Department of Mathematics and Statistics
Semester 122

STAT319 Quiz 3 Saturday April 13, 2013

Name: _____ _____

1. Suppose a PC manufacturer wants to evaluate the performance of its hard disk memory system. One measure of performance is the average time between failures of the disk drive. To estimate this value a quality control engineer recorded the time between failure for a random sample of 45 disk-drive failures giving him a mean and a standard deviation of 1762 hours and 215 hours respectively.
    a. Estimate the true mean between failures with a 90% confidence interval.

    b. Interpret the interval.

    c. Do you need any distributional assumptions to form the interval? If yes, what? If no, why?

    d. If the hard disk memory system is running properly, the true mean time between failures will exceed 1700 hours. Based on the interval what can you infer about the disk memory system?

2. Consider the following data representing the voltage from two processes:

Old

8.05	8.72	8.72	8.8	9.55	9.7	9.73	9.8	9.8	9.84
9.84	9.87	9.87	9.95	9.97	9.98	9.98	10	10.01	10.02
10.03	10.05	10.05	10.12	10.15	10.15	10.26	10.26	10.29	10.55

New

8.51	8.65	8.68	8.78	8.82	8.82	8.83	9.14	9.19	9.27
9.35	9.36	9.37	9.39	9.43	9.48	9.49	9.54	9.6	9.63
9.64	9.7	9.75	9.85	10.01	10.03	10.05	10.09	10.1	10.12

i. Consider the data from the old process.

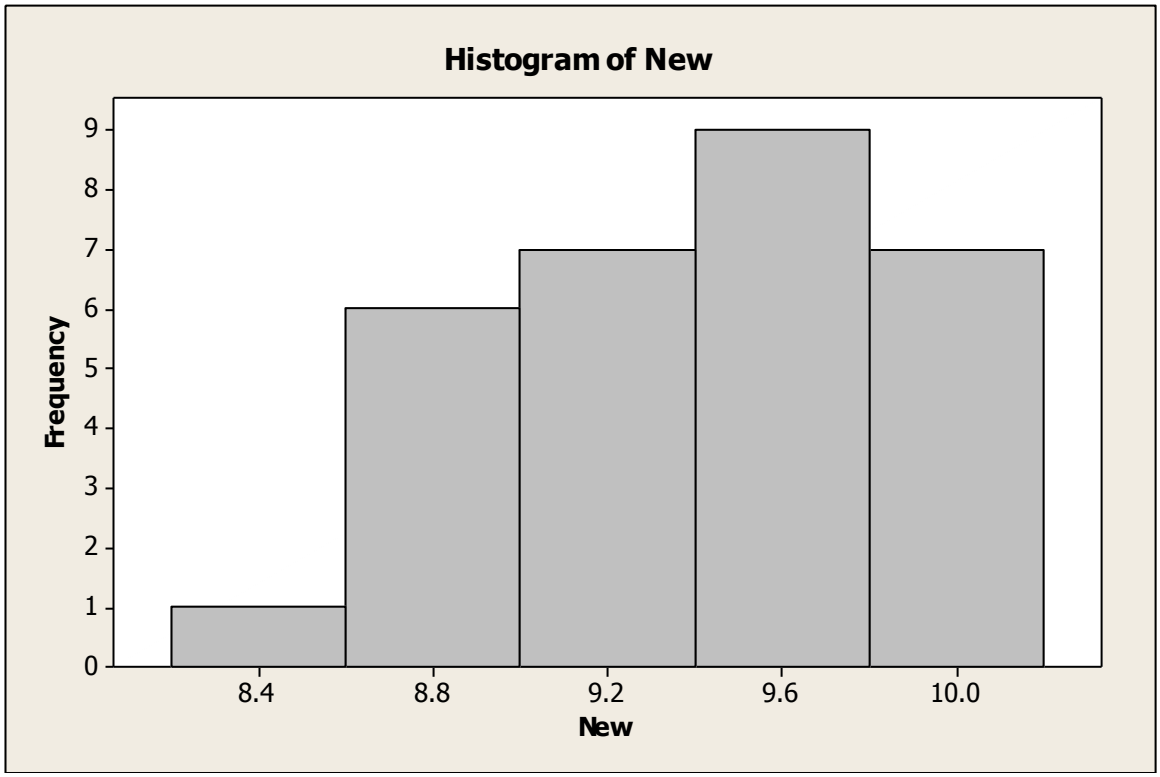
(1) Find the mean, median and mode voltage. Which measure of central tendency is preferred?

