Test Bank

# Chapter 4: *z* Scores

## Multiple Choice

1. Positive *z* scores indicate that:

A. the raw score was above the mean.

B. the raw score was below the mean.

C. the raw score was greater than the standard deviation.

D. the raw score was less than the standard deviation.

Ans: A

Learning Objective: Interpret a *z* score

2. Negative *z* scores indicate that:

A. the raw score was above the mean.

B. the raw score was below the mean.

C. the raw score was greater than the standard deviation.

D. the raw score was less than the standard deviation.

Ans: B

Learning Objective: Interpret a *z* score

3. After taking the SAT, a student learns that he was at the 45th percentile. What do you know about his *z* score?

A. it is equal to 45

B. it is equal to zero

C. it is positive

D. it is negative

Ans: D

Learning Objective: Interpret a *z* score

4. A student takes the ACT and her score puts her at the 88th percentile. What can you infer about her *z* score from this information?

A. nothing without knowing the population mean and standard deviation

B. the *z* score must be greater than zero

C. the *z* score must be less than zero

D. the *z* score is equal to .22

Ans: B

Learning Objective: Interpret a *z* score

5. A student’s score on a Chemistry exam has a *z* score of −1. What do you know about the raw score based on this *z* score?

A. The raw test score is below the mean by 1 question.

B. The raw test score is below the mean by 1 standard deviation

C. The student missed one question more than average.

D. The student missed one question less than average.

Ans: B

Learning Objective: Interpret a *z* score

6. A student’s score on a Biology exam has a *z* score of +2. What do you know about the raw score based on this *z* score?

A. The students missed two questions more than average

B. The students score is 2 standard deviations above the mean

C. The student did worse than most students who took the exam

D. The standard deviation of the exam was equal to 2.

Ans: B

Learning Objective: Interpret a z score

7. Which of the following *z* scores is furthest from the population mean?

A. 2.00

B. 1.07

C. −1.50

D. −0.90

Ans: A

Learning Objective: Interpret a *z* score

Which of the following *z* scores is furthest from the population mean?

A. 1.54

B. 1.07

C. −1.90

D. −0.88

Ans: C

Learning Objective: Interpret a *z* score

9. Which of the following *z* scores is closest to the population mean?

A. 1.87

B. 1.07

C. −1.50

D. −0.56

Ans: D

Learning Objective: Interpret a *z* score

10. Which of the following *z* scores is closest to the population mean?

A. 0.23

B. 0.65

C. −1.50

D. −0.56

Ans: A

Learning Objective: Interpret a *z* score

11. An exam had a mean of 79 with a standard deviation of 11.54. If all of the scores in the distribution are converted into *z* scores, what will the mean and standard deviation of the distribution be?

A. mean = 79, *SD* = 11.54

B. mean = 79, *SD* = 1

C. mean = 0, *SD* = 1

D. mean = 0, *SD* = 11.54

E. mean = 1, *SD* = 0

Ans: C

Learning Objective: Mean and standard deviation of distribution of *z* scores

12. A professor gives an exam with a mean of 48 and a standard deviation of 12 and converts every score in the distribution into *z* scores. What is the mean of that distribution of *z* scores?

A. 0

B. 1

C. 48

D. 12

E. 4

Ans: A

Learning Objective: Mean and standard deviation of distribution of *z* scores

13. A professor gives an exam with a mean of 48 and a standard deviation of 12 and converts every score in the distribution into *z* scores. What is the standard deviation of that distribution of *z* scores?

A. 0

B. 1

C. 48

D. 12

E. 4

Ans: B

Learning Objective: Mean and standard deviation of distribution of *z* scores

14. Amy got 88 points on a Statistics exam. The mean score on the exam was 82 with a standard deviation of 11. What was her *z* score on the exam?

A. .55

B. −.55

C. −.93

D. .93

Ans: A

Learning Objective: Compute a *z* score for a given raw score

15. Yolonda has an IQ of 132. The mean score for this IQ test is 100 with a standard deviation of 16. What was her *z* score on the exam?

A. 2.00

B. −2.00

C. 1.50

D. −1.50

Ans: A

Learning Objective: Compute a *z* score for a given raw score

16. A test of Mathematics skills test is normally distributed with a mean of 90 and a standard deviation of 13. A student receives a score of 101 on the exam. What percent of students did she do better than?

A. .8462

B. .1977

C. .1538

D. .8023

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

17. A test of Mathematics skills test is normally distributed with a mean of 90 and a standard deviation of 13. A student receives a score of 88 on the exam. What percent of students did she do worse than?

