

Chapter 3 Homework: Descriptive Statistics and the Normal Distribution

1. Scores: 1, 2, 3, 3, 4, 2, 2, 3, 2, 1

Calculate the following

$$(\Sigma X \times 3) + (\Sigma X^2)/2$$

2. Scores: 1, 2, 3, 3, 4, 2, 2, 3, 2, 1

Calculate the following

$$[(\Sigma X)^2 + \Sigma X^2]/2$$

3. Here are data from a recent study: 3, 4, 2, 3, 4, 2, 2, 2, 1, 2. Calculate the following from the data.

$$(\Sigma X^2 \times 10)/5$$

$$[(\Sigma X)^2 - (\Sigma X)/5] \times 2$$

4. Assume that you are developing norms for the following three groups.

	Sample 1	Sample 2	Sample 3
<i>N</i>	25	50	40
ΣX	750	1400	1280
ΣX^2	25000	40000	41000
Mean	30	28	32
<i>S</i>	10	4	1

What is the mean for the total of samples 1, 2, and 3? What is the standard deviation for the total of samples 1, 2, and 3?

5. Given: mean is 700; standard deviation is 100. Complete each row of the following table.

Percentile	<i>T</i> score	<i>z</i> score	Raw score
64	53.7	.37	737
	43		
		-1.23	
			618
17			

	68		
68			
			835
		.57	

6. What percentile is associated with a T score of 39?
7. Given the mean is 500 and the standard deviation is 50, what T score represents the 70th percentile?
8. What percentile are you at if your T score is 45?
9. Given the mean is 200 and the standard deviation is 40, what score represents the 90th percentile?
10. Assume that the average number of minutes played by players in a hockey game is 20 and the standard deviation is 4 minutes of playing time. What percentage of players play more than 25 minutes per game?
11. Assume that the average number of points scored in a typical high school basketball game is 100 (total for both teams). The standard deviation is 20 points. What percentage of games have a total between 85 and 115 points?
12. John scored 110 and Karen scored 105 on test 1. The mean is 120 and the s is 10. What percentage of people scored between John and Karen?
13. The average tire lasts 50,000 miles ($s = 10,000$). What percentage of tires would you expect to last more than 54,000 miles?
14. John scored 120 on a test with a mean of 130 and a standard deviation of 15. Karen obtained a T score of 43. Mike had a z score of -0.39 . Susan achieved the 43rd percentile. Who had the best relative performance?

Use the following information to answer questions 15 to 17.

Given: mean = 200, $s = 20$, John's score = 210, and Allison's score = 225.

15. What percentage of people scored greater than or equal to Allison?
16. What are John's and Allison's T scores?
17. What percentage of people scored between John and Allison?

Use the following information to answer questions 18 to 20.

Assume that the average NFL field goal is 35 yards in length with a standard deviation of 5 yards.

18. What percentage of field goals are kicked from 33 yards or farther?
19. What percentage of field goals are greater than 38 yards?
20. What percentage of field goals are between 34 and 39 yards in length?

Use the following information to answer questions 21 to 23.

Assume that the last test had the following characteristics: mean = 500; $s = 100$; $N = 500$.

21. What percentage of students scored between 550 and 600?
22. What percentile is associated with a score of 425?
23. What T score is associated with the 35th percentile?

Use the following information to answer questions 24 to 26.

Assume that the last test had the following characteristics: mean = 200; $s^2 = 100$; $N = 500$.

24. What is your percentile if you scored 217 on the test?
25. What is your percentile if you scored 185 on the test?
26. What percentage of people scored between 210 and 213?

Topic	Possible points	Mean	Standard deviation
A. Quiz grades	0 – 50	43	5.9
B. Written assignments	0 – 100	88	4.2
C. Midterm exam	0 – 100	55	1.1
D. Final examination	0 – 200	142	3.0
E. Term paper	0 – 100	85	2.9

27. In the table are five areas on which a teacher plans to assign grades. Rank them from highest to lowest in terms of which course requirement has the greatest weight in determining the final course grade. Assume that the teacher simply adds the points from each student's assignment to get a total number of points for the course.

28. Pat's score was 68; the mean is 60 and the standard deviation is 5. What is Pat's a) z score, b) T score, c) percentile, and d) percentage? Also, what percentage of students scored better than Pat?

29. What percentile is associated with a T score of 41?
30. Assume that the average college student walks 4 miles per day (when going from class to class on a large campus). The variance is 4 miles. What percentage of students walk less than 7 miles per day?
31. Assume that the bowling average for college students is 110. The standard deviation is 20 pins. What percentage of bowlers have averages between 90 and 95?
32. Given: mean is 100; standard deviation is 20. Complete each row.

Raw score	T score	z score	Percentile
120	60	1.00	84
135			
	42		
	62		
		.68	
			32
95			
			78
		-.75	

33. Your T score is 68. What percentage of people scored higher than you did?
34. The average college student studies 20 hours per week. The variance is 16 hours. What percentage of students study less than 15 hours per week?
35. Mean = 30 and $s = 2$. Therefore, 95% of the people score below what value?
36. Given: T score = 63 for a grade of A; z score = 0.5 for a grade of B; $N = 200$. How many people get a grade of B?
37. Given: mean = 500 and $s = 100$. John scored a T score of 56. Karen obtained a z score of .57. What was each person's percentile?
38. Given: mean = 500 and $s = 100$. Terry scored 435. What was her percentile?
39. The average family spends \$400.00 per month on groceries. The standard deviation is \$50.00. What percentage of families spend between \$450.00 and \$550.00 per month on groceries?
40. The average light bulb lasts 1,000 hours with a standard deviation of 200 hours. Therefore, 40% of light bulbs last less than how many hours?

41. Mean = 100; $s = 50$. Your raw score (X) is 40. What is your percentile?
42. What is your percentile if your T score is 62?
43. What is your percentile if your score is 39 and the mean is 42 with a standard deviation of 2?
44. Find the percentage of scores above and below a z score of -0.5 .
45. Find the percentage of scores between -0.5 and -1.5 .
46. The mean of a test is 45 and the standard deviation is 5. Assuming a normal distribution, find the percentage of scores between 60 and 50.
47. The mean of a test is 45 and the standard deviation is 5. Find the percentile for a score of 40.
48. The mean of a test is 45 and the standard deviation is 5. Find the score associated with the 90th percentile.

Use the information presented in the following table to answer questions 49 to 51.

A teacher administers the following tests to her basketball students. The results are as follows:

Test	Mean	Standard deviation
40-yard dash	4.8 sec	.2 sec
Vertical jump	25"	3"

49. Jaime ran a 4.6 and jumped 28". What is her composite (total) z score?
50. Michelle ran a 5.0 and jumped 26.5". What is her average z score?
51. Assume the teacher wants to count vertical jump twice as important as the 40-yard dash. What is the composite (total) score for Kelly, who scored 24 on vertical jump and 5.2 sec on the 40-yard dash?