Hw 3 Solutions

Not from textbook:

Notice that for the given salaries, the use of both the sample std deviation formula or the population std deviation formula are both plausible for this example. The salaries form a sample of the library salaries. On the other hand, we are not using this sample to make inferences about the population, so we can treat the salaries as a population. (E.g. consider fish from a lake put into an aquarium; if we are not using them to study the fish in the lake then we can consider the aquarium fish as a stand alone population). To simplify calculations, change units to thousands.

(A): Mean: 33750; median: 35000; mode: 31000, 35000, 37000; variance: 72568181.82; standard deviation: 8518.70

(B): 12000 is an outlier, as it is almost 20000 units away from the values in the rest of the list (more than 2 std deviations away, z score > 2).

(C): Mean: 35727.27; median: 35000; standard deviation: 5312.08. The mean is larger because we removed the lowest number on the list, and the standard deviation is much smaller, as we removed an outlier from the list.

(D): New data set: {34100,38500,44000,35200,38500,40700,52800,31900,34100,40700,41800}. Mean: 39300; median: 38500; standard deviation: 5843.29. The mean, median, and standard deviation are each 10% higher than in (C), as each of the values are 10% higher (see the standard deviation formula to see why this increases the standard deviation).

(E): Mean: 35000; median: 35000; standard deviation: 0.

Textbook problems:

3-2

8. Mean = 703.7 hic; median = 630.5 hic; mode: none; midrange = 820.5 hic. All of the measures of center are less than 100 hic, but that does not indicate that all of the individual booster seats satisfy that requirement. One of the booster seats has a measurement of 1210 hic, which does not satisfy the specified requirement of being less than 1000 hic.

9. Mean = $16.4 million; median = $10 million; mode: $4 million, $9 million, and $10 million; midrange = $31 million. The measures of center do not reveal anything about the pattern of the data over time, and that pattern is a key component of a movie's success. The first amount is highest for the opening day when many Harry Potter fans are most eager to see the movie; the third and fourth values are from the first Friday and the first Saturday, which are the popular weekend days when movie attendance tends to spike.

10. Mean = 82.7 manatees; median = 80.0 manatees; mode: 73 manatees; midrange = 83.0 manatees. The measures of center do not reveal anything about the pattern of the data over time, and it is important to monitor the numbers of manatee deaths caused by collisions with watercraft, so that corrective action might be taken.

22. Collection contractor was Brinks: mean = $1.55 million; median = $1.55 million. Collection contractor was not Brinks: mean = $1.73 million, median = $1.65 million. The data do suggest that collections were considerably lower when Brinks was the collection contractor.

23. Obama: mean = $653.9; median = $452.0. McCain: mean = $458.5; median = $350.0. The contributions appear to favor Obama because his mean and median are substantially higher. With 66 contributions to Obama and 20 contributions to McCain, Obama collected substantially more in total contributions.

3-3

10. Range = 28.0 manatees; s^2 = 101.1 manatee squared; s = 10.1 manatees. The measures of variation reveal nothing about the pattern over time.

12. Range = $19,628,584.0; s^2 = 59,583.269,405,325.1 dollars squared; s = $7,719,020.0. The amount of $1 for Jobs is an outlier, and it has a great effect on the measures of variation.

13. Range = 17.50 micrograms per gram; s^2 = 41.75 (micrograms per gram)^2; s = 6.46 micrograms per gram. If the medicines contained no lead, all of the measures would be 0 micrograms per gram, and the measures of variation would all be 0 as well.

15. Range = 11.0 years; s^2 = 12.3 year^2; s = 3.5 years. No, because 12 years is within 2 standard deviations of the mean..

16. Range = 1.170 W/kg; s^2 = 0.179 (W/kg)^2; s = 0.423 W/kg. No. Some models of cell phones are sold much more than others, so the measures from the different models should be weighted according to their size in the population.