Averages: Arithmetic Mean, Median, Mode

by L. Shorser

Definition: To find the **arithmetic mean** of a set of numbers, add the numbers together and divide by the amount of numbers in the set.

Definition: The **median** of an ordered set is the middle element, if the set has an odd number of elements. If the set has an even number of elements, the **median** is the mean average of the two middle elements.

Definition: The **mode** of a set of numbers is the number(s) that appear the most number of times.

Example 1: A class of ten students receive the following marks on their test: 1, 3, 5, 5, 6, 6, 6, 7, 8, 10.

The arithmetic mean average of their marks is $\frac{1+3+5+5+6+6+6+7+8+10}{10} = 5.7$, where the 10 on the bottom of the fraction represents the fact that there are 10 numbers on the top of the fraction.

The median mark is $\frac{6+6}{2} = 6$ because both of the middle marks are 6's.

The mode mark is 6 because there are three 6's, two 5's, and one or zero of every other mark. Therefore 6 is the most popular.

Example 2: A class of 15 students receive the following marks on their test: 1, 2, 4, 5, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 10.

The arithmetic mean of their marks is $\frac{1+2+4+5+5+5+5+6+7+8+8+8+8+9+10}{15} = 6.1$, where the 15 on the bottom reflects the fact that there are 15 numbers on top of the fraction.

The median mark is 6 because there are seven numbers that are less than 6 and seven numbers that are greater than 6 on that list.

There are two modes: 5 and 8 since there are four of each and fewer of every other mark.