Chapter 1 Section 1

1. If quality of conformance has to do with small variation and one wishes to assure it, it will be necessary to measure, monitor, find sources of and seek ways to reduce variation. All of these require data (information on what is happening in a system producing a product) and therefore the tool of statistics. Hence, quality and statistical methods are directly related.

2. Mechanical devices whose features of interest vary substantially tend to be noisy, prone to breakdown, difficult to service and inefficient. In the service sector, variation from what is promised/expected is the principle source of customer dissatisfaction. Customer dissatisfaction is undesirable because if a customer is not satisfied, he will seek another vendor or source to meet his need.

3. If a good or service is designed properly that does not guarantee quality. Quality of conformance may be an issue, i.e., variation of important features as described in question 2 above can lead to serious customer dissatisfaction therefore poor quality.

4. If a good or service conforms to design specifications, that does not guarantee quality because the design may not produce a good or service that is fit for use when no variation occurs, i.e., a poor design for the proposed performance.

Chapter 1 Section 2

1. If processes can be made to work effectively, resulting products or services will be good is the rationale behind a process orientation. Further, root causes of problems will more likely be identified and removed. Material and time will be saved as well as producing goods or services that are considered quality.

2. A customer focus relates to quality in two ways. Studying customer behavior and desires can drive creation of a designed product that is fit for use. Receiving feedback from customers and collecting data concerning a current product or service gives insight as to variation in important features of a good or service. High variation is directly connected with customer dissatisfaction and must be addressed immediately, i.e., poor quality of conformance. Low variation with an appropriately designed product or service results in positive customer feedback.

3. Motivations for a corporate continuous quality improvement emphasis are survival and growth. Competitiveness in the marketplace will force companies who aren't continually improving quality of design and conformance from the marketplace.

4. Effective measurement is a prerequisite to success in process improvement because if one cannot reliably measure important characteristics of what is being

done to produce a good or service, there is no way to tell whether design requirements are being met and customer needs are genuinely being met.

5. Control charts are the basic tools used for monitoring processes and issuing warnings of apparent process instability.

6. If a process is stable or consistent, it is not necessarily producing high quality goods. The feature(s) of interest could be taking values that are consistent but far from the desired or designed value(s). Or, the feature(s) of interest could be consistently of high variation, directly related to poor quality.

Chapter 1 Section 3

1. The top-to-bottom direction of a flowchart usually corresponds to a time dimension.

2. Extra “columns” could be constructed that correspond to, say, different locations or plants or different department spheres of responsibility, still maintaining the top-to-bottom time dimension for each column.

3. A “cause and effect” or “fishbone” diagram are other names of the Ishikawa chart.

4. One purpose of the Ishikawa chart is to provide a tool that organizes ideas from a brainstorming session concerning some matter of interest, either a problem or quality issue. Further, the Ishikawa chart is constructed in such a way that gives clear direction for future action.

Chapter 1 Section 4

1. It is more desirable to have data that provide a true picture of process behavior than to obtain “good numbers” or “favorable results” because effective decision-making can be made only when the true picture of process behavior is understood.

2. People who have seen data collected by themselves or others that were used to harm them or their colleagues will most likely not be cooperative in a data collection event. Further those who have made an honest and sincere effort at data collection in the past only to see their efforts ignored will almost surely guarantee that future data collection efforts produce nothing useful.

3. If operational definitions are not clear before the data collection effort begins, the collected data may very well represent values for multiple unknown variables, i.e., nothing useful can be obtained from an analysis of the collected data.

4. A knowledge of who, how and when the data were collected is most likely not known. Thus, an accurate understanding of how to proceed with an appropriate analysis cannot be reliably made.

5. Through documentation of who, how and when the data were collected, ambiguities can be eliminated that prohibit an appropriate analysis of the data collected.

6. The *x*, *y*, symbol, color, time, symbol size could represent six variables.

7. A checksheet can be easily and quickly constructed with a simple interpretation.

8. A large sample is not necessarily optimal. Instead, one should think in terms of (1) the size of variation that must be accounted for and (2) the size of an effect that is of practical importance. If no variation, a sample of size $n = 1$ is sufficient. If some variation exists and a small effect is of practical interest, more data may be needed.

Chapter 1 Section 5

1. A simple histogram can portray "spread" of a process and "location". Also, for a stable process, shape or distribution of process data can be inferred.

2. Time trends of the process data cannot be portrayed by a simple histogram.

3. The run chart can depict trends in process data and where in time outliers occur. This gives insight into possible special or assignable causes.

4. Beginning at time 1, data slowly trend upward to the mid time point where data occur randomly around the center and then begin to trend up again after the ¾ time point. Or vice versa, at time 1, data slowly trend down from above the center and after the ¾ time point, continue to trend down.

5. The Pareto chart is particularly useful for getting people to prioritize their efforts and focus first on the biggest quality problems an organization faces.

6. The rationale behind the Pareto chart is the most often occurring situation should perhaps receive first attention and likewise the second most often occurring situation the second attention. Most of anything is traceable to a few causes is the underlying theory of the Pareto Chart.