Chapter 2

Set II

9. (a) Describe and explain the difference between the mean, median, and mode. (b) Make up an example (not in the book or in your lectures) in which the median would be the preferred measure of central tendency.

9. The mean is the sum of the scores divided by the total number of scores. The median is the middle score when all the scores in a distribution are arranged in order of value. The mode is the value with the greatest frequency in a distribution.

10. Describe the variance and standard deviation. (b) Explain why the standard deviation is more often used as a descriptive statistic than the variance.

10. The standard deviation gives a more direct sense of the variability of the data since it has the same dimensions as the data values themselves rather than the squares of the data values.

11. For the following scores, find the (a) mean, (b) median, (c) sum of squared deviations, (d) variance, and (e) standard deviation: 2, 2, 0, 5, 1, 4, 1, 3, 0, 0, 1, 4, 4, 0, 1, 4, 3, 4, 2, 1, 0

Mean = 2

Median = 2

Sum of Squared Deviation = 56

Variance = 2.66

Standard Deviation = 1.63

12. For the following scores, find the (a) mean, (b) median, (c) sum of squared deviations, (d) variance, and (e) standard deviation: 1,112; 1,245; 1,361; 1,372; 1,472

Mean = 1,312

Median = 1,361

Sum of Squared Deviation = 76,089.2

Variance = 15,217.84

Standard Deviation = 123.361

13. For the following scores, find the (a) mean, (b) median, (c) sum of squared deviations, (d) variance, and (e) standard deviation: 3.0, 3.4, 2.6, 3.3, 3.5, 3.2

Mean = 3.167

Median = 3.25

Sum of Squared Deviation = 0.533

Variance = 0.089

Standard Deviation = 0.298

13. For the following scores, find the (a) mean, (b) median, (c) sum of squared deviations, (d) variance, and (e) standard deviation: 8, -5, 7, -10, 5.

14. For the following scores, find the (a) mean, (b) median, (c) sum of squared deviations, (d) variance, and (e) standard deviation: 8, -5, 7, -10, 5

14 Mean = 1.8

Median = 3

Sum of Squared Deviation = 54.8

Variance = 13.7

Standard Deviation = 3.7014

15. Make up three sets of scores: (a) one with the mean greater than the median, (b) one with the median and the mean the same, and (c) one with the mode greater than the median. (Each made-up set of scores should include at least five scores.)

16. A psychologist interested in political behavior measured the square footage of the desks in the official office of four U.S. governors and of four chief executive officers (CEOs) of major U.S. corporations. The figures for the governors were 44, 36, 52, and 40 square feet. The figures for the CEOs were 32, 60, 48, and 36 square feet. (a) Figure the means and standard deviations for the governors and for the CEOs. (b) Explain, to a person who has never had a course in statistics, what you have done. (c) Note the ways in which the means and standard deviations differ, and speculate on the possible meaning of these differences, presuming that they are representative of U.S. governors and large corporations' CEOs in general.

16. a) Governors: 36; 44; 52; 40

Mean: 43

Standard deviation: 6.83

CEOs: 32; 60; 48; 36

Mean: 44

Standard deviation: 12.65

b) We have just found the average measurements of the desks of the governors and CEOs in major US corporations. We also found the spread of the data.

c) The average, or mean of the measurements are almost the same in both cases. However, the standard deviation of the CEOs' measurements is almost double of the governors', which means that the CEO's desks can be either much bigger or much smaller than the governors.

17. A developmental psychologist studies the number of words that seven infants have learned at a particular age. The numbers are 10, 12, 8, 0, 3, 40, and 18. Figure the (a) mean, (b) median, and (c) standard deviation for the number of words learned by these seven infants. (d) Explain what you have done and what the results mean to a person who has never had a course in statistics.

The mean is the average number of words learned found by dividing the total number of words learned by the number of infants in the study. The median is the middle value in the ordered list of number of words learned. The standard deviation is roughly the average amount the number of words learned for the infants differ from the mean.

The mean is the middle of the 7 ordered numbers, or the fourth. It is 10 words.
The sd is 13.28 words.
The typical number of words is 13 for the infants, but the variability is quite large, and the range is from 0 to 40. Most of the values cluster from 0 to 18 words.

18. Describe and explain the location of the mean, mode, and median of a distribu tion of scores that is strongly skewed to the left.

18. Generally if the distribution of data is skewed to the left, the mean is less than the median, which is often less than the mode. If the distribution of data is skewed to the right, the mode is often less than the median, which is less than the mean.

