IE 361 Lab#6/ Deming Drama and First Control Charts ________________________

(Name)

In class we will conduct the famous IE 361 "Deming Drama," that is intended to help you to forever remember what Shewhart control charting is and is not all about. In the progress of that demonstration/drama we will generate data that will be collected/recorded on a "variables" control chart form attached to this Lab. Fill it out and use what you have filled in to answer the following questions.

The basic sample size in this demonstration was $n =$________ .

The first __________ samples were drawn from the "brown bag process," and the last __________ were drawn from another process.

1) Compute the sample means $\bar{x}$ and the sample ranges R (for the samples of size n) and enter them on the control chart form. Then average $\bar{x}$'s and $R's$ and record those below.

Based on samples from only the "brown bag process":

$\bar{\bar{x}} =$__________ $\bar{R} =$__________

Based on all samples:

$\bar{\bar{x}} =$__________ $\bar{R} =$__________

Brown bag process parameters are $\mu = 5$ and $\sigma = 1.715$**.**

2) Find "standards given" control limits for $\bar{x}$

based on $n = 3$:

$LCL_{\bar{x}} =$________ $UCL_{\bar{x}} =$________

based on $n = 5$:

$LCL_{\bar{x}} =$________ $UCL_{\bar{x}} =$________

3) After studying Module 11, find standards given control limits for R

based on $n=3$: based on $n=5$:

$LCL_R =$ ________ $UCL_R =$ ________ $LCL_R =$ ________ $UCL_R =$ ________

4) Using the appropriate control limits, as you look across the whole set of samples from the Deming Drama, do you see evidence of process change (from the brown bag process parameters) in the $\bar{x}$'s? Explain. (Be sure to say what limits you are using.)

5) Using the appropriate control limits, as you look across the whole set of samples from the Deming Drama, do you see evidence of process change (from the brown bag process parameters) in the R's? Explain. (R chart limits are not discussed until Module 11. Be sure to say what limits you are applying.)

6) After studying Module 11, compute retrospective control limits for $\bar{x}$'s based on all samples.

$LCL_{\bar{x}} =$ ___________ $UCL_{\bar{x}} =$ ___________

7) Apply your limits from 6) to the sample means. Do they indicate that there was process change across the data collection period represented in the Deming Drama data? Explain.

8) After studying Module 11, compute retrospective control limits for the R's .

$LCL_R =$ ___________ $UCL_R =$ ___________

9) Apply your limits from 8) to the sample ranges. Do they indicate that there was process change somewhere in the data collection period represented in the Deming Drama data? Explain.

10) If you didn't know the brown bag process parameters but had to estimate them based on the sample means and ranges from the Deming drama, what would you get for estimates of μ and σ ? (Use only the samples that were actually taken from the brown bag.)

11) Compute the 18 sample standard deviations for the Deming drama data and record them below.

Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
s																		

12) After studying Module 11, find standards given control limits for s.

$LCL_s =$ __________ $UCL_s =$ __________

13) What do the limits in 12) indicate about the process stability in the Deming drama? Explain.

14) If you didn't know σ but had to estimate it based on the sample standard deviations from the Deming drama, what would you get for an estimate? (Use only the samples that were actually taken from the brown bag.)

15) After studying Module 11, find retrospective control limits for s.

$LCL_s =$ __________ $UCL_s =$ __________

Part and Drawing	**Variables Control Chart**		Machine
Dimension	Gage		Operation
Production Lot(s)	Units	Zero Equals	Operator
Period Covered	Specifications		Raw Material Lot

	Mean	Sum	Measurements 5	4	3	2	1	Range		DateTime