

Basic Statistics

Final Exam Study Guide

Below is a review of the recently covered material. Use this as a guide when taking your final exam! It is open-note.

1. Define each type of sampling:

Cluster sampling:

Simple Random sampling:

Convenience sampling:

Stratified sampling:

Systematic sampling:

2. Here's some example each type of Sampling question:

The following scenarios below is an example of what type of sampling?

- A. "A single candy bar is pulled at the Mars plant for nutritional content testing out of every 300th batch of Snickers selected." *(Systematic sampling)*
- B. The [American Community Survey \(ACS\)](#) uses simple random sampling. Officials from the United States Census Bureau follow a random selection of individual inhabitants of the United States for a year, asking detailed questions about their lives in order to draw conclusions about the whole population of the US. *(Simple Random sampling)*

- C. "You are interested in the average reading level of all the seventh-graders in your city. It would be very difficult to obtain a list of all seventh-graders and collect data from a random sample spread across the city. However, you can easily obtain a list of all schools and collect data from a subset of these. You thus decide to use the cluster sampling method." *(Cluster sampling)*
- D. "Your population list alternates between men (on the even numbers) and women (on the odd numbers). You choose to sample every tenth individual, which will therefore result in only men being included in your sample. This would obviously be unrepresentative of the population." *(Systematic sampling)*
- E. "A company wants to save some money so decides to distribute their promotional pamphlets and ask questions at a mall or on a crowded street with randomly selected participants." *(Convenience sampling)*
- F. "You are interested in how having a doctoral degree affects the wage gap between gender identities among graduates of a certain university.

Because only a small proportion of this university's graduates have obtained a doctoral degree, using a simple random sample would likely give you a sample size too small to properly compare the differences between men, women, and those who do not identify as men or women with a doctoral degree versus those without one.

Therefore, you decide to use a stratified sample, relying on a list provided by the university of all its graduates within the last ten years." *(Stratified sampling)*

3. Define each type of variable:

Ordinal:

Categorical:

Quantitative:

4. Is the following variable categorical, quantitative, or ordinal?

- A. The levels of difficulty in video games: *ordinal*
- B. Education Level: *categorical*
- C. Age: *quantitative*

Is the following variable categorical, quantitative, or ordinal?

- D. Sex: *categorical*
- E. A jug of milk holds 1 gallon: *quantitative*
- F. The letter grading system: *ordinal*

Is the following variable categorical, quantitative, or ordinal?

- G. Group: *categorical*
- H. Slow, medium and high speeds on a box fan: *ordinal*
- I. Bag of broccoli weighs 1 pound: *quantitative*

Is the following variable categorical, quantitative, or ordinal?

- J. Coffee mug holds 10 ounces: *quantitative*
- K. the Bronze, Silver and Gold medals of the Olympics: *ordinal*
- L. Race: *categorical*

5. Define each type of Logic Boolean:

The "AND" Operator:

The "OR" Operator:

The "NOT" Operator:

6. If two events are independent, how do you calculate the probability of an "or" in the probability question?

- A. Multiply
- B. Subtract
- C. Add

D. Divide

7. What is the probability of selecting a door with anything except a soda can?

In a game show, a board with 30 spaces has prizes behind each space. The prizes have the following frequencies: 5 toasters, 4 car, 5 vacations, 8 dinner gift cards, and 8 empty soda cans.

- A. 16
- B. 0.733
- C. 0.267
- D. 0.533

8. Is there a difference between the distribution of X and the distribution of x-bar?

- A. Yes
- B. No

9. Define the rules of probability?

10. If $x = 377$, $\mu = 494$, and the z-score is 0.9, what is σ ?

- A. -495
- B. -130
- C. 57
- D. 28

The formula is $z = (x - \mu) / \sigma$

11. What does the word "random" mean in probability?

12. If you have a population with a mu of 55 and a sigma of 21, what is the standard deviation of the distribution of x-bar if your sample size is 22?

- A. 1.89
- B. 4.48
- C. 7.59
- D. 21
- E. 22

13. For a distribution whose mean is 421 and sigma is 96, what is the probability of randomly selecting a single value of less than 359 or greater than 628?

- A. 1.4033
- B. 0.4737
- C. 0.2747
- D. 1.0200

14. Look at the following situation, and determine which best describes the data conversion.

Using binoculars, a teacher observes how many times each student's river rock skipped on the water at the lake. After counting 140 throws, the teacher reports the results in the following groups: "one and done," "classic skipped rock," and "a sea creature had to be moving it the entire way!"

- A. Quantitative to categorical
- B. Categorical to quantitative
- C. Both of the above
- D. Neither of the above

16. When rolling a 6 sided die, what is the probability of rolling an odd number or a number greater than or equal to 3?

- A. 1/6
- B. 2/6
- C. 3/6
- D. 4/6
- E. 5/6
- F. 6/6

17. What is a confidence interval?

18. The following scenario is an example of what type of sampling?

A new testing method is being investigated at WozData high school. The investigation evaluates all students in both 7th period Gym class and the 2nd period Humanities class.

- A. Cluster sampling
- B. Simple Random sampling
- C. Convenience sampling
- D. Stratified sampling

19. If a parent distribution has a mean of 166 and a standard deviation of 44, and you create a distribution of \bar{x} using samples of size 30, what are the mean and standard deviation of your distribution

- A. Mean = 166, standard deviation = 46
- B. Mean = 166, standard deviation = 31
- C. Mean = 122, standard deviation = 12
- D. Mean = 18, standard deviation = 30
- E. Mean = 114, standard deviation = 22

20. Describe each of the following and list the types of data needed to make the chart:

Bar Graph:

Line Graph:

Box Plot:

Scatter Plot:

Pie Chart:

Area Graph:

Heat Map:

24. What is the alternative hypothesis for Independent Chi-Square?

25. When you have a p value of .72 will you accept or reject the null?

- A. Accept
- B. Fail to accept (Reject)

26. What is the z-score if $\mu = 184$ and $\sigma = 27$?

- A. -1.994
- B. 0.006
- C. 2.868
- D. There is not enough information given

SOURCES:

<https://www.scribbr.com/methodology/>

<https://www.questionpro.com/blog/convenience-sampling/>