley

e. The median score on the GRE for 100 female students sampled from SFSU

9) The highway mileages of 13 compact cars are:

Model	Mileage
Aston Martin Vanquish	19
Audi TT Coupe	29
BMW 325CI	27
BMW 330CI	28
BMW M3	23
Jaguar XK8	26
Jaguar XKR	23
Lexus SC 430	23
Mini Cooper	32
Mitsubishi Eclipse	31
Mitsubishi Spyder	29
Porsche Cabriolet	26
Porsche Turbo 911	22

a. Calculate the median

b. Calculate the mode

c. Calculate the mean

d. Calculate the range

e. Calculate the Interquartile Range (IQR)

10) Luke took the GRE test and scored in the 88th percentile. What percentage of the scores was above his score? Explain your choice.

(1) 87% (2) 13% (3) 89% (4) 88% (e) 12%

11) A person's metabolic rate is the rate at which the body consumes energy. Here are the metabolic rates of 77 men who took part in a study of dieting. (The units are calories per 24 hours.)

1792 1666 1362 1614 1460 1867 1439

Calculate the mean and standard deviation of the metabolic rates, showing each step in detail. First find the mean $\bar{x}$. Then find each of the deviations $(x_i - \bar{x})$, and their squares $(x_i - \bar{x})^2$. Finally, add all the squared deviations and divide them by $n-1$.

Write down all the computing steps

12) A small accounting firm pays each of its five clerks $35,000, two junior accountants $80,000 each, and the firm's owner $320,000.

a. What is the mean salary paid at this firm?

b. How many of the employees earn less than the mean?

c. What is the median salary?

13) The firm in the previous question gives no raises to the clerks and junior accountants, while the owner's take increases to $455,000.

a. How does this change affect the mean?

b. How does it affect the median?

14) Select the correct answer:

a.	$median > mode$	always true	sometimes true	never true
b.	$\bar{x} + 2 > 2$	always true	sometimes true	never true
c.	$\bar{x} < S^2$	always true	sometimes true	never true
d.	$\bar{x} - median < 0$	always true	sometimes true	never true
e.	$\bar{x} \times 3 > \bar{x}$	always true	sometimes true	never true
f.	$S \geq 0$	always true	sometimes true	never true
g.	$S^2 > S$	always true	sometimes true	never true
h.	$\sum_i^n (x_i - \bar{x}) = 0$	always true	sometimes true	never true