A. 15.38%

B. 55.96%

C. 44.04%

D. 65.28%

Ans: B

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

18. Aiden receives a *z* score of −.3 on an exam that is normally distributed, what percentage of the students did *worse* than Aiden?

A. 30%

B. 70%

C. 61.79%

D. 38.21%

Ans: D

Learning Objective: Use a unit normal table to determine the proportion of scores above or below any given *z* score

19. Tessa’s *z* score for her Biology test was 1.5. What percentage of students did better than Tessa?

A. 9.32%

B. 93.32%

C. 6.68%

D. .68%

Ans: C

Learning Objective: Use a unit normal table to determine the proportion of scores above or below any given *z* score

20. Laura took a standardized test and received a *z* score of −1.2. What percentage of the class did she do better than?

A. .8849

B. .1151

C. .3859

D. .5000

Ans: B

Learning Objective: Use a unit normal table to determine the proportion of scores above or below any given *z* score

21. The average weight of 3-year-old boys is 31.5 pounds with a standard deviation of 2.1. Henry is a 3-year-old who weighs 30 pounds. What is the *z* score for Henry’s weight?

A. .71

B. −.71

C. .5

D. −.5  
Ans: B

Learning Objective: Compute a *z* score for a given raw score

22. The average weight of 3-year-old boys is 31.5 pounds with a standard deviation of 2.1. Henry is a 3 year old that weighs 30 pounds. What percent of 3-year-old boys is Henry heavier than?

A. .7611

B. .6915

C. .3085

D. .2389

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z*-score

23. The average weight of 3-year-old boys is 31.5 pounds with a standard deviation of 2.1. Garrison is a 3-year-old boy who weighs 34 pounds. What is the *z*-score for Garrison’s weight?

A. 2.5

B. −25

C. 1.19

D. −1.19

Ans: D

Learning Objective: Compute a *z* score for a given raw score

24. The average weight of 3-year-old boys is 31.5 pounds with a standard deviation of 2.1. Garrison is a 3-year-old boy who weighs 34 pounds. What percent of 3-year-old boys is Garrison heavier than?

A. .9938

B. .0017

C. .1170

D. 8830

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z*-score

25. Scores on a memory test are normally distributed with a mean of 16 and standard deviation of 10.70. What is the *z* score for someone with a score of 18?

A. .19

B. −.19

C. .29

D. −.29

Ans: A

Learning Objective: Compute a *z* score for a given raw score

26. Scores on a memory test are normally distributed with a mean of 16 and standard deviation of 10.70. What proportion of people have scores of 18 or higher?

A. .6141

B. .3859

C. .4286

D. .5714

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

27. Scores on a memory test are normally distributed with a mean of 16 and standard deviation of 10.70. Suppose that you randomly select one person from this population. What is the probability that this person will have a score less than 13?

A. .28

B. .72

C. .6103

D. .3897

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

28. The average height of men in the United States is 70 inches with a standard deviation of 4 inches. The *z* score for an individual is 2. What is his height in inches?

A. 72 inches

B. 78 inches

C. 68 inches

D. 74 inches

Ans: B

Learning Objective: Compute a raw score for a given *z* score

29. The average height of men in the United States is 70 inches with a standard deviation of 4 inches. What proportion of men are 6 feet (72 inches) or taller?

A. .1587

B. .8413

C. .6915

D. .3085

Ans: D

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

30. The average height of men in the United States is 70 inches with a standard deviation of 4 inches. What proportion of men are 67 inches or taller?

A. .7500

B. .2500

C. .7734

D. .2266

Ans: C

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

31. The average height of men in the United States is 70 inches with a standard deviation of 4 inches. What proportion of men are between 66 and 74 inches tall?

A. .5000

B. .6826

C. .8413

D. .4687

Ans: B

Learning Objective: Compute a *z* score and use a unit normal table to determine the proportion of scores above or below the *z* score

32. The average height of men in the United States is 70 inches with a standard deviation of 4 inches. The *z* score for an individual is −1. What is his height in inches?

A. 69 inches

B. 64 inches

C. 68 inches

D. 66 inches

Ans: D

Learning Objective: Compute a raw score for a given *z* score

33. A college admissions officer needs to determine which of two students should receive a scholarship. In part, the scholarship is based on standardized test score from tests of fluency in a foreign language. In this case, one student took the Spanish Fluency Test (SFT) and the other took the German Fluency Test (GFT). Use the information below to determine who did better on the standardized test. Compute the students’ *z* score for the SFT and the GFT

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean on Test | Standard Deviation on Test | Student’s Test Score |
| Student A (took the SFT) | 50 | 10 | 62 |
| Student B (took the GFT) | 115 | 20 | 120 |

