

## Review for Mth126 Exam #2 (Statistics)

Do Problems 1 – 32 (exclude 8-12, 26, 31) in the Chapter 13 Review on Pages 785-787. See notes below.

- For #23, give the interval within which 80% of the spruce tree heights fall.
- For #25 and #27, note that a weighted average may be needed for some parts due to the different sized leagues.
- For #29, first sketch a “best fit” line by eye and find its equation. Then find the LSR line using a calculator or computer. Compare your answers, and interpret the correlation coefficient  $r$ .
  - o I will NOT ask you to calculate a LSR line by hand on the exam, but you should understand how it is determined and how it may differ from a linear model found “by eye.”
- You will be given the standard deviation formula on the exam (see below).

### Additional Problems:

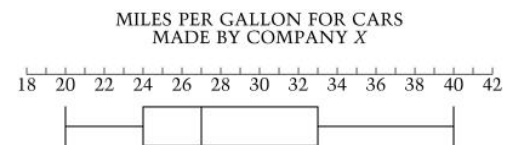
1. List 3 measures of center, 3 measures of position, & 3 measures of spread; where does  $z$ -score go?
2. Use the following data: The number of stories of randomly selected skyscrapers in Atlanta and Philadelphia are shown.

Atlanta				
55	70	44	36	40
63	40	44	34	38
60	47	52	32	32
50	53	32	28	31
52	32	34	32	50
26				

Philadelphia				
61	40	38	32	30
58	40	40	25	30
54	40	36	30	30
53	39	36	34	33
50	38	36	39	32

- a) Construct a back-to-back stem and leaf plot and describe the shape of each distribution.
- b) Overall, which city has taller buildings?
- c) Is 61 an outlier for the Philadelphia data? Use  $1.5 \times$  IQR Rule.
- d) Suppose Atlanta tore down their tallest building of 70 floors and replaced it by a building with 100 floors. Which measures of center would change? Which measures of spread would change?
- e) Atlanta’s mean height is 42.5 stories, and Philadelphia’s mean height is 39.0 stories. The appropriate standard deviation for the confidence interval is 2.1 stories. Find the 80% and 95% confidence intervals for the mean difference in heights for these two cities. Write the corresponding confidence statement, or explain why there is not enough statistical evidence *at the given confidence level* to conclude there is a difference.

3. According to the box-and-whisker plot below, half of the cars made by Company X get between how many miles per gallon (mpg)?



- a. 24 to 40 mpg
- b. 20 to 27 mpg
- c. 20 to 33 mpg
- d. None of the above.

4. The number of hamburgers eaten per month by my brother-in-law is normally distributed with a mean of 14 and a standard deviation of 5.

- a) What is the probability he eats between 10 and 20 hamburgers in a given month?
- b) What is the probability he eats between 18 and 20 hamburgers in a given month?  
*Compare your calculations with part a. What’s the same? What’s different?*
- c) What is the probability he eats at least 11 hamburgers? How about between 4 and 11?
- d) How many hamburgers would my brother-in-law eat in a month in order to be at the 68<sup>th</sup> percentile?

5. The Common Core Standards expect students to informally assess the difference between datasets by comparing the difference in the means in terms of the variability, using the mean absolute deviation for the latter. In that spirit, compare the following two datasets: {3, 4, 4, 5, 6, 6, 6, 6, 7, 7, 8} and {4, 6, 7, 7, 7, 8, 8, 8, 9, 9, 12}.

6. Calculate the mean absolute deviation and the standard deviation of the following small data set: 2, 7, 8, 9, 9.  
For the standard deviation, use the formula:

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$