Test Bank

# Chapter 3: Variability

## Multiple Choice

1. The range is a poor measure of variability because it is:

A. difficult to interpret.

B. insensitive to variability among scores in the middle of the distribution.

C. too sensitive to differences among the middle scores in a distribution.

Ans: B

Learning Objective: Range

2. When data are interval or ratio you should use the \_\_\_\_\_\_ as a measure of variability.

A. range

B. standard deviation

Ans: B

Learning Objective: Range vs Standard Deviation

3. Which of the following symbols identifies the sample variance?

A. *SD*

B. *SD*2

C. σ

D. σ2

Ans: B

Learning Objective: Sample variance

4. Which of the following symbols identifies the population standard deviation?

A. *SD*

B. *SD*2

C. σ

D. σ2

Ans: C

Learning Objective: Population standard deviation

5. In words, the SS is:

A. the sum of the scores

B. the sum of the squared deviations

C. the sum of the squared scores

D. the sum of the standard scores

Ans: B

Learning Objective: Sum of squares

6. Which of the following cannot be a correct SS?

A. 100.4

B. −50

C. 0

D. More information is needed to answer this question.

Ans: B

Learning Objective: Computing standard deviation

7. Which of the following cannot be a standard deviation?

A. 87

B. 45.3

C. 0

D. −5.

Ans: D

Learning Objective: Understanding the standard deviation

8. Which of the following sources of variability do researchers try to maximize?

A. Treatment differences variability

B. Individual differences variability

C. Measurement error variability

Ans: A

Learning Objective: Sources of variability

9. Which of the following sources of variability do researchers try to minimize?

A. treatment differences variability

B. measurement error variability

Ans: B

Learning Objective: Sources of variability

10. Which of the following data sets will have more variability created by measurement error?

A. Students are asked to report how many hours they spent each week doing homework.

B. Number of hours students worked each week during a semester (obtained via time cards).

Ans: A

Learning Objective: Sources of variability

11. Which of the following data sets will have more variability created by individual differences?

A. Weight of 98 infants

B. Weight of 98 adults

Ans: B

Learning Objective: Sources of variability

12. The Σ*X*2 is computed by:

A. summing the *X*’s and then squaring that sum.

B. squaring each *X* then summing all of those products.

C. computing the deviation score of each *X* and then squaring the deviation scores.

Ans: B

Learning Objectives: Computing standard deviation

13. The (Σ*X*)2 is computed by:

A. summing the *X*’s and then squaring that sum.

B. squaring each *X* then summing all of those products.

C. computing the deviation score of each *X* and then squaring the deviation scores.

Ans: A

Learning Objectives: Computing standard deviation

14. A researcher wanted to know if waitresses who smile and touch their customers on the shoulder get bigger tips than waitresses who don’t. The research had a waitress smile and touch the shoulder of half of her customers and did not smile or touch the shoulders of her other customers. The fact that some people ordered more expensive meals than others contributes to the \_\_\_\_\_\_ in this study.

A. treatment variability

B. individual differences variability

Ans: B

Learning Objective: Sources of variability

15. A researcher wanted to know if waitresses who smile and touch their customers on the shoulder get bigger tips than waitresses who don’t. The research had a waitress smile and touch the shoulder of half of her customers and did not smile or touch the shoulders of her other customers. The fact that the waitress smiled at and touched some customers and not others contributes to the \_\_\_\_\_\_ in this study.

A. treatment variability

B. individual differences variability

C. measurement error variability

Ans: A

Learning Objective: Sources of variability

16. Which of the following data sets will have more variability created by measurement error?

A. Scores on a 100 point essay exam graded by three different teaching assistants

B. Scores on a 100 point multiple choice exam graded by computer

Ans: A

Learning Objective: Sources of variability

17. Which of the following data sets will have more variability created by individual differences?

A. Scores on an IQ test given to a random sample of 100 people from the general population.

B. Scores on an IQ test given to a random sample of 100 college seniors

Ans: A

Learning Objective: Sources of variability

18. Which of the following is an accurate description of what the standard deviation is measuring? The standard deviation measures:

A. the typical deviation bewteen scores in a distribution and the mean of that distribution.

B. the typical deviation between sample means and population means.

C. the typical deviation between scores.

Ans: A

Learning Objective: Define standard deviation

19. Which of the following conclusions can the professor reach about the distribution of test scores with a mean of 75 and a standard deviation of 12?

A. The median is equal to the mean.

B. All of the scores were not equal to 75, some were higher and some were lower.

C. The scores are normally distribute D.

D. All of the above are valid conclusions.

E.. None of the above are valid conclusions.

Ans: B

Learning Objective: Interpreting standard deviation

20. A population has a mean of 20 and a standard deviation of 5. Which of the following is the best description of this distribution of scores?

