Practice 4 – Statistics Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Interpreting the Standard Deviation

Lesson Summary

* The mean and the standard deviation of a data set can be found directly using the statistical features of a calculator.
* The size of the standard deviation is related to the sizes of the deviations from the mean. Therefore, the standard deviation is minimized when all the numbers in the data set are the same and is maximized when the deviations from the mean are made as large as possible.
1. At a track meet, there are three men’s $100$ m races. The times for eight of the sprinters are recorded to the nearest $\frac{1}{10}$ of a second. The results of the three races for these eight sprinters are shown in the dot plots below.

Race 1



Race 2



Race 3



* 1. Remember that the size of the standard deviation is related to the sizes of the deviations from the mean. Without doing any calculations, indicate which of the three races has the smallest standard deviation of times. Justify your answer.
	2. Which race had the largest standard deviation of times? (Again, don’t do any calculations!) Justify your answer.
	3. Roughly what would be the standard deviation in Race 1? (Remember that the standard deviation is a typical deviation from the mean. So, here you are looking for a typical deviation from the mean, in seconds, for Race 1.)
	4. Use your calculator to find the mean and the standard deviation for each of the three races. Write your answers in the table below to the nearest thousandth.

|  |  |  |
| --- | --- | --- |
|  | Mean | Standard Deviation |
| Race 1 |  |  |
| Race 2 |  |  |
| Race 3 |  |  |

* 1. How close were your answers (a)–(c) to the actual values?
1. A large city, which we will call City A, holds a marathon. Suppose that the ages of the participants in the marathon that took place in City A were summarized in the histogram below.



* 1. Make an estimate of the mean age of the participants in the City A marathon.
	2. Make an *estimate* of the standard deviation of the ages of the participants in the City A marathon.

A smaller city, City B, also held a marathon. However, City B restricts the number of people of each age category who can take part to $100$. The ages of the participants for one race are summarized in the histogram below. The ages of the participants are summarized in the histogram below.



* 1. Approximately what was the mean age of the participants in the City B marathon? Approximately what was the standard deviation of the ages?
	2. Explain why the standard deviation of the ages in the City B marathon is greater than the standard deviation of the ages for the City A marathon.