19. You figure the variance of a distribution of scores to be –4.26. Explain why your answer cannot be correct

19. Variance cannot be negative number, so variance of a distribution of scores to be -4.26 is wrong.

20. A study involves measuring the number of days absent from work for 216 employees of a large company during the preceding year. As part of the results, the researcher reports, "The number of days absent during the preceding year 1M = 9.21; SD = 7.342 was . . . ." Explain what is written in parentheses to a person who has never had a course in statistics.

20. In the given problem M stands for "mean" and SD stands for " Standard deviation What's written in parentheses : (M = 9.21; SD = 7.34) Explanation of it to someone not well versed with statistical terms: The average number of days that an employee at work had been absent in the last year is 9.21. Data on number of days of work missed and annual salary increase for a company's employees show that in general exployees who missed more days of work during the year received smaller raises than those who missed fewer days.

Chapter 3

Set II

14. On a standard measure of hearing ability, the mean is 300 and the standard deviation is 20. Give the Z scores for persons who score (a) 340, (b) 310, and (c) 260. Give the raw scores for persons whose Z scores on this test are (d) 2.4, (e) 1.5, (f) 0, and (g) -4.5..

14. Mean = 300

Standard deviation = 20

z = (x - mean) / standard deviation

a) z (340) = (340-300)/20=2

b) z (310) = (310-300)/20=0.5

c) z (260) = (260-300)/20=-2

x = z * (standard deviation) + mean

d) x = 2.4*20+300 = 348

e) x = 1 .5*20+300 = 330

f) x = 0*20+300 = 300

g) x = - 4.5*20+300 = 210

15. A person scores 81 on a test of verbal ability and 6.4 on a test of quantitative ability. For the verbal ability test, the mean for people in general is 50 and the standard de viation is 20. For the quantitative ability test, the mean for people in general is 0 and the standard deviation is 5. Which is this person's stronger ability: verbal or quanti tative? Explain your answer to a person who has never had a course in statistics.

15. Z-scores:

Verbal ability:

z (81) = (81-50)/20 = 31/20 = 1.55

Quantitative ability:

z (6.4) = (6.4-0)/5 = 1.28

We can see that the verbal ability score is higher than the quantitative ability score, which shows that this person is stronger with verbal skills.

16. . The amount of time it takes to recover physiologically from a certain kind of sudden noise is found to be normally distributed with a mean of 80 seconds and a standard deviation of 10 seconds. Using the 50%-34%-14% figures, approximately what percentage of scores (on time to recover) will be (a) above 100, (b) below 100, (c) above 90, (d) below 90, (e) above 80, (f) below 80, (g) above 70, (h) below 70, (i) above 60, and (j) below 60?

16. a) 2,5%

b) 97,5%

c) 16%

d) 84%

e) 50%

f) 50%

g) 84%

h) 16%

I) 97.5%

j) 2.5%

17. Using the information in problem 16 and the 50%-34%-14% figures, what is the longest time to recover that a person can take and still be in the bottom (a) 2%, (b) 16%, (c) 50%, (d) 84%, and (e) 98%?

17. The 50% - 34% - 14% figure means that 50% of the data scores should be above the mean and below the mean, 34% of the data scores should be within one standard deviation above the mean and within one standard deviation below the mean, 14% of the data scores should be within two standard deviations above the mean and within two standard deviations below the mean. From these figures, it is concluded that 2% of the data scores should be two standard deviations or more above the mean and two standard deviations or more below the mean. By empirical law of probability from using the 50%–34%–14% figures longest time to recover that a person can take and still be in the bottom 2% = mean - 2*s.d. = 60 seconds.

18. Suppose that the scores of architects on a particular creativity test are normally distributed. Using a normal curve table, what percentage of architects have Z scores (a) above .10, (b) below .10, (c) above .20, (d) below .20, (e) above 1.10, (f) below 1.10, (g) above -.10, and (h) below -.10 ?

18. a. above 0.10

b. below 0.10

c. above 0.20

d. below 0.20

e. above 1.10

f. below 1.10

19. In the example in problem 18, using a normal curve table, what is the minimum Z score an architect can have on the creativity test to be in the (a) top 50%, (b) top 40%, (c) top 60%, (d) top 30%, and (e) top 20%?

19. 1. Between z = 0 and z = 1.63 2. Between z = 1.56 and = 2.51 3. Between z = -0.76 and z =1.35 4. Between z= -0.26 and z = -1.76 5. To the left of z = 2.35 6 To the right of z = -1.31
7. mean=300
standard deviation=25.