A. The deviation scores for all the *X*’s are 5 above the mean of 20.

B. The scores range between 15 and 25 (5 above and below the mean).

C. The typical distance of each score from the mean is 5.

D. All scores are within 5 deviations of the mean of 20.

Ans: C

Learning Objective: Interpreting standard deviation

21. Which of the following two graphs has more variability? Choose A, B or same.



A. Graph A has more variability

B. Graph B has more variability

C. Graphs A and B have the same amount of variability

Ans: A

Learning Objective: Variability in graphs

22. Which of the following two graphs has more variability? Choose A, B or same.



A. Graph A has more variability

B. Graph B has more variability

C. Same amount of variability

Ans: C

Learning Objective: Variability in graphs

23. Which of the following two graphs has *more* variability? Choose A, B or same.



A. Graph A has a larger standard deviation.

B. Graph B has a larger standard deviation.

C. The standard deviations are the same for graphs A and B.

Ans: A

Learning Objective: Variability in graphs

24. Which of the following two graphs has *more* variability? Choose A, B or same.



A. Graph A has a larger standard deviation.

B. Graph B has a larger standard deviation.

C. The standard deviations are the same for graphs A and B.

Ans: C

Learning Objective: Variability in graphs

25. Which of the following two graphs has *more* variability? Choose A, B or same.



A. Graph A has a larger standard deviation.

B. Graph B has a larger standard deviation.

C. The standard deviations are the same for graphs A and B.

Ans: A

Learning Objective: Variability in graphs

26. In most situations, when computing a standard deviation, which method leads to greater amounts of rounding error?

A. the computational method

B. the definitional method

C. the combination method

Ans: B

Learning Objective: Computing the standard deviation

27. A sleep researcher is interested in the number of hours of sleep her patients got the previous night. Below are data from 15 of her patients rounded to the nearest hour.

1, 5, 3, 4, 5, 3, 6, 5, 4, 3, 4, 5, 3, 5, 4

What is the SS for this *population* of scores?

A. 1.25

B. 262

C. 22

D. 1.57

E. 4.18

F. 1.47

Ans: C

Learning Objective: Computing standard deviation

28. What is the variance for this *population* of scores?

1, 5, 3, 4, 5, 3, 6, 5, 4, 3, 4, 5, 3, 5, 4

A. 1.25

B. 262

C. 22

D. 1.57

E. 4.18

F. 1.47

Ans: F

Learning Objective: Computing standard deviation

29. What is the standard deviation for this *population* of scores?

1, 5, 3, 4, 5, 3, 6, 5, 4, 3, 4, 5, 3, 5, 4

A. 1.25

B. 1.21

C. 22

D. 1.57

E. 4.18

F. 1.47

Ans: B

Learning Objective: Computing standard deviation

30. What is the standard deviation for this *sample* of scores?

7, 9, 10, 5, 6, 7, 11, 15

A. 3.24

B. 10.5

C. 73.5

D. 3.03

E. 2.89

Ans: A

Learning Objective: Computing standard deviation

31. What is the SS for this sample of scores?

7, 9, 10, 5, 6, 7, 11, 15

A. 3.24

B. 10.5

C. 73.5

D. 3.03

E. 2.89

Ans: C

Learning Objective: Computing standard deviation

32. What is the variance for this sample of scores?

7, 9, 10, 5, 6, 7, 11, 15

A. 3.24

B. 10.5

C. 73.5

D. 3.03

E. 2.89

Ans: B

Learning Objective: Computing standard deviation

33. Compute the standard deviation for this *population* of scores: 20, 6, 8, 26, 29, 30, 14

A. 9.15

B. 9.88

C. 97.61

D. 84.27

E. 586

Ans: A

Learning Objective: Computing standard deviation

34. Compute the standard deviation for this sample of test scores

|  |  |
| --- | --- |
| *X* | *f* |
| 90 | 6 |
| 80 | 3 |
| 70 | 5 |
| 60 | 0 |
| 50 | 2 |

A. 548.75

B. 182.92

C. 13.52

D. 14.2

Ans: C

Learning Objective: Computing standard deviation

35. You asked several classmates how many times they texted their parents over the weekend. Compute the standard deviation for the *sample* data below.



A. 1.46

B. 2.16

C. 1.50

D. 2

Ans: C

Learning Objective: Computing standard deviation

36. Use the following frequency table to answer the following questions. The data came from the question, “On a scale of 1–6 (1 = *not at all* and 6 = *a lot*), how much do you like eating yogurt for breakfast?” Compute the standard deviation of this distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *X* | *f* | Proportion | Percent | Cumulative Frequencies | Cumulative Percentages |
| 6 | 3 | .3 | 30 | 10 | 100 |
| 5 | 4 | .4 | 40 | 7 | 70 |
| 4 | 2 | .2 | 20 | 3 | 30 |
| 3 | 1 | .1 | 10 | 1 | 10 |
| 2 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 |

A. 2.49

B. .99

C. .94

D. 4.9

Ans: B

Learning Objective: Computing standard deviation

37. The standard deviation of a distribution of numbers is computed and found to be zero, *SD* = 0. Which of the following statements must be true.

A. assuming there were no computational errors, all of the scores in the distribution must be identical.

B. there has to a computational error a standard deviation of zero is not possible.

C. the scores in the distribution are very similar to each other.

D. the scores in the distribution are very different from each other.

Ans: A

Learning Objective: Explaining the standard deviation

38. A teacher tried a new way of teaching a math concept to her students *because she wanted to help more of her students understand the concept*. After teaching a class the new way, she gave a test on that concept to see how well her students learned the concept. The mean and standard deviation of the students test scores from the new way and the old way are shown below.

New way Class: Mean = 83%, *SD* = 5%

Old way Class: Mean = 83%, *SD* = 12%

Based on the above results which method of teaching is probably better?

A. The new method is probably better because it created a lower SD.

B. The old method is probably better because it created a higher SD.

C. The two methods are equally good, both created means of 83%.

Learning Objective: Explaining the standard deviation

## True/False

1. A standard deviation can never be negative.

Ans: T

Learning Objective: Computing standard deviation

2. The variance can never be negative.

Ans: T

Learning Objective: Computing standard deviation