A. SFT *z* = 1.2; GFT *z* = −.25

B. SFT *z* = −1.2; GFT *z* = −.25

C. SFT *z* = 1.2; GFT *z* = .25

D. SFT *z* = −1.2; GFT *z* = .25

E. SFT *z* = .65; GFT *z* = −.79

F. SFT *z* = −.65; GFT *z* = −.79

G. SFT *z* = .65; GFT *z* = .79

H. SFT *z* = −.65; GFT *z* = .79

Ans: C

Learning Objective: Compute a *z* score for a given raw score

34. A college admissions officer needs to determine which of two students should receive a scholarship. In part, the scholarship is based on standardized test score from tests of fluency in a foreign language. In this case, one student took the Spanish Fluency Test (SFT) and the other took the German Fluency Test (GFT). Use the information below to determine who did better on the standardized test. Compute the students’ *z* score for the SFT and the GFT. Which student did better on their exam compared to their peers?

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean on Test | Standard Deviation on Test | Student’s Test Score |
| Student A (took the SFT) | 50 | 10 | 62 |
| Student B (took the GFT) | 115 | 20 | 120 |

A. The student who took the Spanish (SFT) test did better.

B. The student who took the German (GFT) test did better.

Ans: A

Learning Objective: Compute and interpret a *z* score for a given raw score

35. Harriet wants to know if she is better at History or Cognitive Psychology. In order to answer this question, she compiled the following information from her last exam in each of these courses. Use the information below to determine in which course Harriet performed better, History or Cognitive Psychology. What were Harriet’s *z* scores for the History exam and the Cognitive Psych Exam?

|  |  |  |  |
| --- | --- | --- | --- |
| Topic | Mean on Test | Standard Deviation on Test | Harriet’s Score on Test |
| History | 70 | 14 | 80 |
| Cognitive Psych | 55 | 9 | 63 |

A. History Exam *z* = .71, Cognitive Psych exam *z* = .89

B. History Exam *z* = −.71, Cognitive Psych exam *z* = .89

C. History Exam *z* = −.43, Cognitive Psych exam *z* = −.89

D. History Exam *z* =.43, Cognitive Psych exam *z* = −.89

E. History Exam *z* = .71, Cognitive Psych exam *z* = .98

F. History Exam *z* = −.71, Cognitive Psych exam *z* = .98

G. History Exam *z* = −.43, Cognitive Psych exam *z* =−.98

H. History Exam *z* =.43, Cognitive Psych exam *z* = −.98

Ans: A

Learning Objective: Computing z scores

36. Harriet wants to know if she is better at History or Cognitive Psychology. In order to answer this question she compiled the following information from her last exam in each of these courses. Use the information below to determine in which course Harriet performed better, History or Cognitive Psychology. What were Harriet’s *z* scores for the History exam and the Cognitive Psych Exam? What test did Harriet receive a better score on relative to her classmates?

|  |  |  |  |
| --- | --- | --- | --- |
| Topic | Mean on Test | Standard Deviation on Test | Harriet’s Score on Test |
| History | 70 | 14 | 80 |
| Cognitive Psych | 55 | 9 | 63 |

A. History

B. Cognitive Psych

Ans: B

Learning Objective: Interpreting z scores

37. Scores on a test of reading ability for second graders are normally distributed with a mean of 60 and a standard deviation of 11. The principal of a school wants to identify the students who are in the top 5% of the class for participation in accelerated work in reading. What is the minimum raw score a student must have to be in the top 5%

A. 65

B. 78.15

C. 66.65

D. 77.58

Ans: B

Learning Objective: Use a unit normal table to determine the proportion of scores above or below the *z* score and compute a raw score from the *z* score

38. Scores on a test of reading ability for second graders are normally distributed with a mean of 60 and a standard deviation of 11. The principal of a school wants to identify the students who are in the bottom 15% of the class so that they can receive extra help in reading. What test score is the cut off for the bottom 15% of the class?

A. 48.56

B. 45.00

C. 58.96

D. 49.82

Ans: A

Learning Objective: Use a unit normal table to determine the proportion of scores above or below the *z* score and compute a raw score from the *z* score

39. Scores on a Statistics exam are negatively skewed with a mean of 80 and standard deviation of 15. Why can’t the instructor use the *z* table to determine the proportion of students who failed (i.e., received scores lower than 60)?

A. The distribution is skewed, it is not normal (bell) shaped

B. The scores are too variable (i.e., the standard deviation is too high)

C. He doesn’t know the size of the population

Ans: A

Learning Objective: Assumption of normality for z table

## True/False

1. The *z* table can only be used to find proportions if distribution of scores has a normal (bell) shape.

Ans: T