20. In the example in problem 18, assume that the mean is 300 and the standard deviation is 25. Using a normal curve table, what scores would be the top and bottom scores to find (a) the middle 50% of architects, (b) the middle 90% of architects, and (c) the middle 99% of architects

20. The middle 50% need probability of .2500 on both sides.
This is z=+/-0.67
z*sigma=+/-16.75
scores are (283.25, 316.75
z for the middle 90% is +/-1.645
z*sigma=+/-41.1
scores are (258.9, 341.1)
middle 99% z is +/- 2.576
z*sigma=+/-25*2.576=+/-64.4

scores are (235.6, 364.4)
>0.1=0.4602
<0.1=0.5398
>0.20=0.4207
<0.20=0.5793
>1,10=0.1357
<1.10=0.8643
>-0.10=0.5398
<-0.10=0.4602

21. Suppose that you are designing an instrument panel for a large industrial ma chine. The machine requires the person using it to reach 2 feet from a particu lar position. The reach from this position for adult women is known to have a mean of 2.8 feet with a standard deviation of .5. The reach for adult men is known to have a mean of 3.1 feet with a standard deviation of .6. Both women's and men's reach from this position is normally distributed. If this design is implemented, (a) what percentage of women will not be able to work on this instrument panel? (b) What percentage of men will not be able to work on this instrument panel? (c) Explain your answers to a person who has never had a course in statistics.

21. a) This is considered a convenience sampling.

b) This method is not always very effective because the sample does not necessarily represent the population, since it was not randomly selected. Because of this, the results will not be accurately transferrable to the population.

22. Suppose you want to conduct a survey of the attitude of psychology graduate students studying clinical psychology toward psychoanalytic methods of psy chotherapy. One approach would be to contact every psychology graduate stu dent you know and ask them to fill out a questionnaire about it. (a) What kind of sampling method is this? (b) What is a major limitation of this kind of approach?

22. a) This is a convenience sample, since you are sampling people who are easy for you to find, in a non random way. It's an easy and quick method to use, though.

(b) This method is not always very effective because the sample does not necessarily represent the population, since it was not randomly selected. Because of this, the results will not be accurately transferrable to the population.

The limitation is that you will only be sampling people you know. These people are probably studying with the same professors and therefore may have similar points of view. They may all be from the same part of the country, or from a similar demographic. By using this method, you won't get an accurate cross section of all psychology students.

23. Suppose that you were going to conduct a survey of visitors to your campus. You want the survey to be as representative as possible. (a) How would you select the people to survey? (b) Why would that be your best method?

23. (a) A simple random sample should be a good method to select the people to take the survey.

(b) With a simple random sample, you eliminate most bias that could result in the survey. If you didn't do things randomly, then you may select people who strongly favor the campus and leave out a lot of people who don't like the campus. This would then falsely give you the idea that everyone (on average) likes the campus. To fix this bias, you'd just randomly pick people and that would give you a better snapshot of the population.

24. You are conducting a survey at a college with 800 students, 50 faculty mem bers, and 150 administrators. Each of these 1,000 individuals has a single email address listed in the online campus directory. Suppose you were to select one email address at random. What is the probability it would be (a) a student, (b) a faculty member, (c) an administrator, (d) a faculty member or administrator, and (e) anyone except an administrator? (f) Explain your answers to someone who has never had a course in statistics.

24. a) P (student) = 800/1000 = 0.8

b) P (faculty) = 50/1000 = 0.05

c) P (administrator) = 150/1000 = 0.15

d) P (faculty member or administrator) = 0.05+0.15 = 0.2

e) P (anyone except an administrator) = 1-0.15 = 0.85

f) To find the probability of the occurrence of an event, we must divide the number of successes by the number of possible outcomes. By doing that we can find the probability of an event happening. For example, dividing the number of students by the total number of individuals, we get the probability of a student being selected, and so on.

25. You apply to 20 graduate programs, 10 of which are in clinical psychology, 5 of which are in counseling psychology, and 5 of which are in social work. You get a message from home that you have a letter from one of the programs you applied to, but nothing is said about which one. Give the probabilities it is from (a) a clinical psychology program, (b) a counseling psychology program, (c) from any program other than social work. (d) Explain your answers to someone who has never had a course in statistics.

25. (a) a clinical psychology program,

= 10/20

= 1/2

(b) a counseling psychology program,

= 5/20

= 1/4

(c) from any program other than social work.

= (10+5)/20

= 3/4

(d) Explain your answers to someone who has never had a course in statistics."

For each of these answers, you take the number of people who meet the given criteria, and divide by the total number of people in the study. That gives you the probability.