Common Core Math 1 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

One-Variable Data Date \_\_\_\_\_\_\_\_\_\_\_

Measures of Center and the Standard Deviation

1. A visitor from the star Alpha Centauri has selected you to provide her with information about our solar system. She asks about the length of a typical day in our solar system. Study the following table.

|  |  |
| --- | --- |
| Planet | Approximate Length of aDay in Earth Hours |
| Mercury | 1416 |
| Venus | 5832 |
| Earth | 24 |
| Mars | 24.5 |
| Jupiter | 10 |
| Saturn | 11 |
| Uranus | 22 |
| Neptune | 16 |

1. Compute the mean length of a day in our solar system in hours. 919.4 Earth hours
2. How many Earth days is this? 38.3 Earth days
3. Find the median length of a day in our solar system. 23 Earth hours
4. Do you think it is better to give your visitor the mean length of a day or the median length of a day? Explain. The median because most planets are close to this number (6 of 8), so the typical length of a day is best represented by 23 Earth hours, not 919!
5. Are you happy about giving your visitor one single number? Why or why not? No, just giving a measure of center does not give a complete “picture” of the data. We need to also give information about the spread of the data.
6. What other information could you give the visitor from Alpha Centauri to help describe the length of a day in our solar system? I think we need to also let the visitor know how much the planet days typically vary from 23 Earth hours by reporting the range (5822) and/or standard deviation (1912). We could make a dot plot or histogram so that the visitor can see how spread out the data is. We should also point out that Mercury and Venus are outliers. These planets move very slowly around the sun compared to the other planets.
7. Superbowl XLIII featured 2 of the NFL’s most unknown offensive linemen. The data sets give the name of the players and their weights (lbs).

|  |  |
| --- | --- |
| Cardinals | Steelers |
| Mike Gandy | 316 | Max Starks | 345 |
| Reggie Wells | 308 | Chris Kemoeata | 344 |
| Lyle Sendlein | 300 | Justin Hartwig | 312 |
| Duece Luti | 332 | Darnell Stapelton | 305 |
| Levi Brown | 322 | Willie Colon | 315 |

1. Find the mean and median weights of both the Steelers’ and Cardinals’ offensive lines. Cardinals: $\overbar{x}=315.6, M=316$; Steelers: $\overbar{x}=324.2, M=315$
2. Calculate the standard deviation of the weights of both the Steelers’ and Cardinals’offensive lines. Cardinals: $s=12.4$, Steelers: $s=18.9$
3. Compare the Steelers’ and the Cardinals’ offensive lines. How are they different? How are they alike? The medians of the two groups are fairly close with the Cardinals at 316 pounds and the Steelers at 315 pounds. However, the mean weight of 315.6 pounds for the Cardinals is almost 10 pounds lower than the mean weight of the Steelers (324.2 pounds). The lightest person on the Steelers, Darnell Stapleton, is five pounds heavier than the lightest person on the Cardinals, Lyle Sendlein. There are two players on the Steelers – Max Starks and Chris Kemoeata – who are more than ten pounds heavier than any player on the Cardinals’ offensive line. The weights of the Steelers vary more than the weights of the Cardinals. I think that the Steelers have the weight advantage.
4. Assume that the Cardinals’offensive linemen each put on 15 pounds. Calculate the mean, median, and standard deviation for this new group of data. $\overbar{x}=330.6, M=331, s=12.4$
5. Which statistical values changed compared to the original group of Cardinals’ linesmen? Which stayed the same? Why do you think this happened? The mean and the median both shifted up by 15 pounds, but the standard deviation stayed the same. By adding 15 pounds to each player’s weight, the mean and the median both increase by 15, but the standard deviation stays the same because the spread of the data hasn’t changed. The new lowest weight of 315 pounds is still 32 pounds away from the highest weight of 347 pounds (just like 300 pounds is 32 pounds away from 332 pounds in the original Cardinal’s data.