STAT 7110 Midterm Exam Review Sheet

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- What is "quality?" How do we define it for a service organization or a manufacturing organization?

- The DMAIC Process. What takes place at each step?
  a. Define
  b. Measure
  c. Analyze
  d. Improve
  e. Control

- The Magnificent 7
  a. Histogram
  b. Check Sheet
  c. Pareto Chart
  d. Cause-and-Effect Chart
  e. Defect Concentration Chart
  f. Scatterplot
  g. Control Chart

- Control Chart Basics

a. Plotting Statistic
b. In-Control Target Value (Either Known or Estimated)
c. Control Limits (Either σ or α derived)
d. Phase I and Phase II monitoring

- **Control Charts for Variables (Continuously Measured)**

- The $\bar{X}$ and R Charts
  a. When would this be appropriate to use?
  b. How do we estimate the control limits in Phase I?
  c. How do we know when we can move on to Phase II monitoring?
  d. What are some potential limitations with using this monitoring scheme?

- The $\bar{X}$ and s Charts
  a. When would we want to use this chart instead of the $\bar{x}$ and R chart?
  b. How do we estimate the control limits in Phase I?
  c. What are some potential limitations with using this monitoring scheme?

- The s^2 Chart
  a. Why would we use this chart instead of the s chart?
  b. Why would we refrain from using this chart and go with the s chart instead?

- Control Charts for Individuals and the Moving Range Chart
  a. When would this chart be appropriate to use?
  b. What are a couple of the primary limiations of using this charting scheme?

- OC Charts and Average Run Length
  a. What is an OC chart? How is it used?
  b. What is Average Run Length? Why does it matter to us?
  c. What is the difference between in-control Average Run Length and out-of-control average run length?

- Process Capability
  a. Fraction Nonconforming (What is it? How do we calculate it?)
  b. The C_p Ratio (How do we interpret this?)
  c. The p Ratio (How do we interpret this?)

- **Control Charts for Attributes: The Fraction Nonconforming**

- The p Chart

  a. What does this chart monitor? How is it different than the $\bar{x}$ chart?
  b. How do we calculate control limits in Phase I?
  c. If $\hat{p} < LCL$, does this mean the process is improving?
  d. What might be a limitation of using this control chart?

- **Control Charts for Attributes: The Number of Nonconformities**

- The np Chart

  a. How does this differ from the p chart? How is it similar?
  b. Why would we use this chart instead of the p chart?
  c. How do we calculate control limits in Phase I?

- The C Chart

  a. What is this chart monitoring? What is its defining characteristic?
  b. How do we set up control limits for this chart in Phase I?
  c. What are some potential limitations of using this control chart?

- The U Chart

  a. How does this chart differ from the C chart? How is it similar?
  b. How do we set up control limits for this chart in Phase I?
  c. What might be a limitation of using this control chart?