KPE 372
Fall 2014

Assignment #1

**Instructions**

1. First and foremost, budget your time over the next few weeks. This assignment is not meant to be saved for the day before the due date!

2. Where written responses are called for, address the question clearly and thoroughly.

3. Do not overlook the “why?” or “explain” prompt that you will find in many questions.

4. Paraphrase, rather than replay, any language from the text.

5. Students working in small groups should not use identical language when providing written responses.

6. Where calculations are called for, show all work (neatly, please). Carry all calculations out to the thousandth and round to the hundredth.

7. Except where noted, provide answers and show work directly on the homework page containing the question. (The space I have provided for each question is sufficient.)

8. Do not use computer software for any aspects of this assignment.

9. If you have any questions, do not hesitate to contact me.

Your name: ________________________

Group members with whom you worked (if any; no more than three total in a group):
1. Consider the data in the table below showing students achievement on an overall fitness test. Suppose the person with the score of 21 actually should have received a score of 12. For each of the statistics below, indicate whether the statistic would be affected by this change, and why. *Doodling and sketching are encouraged, but no calculations.*

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(a) mode

(b) median

(c) mean

(d) range

(e) variance

(f) standard deviation
2. (a) What is meant by the “balance point” of a distribution of scores? How is the expression, \( \sum (X - \overline{X}) = 0 \), relevant to this concept?

(b) Show that \( \sum (X - \overline{X}) = 0 \) for the following set of scores: 1, 4, 7, 9, 14

3. Consider and comment:

   • From the New York Times: “The median salary for NCAA coaches was $267,000. Included in the upper half [of coaches’ salaries] are the relatively few individuals that are paid more than $1 million, which brings up the median salary for the entire group.” Is it true that these few highly paid would have this effect on the median income? (Explain.)

   • A newspaper editorial claimed that more than half of Americans have below-average fitness levels. How could this be? (Explain.)

   • The National Football League reported two “averages” for the annual income of NFL players in 2009: one was $770,000, the other was $1,400,000, and neither was the mode. Which measure of central tendency does each figure relate to, and how do you know?
4. Imagine that you incorrectly rated your clients’ FITNESSGRAM scores, and now you must subtract one point from the scores of some—but not all—clients.

(a) Under what condition would such a change increase the variance ($S^2$) among scores?

(b) Under what condition would such a change decrease the variance among scores?

5. $\bar{X} = 45$ for a particular distribution of scores ($n = 30$). It was found that a mistake had been made on one score: Someone who had a score of 22 actually should have received a score of 18. What is the correct value for $\bar{X}$?

6. The histogram below shows the distribution of activity levels over the course of 4 weeks for 51 children in a public elementary school (Kühnhausen et al., 2013) as measured by an electronic activity meter, similar to the Fitbit devices we will be using in class. The scale shown on the histogram ranges from a possible low of 0% of time spent in active minutes measured per day to a measured high of 90% of measured time in active minutes.
(a) What is the “modal” interval of this distribution of scores? (You’ll need to approximate.)

(b) What is the general shape of this distribution? (Select from among the conventional terms for describing distributions.)

(c) List three possible reasons that would explain why the distribution takes on this particular shape. (This is not a statistical question, use no numbers in your answers)

7. If \( S = 10 \) \((n = 50)\), what is the sum of squares?

8. State achievement on subject area tests has been a topic of debate for decades. Comment on the accuracy of the fictitious news article below:

   “. . . eighth-grade math scores soared to the 96th percentile nationally for the 2010-2011 school year, from the 86th percentile the year before” (my emphasis).

   Evaluate the writer’s inference, in light of the properties of percentiles (see BlackBoard lecture on standard scores and percentile ranks)

9. If for some unfathomable reason I correlated the number of correct answers on this assignment with the number of incorrect answers, I would see that \( r = \ldots \). (Support your answer with a hypothetical scatterplot.)
10. True statement: There is a strong positive correlation between the number of churches in a community and the incidence of violent crime (e.g., one researcher reported $r = +.62$). Provide three possible interpretations of this association: two interpretations that you find implausible, and a third interpretation that you believe is closer to the mark. (For this final interpretation, be as specific as possible and identify what you actually believe to be the causal link.)

1. 

2. 

3.