(2) What voltage is exceeded by 10% of all readings?

(3) Construct a histogram of the data using midpoints 8.0, 8.6, etc.

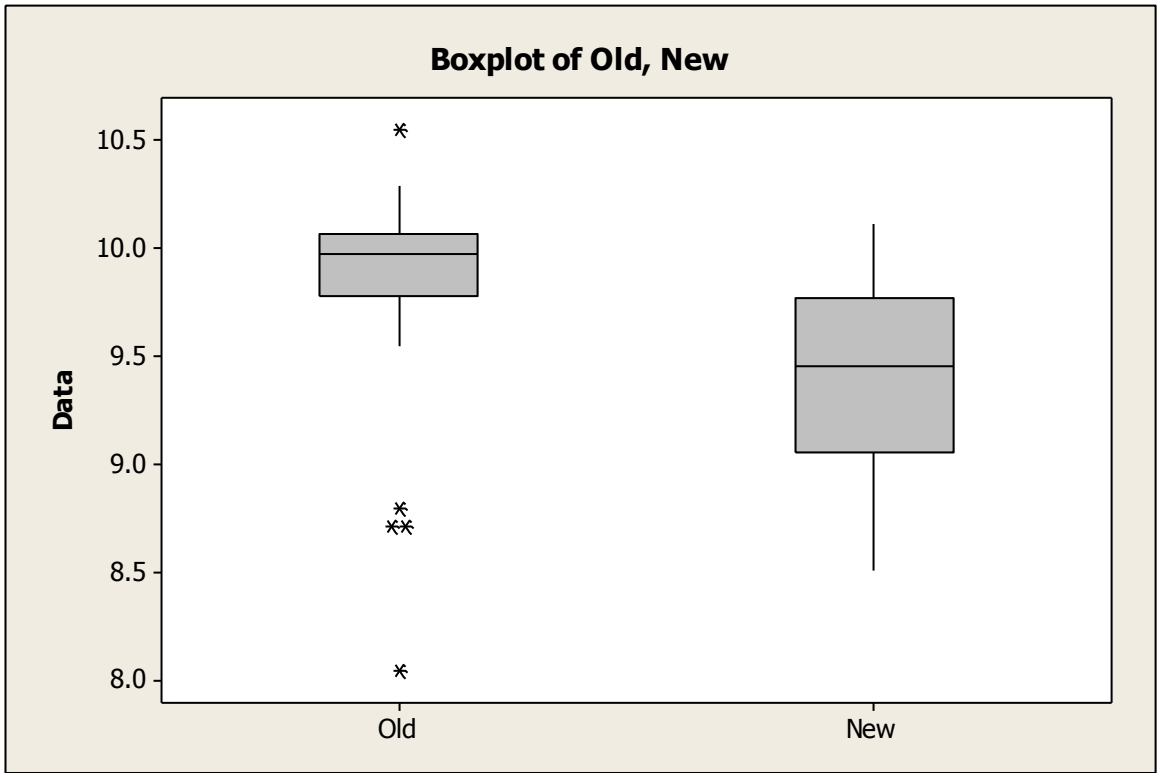
(4) Comment on the shape of the histogram.

ii. Here is a histogram of the data from the new process.



Use the histogram to approximate the mean voltage, and the standard deviation.

iii. Below is a box plot of data from both processes:



(1) Explain each box plot thoroughly.

(2) Compare the two processes.

(3) A process is considered good if the voltage readings are at least 9.2 volts with larger reading being better than smaller ones, which is the better process? Explain.