

Instructions

Calculators and notes/cheatsheets will not be permitted for this quiz. You will receive a copy of the z-table with this quiz. You will have the full class period (50 minutes minus setup time).

Formulas

$$\bar{X} = \frac{\sum X_i}{n}$$

$$z = \frac{x - \mu}{\sigma}$$

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Frequency

Given the following values:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 4 | 7 | 6 | 5 | 6 | 5 | 2 | 8 |
| 1 | 4 | 5 | 5 | 6 | 7 | 5 | 6 | 5 | 8 |

1. What is the probability of getting a value more than 2 away from the median?
(hint: if the median is 20, then 21 is “1 away”, 22 is “2 away”, so 23 is “more than 2 away”)

- a. 5%
- b. 10%
- c. 20%
- d. 50%

2. How would you describe the population? (select all that apply)

- a. Strongly skewed towards low values
- b. Having only one mode
- c. Uniform
- d. Normal

Mean & Standard Deviation

Given the following values:

| | | | | | |
|---|---|---|---|---|---|
| 3 | 8 | 7 | 9 | 7 | 2 |
|---|---|---|---|---|---|

3. Calculate the mean:

- a. 5.0
- b. 5.4
- c. 6.0
- d. 6.3

4. Assuming this is a population, calculate the variance:

- a. 4.2
- b. 6.0
- c. 6.7
- d. 8.0

5. Assuming this is a sample, calculate an estimate of the population variance:

- a. 4.2
- b. 6.0
- c. 6.7
- d. 8.0

Normal Distribution

Given a normal population with $\mu = 12$ and $\sigma = 3$

6. What is the z-score of a value of 16.5?

- a. 1.5
- b. 3.2
- c. 4.5
- d. 12.0

7. What raw score corresponds to a z-score of -2?

- a. -1
- b. 6
- c. 10
- d. 15

8. What percent of scores are between 9 and 13.5?

- a. 21%
- b. 34%
- c. 53%
- d. 62%

9. What score would you have to have to be in the top 10% of the population?

- a. 10.5
- b. 12.8
- c. 15.8
- d. 90.0

Distribution of Sampling Means

Assume a population with a mean of 110 and a standard deviation of 12.

10. Calculate the standard error of the mean for a sample size of 16.

- a. 0.75
- b. 1.3
- c. 3.0
- d. 9.2

11. Which sample mean is most likely to occur?

- a. 108
- b. 111
- c. 115
- d. 120

12. Which of the following will increase the standard error of the mean?

- a. Increasing the sample size
- b. Increasing the population mean
- c. Increasing the standard deviation

Z-test

A sample of 9 scores is drawn from a normal population with $\mu = 2.5$ and $\sigma = 0.3$. The sample mean is 2.8.

13. What is the z-score for the sample mean?

- a. 0.1
- b. 0.3
- c. 1.0
- d. 3.0

14. What is the probability of getting a sample mean that is equal or greater than the one found in this example?

- a. 0%
- b. 1.3%
- c. 5.0%
- d. 11%

Conceptual

15. In the formula for standard deviation, when do we divide by $(n-1)$?
- when dealing with a population
 - when trying to estimate the population standard deviation from a sample
 - when trying to calculate the standard error of the mean
16. Which of the following add to the variability of our data (select all that apply):
- sampling error
 - chance
 - treatment effects
 - measurement error
17. The distribution of sample means (select all that apply):
- is always a normal distribution
 - is the collection of means from many samples
 - is made up of individuals scores like the population