

Answer all questions using complete sentences.

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

An individual is a member of the population of interest.

A variable is an aspect of an individual subject or object being measured.

2. What is the difference between a parameter and a statistic?

A parameter is a numerical measurement describing data from a population. A statistic is a numerical measurement describing data from a sample.

3. Numbers are often assigned to data that are categorical in nature.

- a. Consider these number assignments for category items describing electronic ways of expressing personal opinions:

1 = Twitter; 2 = e-mail; 3 = text message; 4 = Facebook; 5 = blog

Are these numerical assignments at the nominal data level or higher?

Nominal level. There is no apparent order relationship among the responses.

- b. Consider these number assignments for category items describing usefulness of customer service:

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

Are these numerical assignments at the ordinal data level? Explain. What about at the interval level or higher? Explain.

Ordinal level. There is an increasing relationship from worst to best. level of service.

Difference and ratios between levels is not meaningful

4. Lucy conducted a survey asking some of her friends to specify their favorite type of TV entertainment from the following list of choices:

sitcom; reality; documentary; drama; cartoon; other

Do Lucy's observations apply to *all* adults? Explain. From the description of the survey group, can we draw any conclusions regarding age of participants, gender of participants, or education level of participants?

Lucy's observations do not apply to all adults. She only asked a group of her friends. The participants are most likely peers of Lucy.

5. *USA Today* reported that 44.9% of those surveyed (1261 adults) ate in fast-food restaurants from one to three times each week.

a. Identify the variable.

Response regarding frequency of eating at fast-food restaurants.

b. Is the variable quantitative or qualitative?

Qualitative

c. What is the implied population?

Responses for all adults in the U.S.

6. What is the average miles per gallon (mpg) for all new cars? Using *Consumer Reports*, a random sample of 35 new cars gave an average of 21.1 mpg.

a. Identify the variable.

miles per gallon

b. Is the variable quantitative or qualitative?

Quantitative

c. What is the implied population?

Gas mileage for all new cars

7. The archaeological site of Tara is more than 4000 years old. Tradition states that Tara was the seat of the high kings of Ireland. Because of its archaeological importance, Tara has received extensive study. Suppose an archaeologist wants to estimate the density of ferromagnetic artifacts in the Tara region. For this purpose, a random sample of 55 plots, each of size 100 square meters, is used. The number of ferromagnetic artifacts for each plot is determined.

a. Identify the variable.

Number of ferromagnetic artifacts per 100 m<sup>2</sup>

b. Is the variable quantitative or qualitative?

Quantitative

c. What is the implied population?

Number of ferromagnetic artifacts per each distinct 100m<sup>2</sup> plot in the Tara region

8. If you were going to apply *statistical methods* to analyze teacher evaluations, which question form, A or B, would be better?

*Form A:* In your own words, tell how this teacher compares with other teachers you have had.

*Form B:* Use the following scale to rank your teacher as compared with other teachers you have had.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>worst</b>	<b>below</b>	<b>average</b>	<b>above</b>	<b>best</b>
	<b>average</b>		<b>average</b>	

Form B because you are to see an increasing relationship from worst to best.

9. Categorize these measurements associated with student life according to level: nominal, ordinal, interval, or ratio.

- a. Length of time to complete an exam

Ratio

- b. Time of first class

Interval

- c. Major field of study

Nominal

- d. Course evaluation scale: poor, acceptable, good

Ordinal

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

Ratio

- f. Age of student

Ratio