# TAKE IT TO THE MAT

*A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION*

Math Audit Team
Regional Professional Development Program
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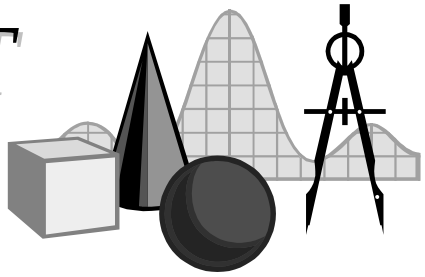
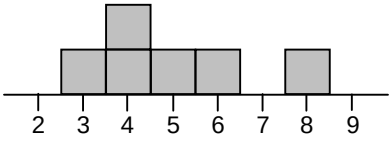


There are four basic statistics that students must know for the Nevada High School Proficiency Exam (NHSPE): *mean*, *median*, *mode*, and *range*. In this issue of *Take It to the MAT*, we will address the most frequently used of these values, the *mean*.

The arithmetic mean is commonly referred to as the *average*, but it must be noted that the *median* and *mode* are also averages. An average—or more appropriately, a measure of central tendency—is a single value that is used to represent an entire data set or population. Students should understand this, and teachers should refer to what is commonly called the average by its proper name, the *mean*.

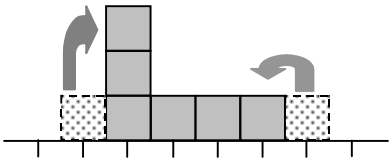
The mean is a very simple number to calculate; sum the values of the data and then divide by the number of data points. Let's say that we have six pieces of data: 3, 4, 4, 5, 6, and 8. The mean is 5, because $\frac{3+4+4+5+6+8}{6}=5$. The computation is easy.

The concept of mean is much more difficult to fathom, however. Technically speaking, the mean is located at the "balance point" of the data when placed on the number line. Sometimes this point is called the *centroid*, much like the centroid of a triangle.



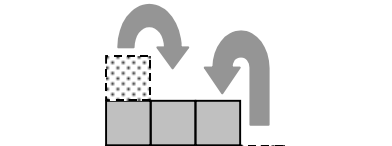
Graph 1

Let's look at our previous data when stacked on a number line, or more appropriately a bar graph. (Graph 1) Imagine this graph as blocks stacked on a ruler. Where would you place a finger so as to balance the object? Hold that thought.



Graph 2

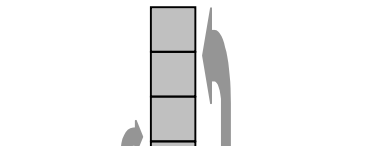
Now think about this. Can you alter the data/block positions in some way such that the calculated value of the *mean* remains the same, but the data are a little less spread out? How about increasing the 3 to a 4, and decreasing 8 to 7. The mean of 4, 4, 4, 5, 6, and 7 is still 5. Check out the accompanying figure. (Graph 2)



Graph 3

Continue the process of moving data points so the *mean* remains the same, but the data are more uniform. (Graph 3)

Is the balance point of the ruler clearer now? If we continue this technique to its logical conclusion, we would get what is seen in the fourth graph. Now the balance point is clearly at 5, since all of the modified data are 5.



Graph 4

On the NHSPE, students may be required to find the *mean* of a set of data by analyzing its graph. While the technique shown here is not always efficient, understanding the concept of balance can at least provide students with a fair idea of the concept of the *mean*.