Perspectives for Statistics

1. **Statistics is a technique for deciding what is true.** When someone makes a statement like "most Southwestern College students intend to vote for Obama" how do we know if that is a true statement? One way is to depend on the stature of whoever made the statement, e.g. "that is what my teacher said so it must be true". A better technique is to use actual data from the real world. The data is evaluated using statistical techniques to see if there is evidence regarding the truth or falsity of the claim. This is the essence of "truth" in science—check the real world to see what is really there.

2. Statistics requires care with wording and interpretation. Casual English speakers often assume unstated interpretations. In statistics using these unstated interpretations causes misunderstandings. For the purposes of statistics, students will be expected to say what they mean and mean what they say. For example "Why don't you explain the Binomial Formula?" is a question about teaching methodology and will likely elicit some statement about the construction of the lecture. What the student probably intended was something like "Please explain the Binomial Formula". This language exactness may require some practice. Statistical and legal arguments often use the difference between literal meanings and conventional meanings to mislead people.

3. Statistics uses mathematics but is not formally a mathematics discipline. Statistic encompasses things like common sense, reasonableness arguments, holistic evaluations, how humans interpret data, etc. Statistics does rely on Probability, which is a mathematical discipline.

4. Understanding how and when to use a statistical technique is more important than the details of the computations. Machines can be used to perform statistical computations with precision. What is important for humans to know is how to gather the data, which techniques are the appropriate ones, and what the results mean.

5. Much of what people believe is based on weak or no evidence. When you read the newspaper or listen to someone talk, keep asking yourself "what evidence is there for that statement?" Then ask yourself "what data could be gathered to assess that claim?"

6. Outlandish claims require stronger evidence than plausible claims. A statement like "I was born in California" could readily be supported with a birth certificate. However a statement like "I was born on Mars" is going to require stronger evidence than just a birth certificate.