Statistics, Probability and Sets

1. **Mean**

   The mean is the average of a set of numbers. For example, the mean of a data set {1,2,3,4,5} is (1+2+3+4+5)/5 = 3.

2. **Median**

   The median is the value that is located in the middle of a date set that is in increasing order. If there is an even number of numbers, the median is found by average the middle two values. For example, the median of the data set {2,3,4,5,6} is 4. And the median of the data set {2,3,4,5,6,7} is 4.5, because that is the average of the middle numbers 4 and 5.

3. **Mode**

   The mode is the value that occurs most frequently. For example, the mode of the data set {2,7,3,2,11,2,15,3} is 2, because there are more 2s than any other value.

4. **Range**

   The range of a data set is the difference between the highest terms and the lowest. For example, the range of the data set {2,7,14,9,23,22,18} is 23-2=21. Remember data sets are not always given in increasing order so make sure you look for the highest and lowest values.

5. **Probability**

   Probability can be expressed as a fraction, percent, or decimal and is always between 0 and 1. A probability of 0 means that the event is impossible. A probability of 1 is a certainty.

   To determine basic probability, you only have to know how many possible outcomes there are for an event and how many of those outcomes could be in your favor. For example, when reaching into a jar with 8 red candies, 4 blue, and 3 green, the probability of selecting a blue candy can be written as:

   $$\text{Probability} = \frac{\text{the number of possible favorable outcomes}}{\text{number of possible outcomes}} = \frac{\text{4 blue}}{\text{15 marbles}} = 4/15$$

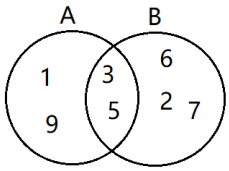
6. Combinations

When determining how many combinations, pairs, sets, etc., there are of something, you can use the multiplication rule. This rule states that to determine the number of possible outcomes there can be in a given situation, multiply the number of choices for each event.

For example, you have 3 tops and 5 pairs of pants. How many combinations can you make? There are 3 tops, so you have 3 tops to choose from, and you have 5 pairs of pants to choose from. Simply multiply 3 by 5 to find there are 15 possible combinations.

7. Sets

A set is simply a collection of values. To present a set, we can use diagrams or set notation. Look at the following sets:



Here you see Set A and Set B: Set A = {1,3,5,9} and set B={2,3,5,6,7}. The **union** of two sets is simply all the values that are in either set A or B. The symbol of union is the first letter of the word **U**nion. **AUB** = {1,2,3,5,6,7,9}. The **intersection** of set A and B is the set of values that are in both A and B.The intersection symbol is ∩. **A∩B** = {3,5}.