MM305M6 Competency Assessment Example

Scenario: A venture capitalist has just given you several million dollars to develop your dream product! Explain in detail what this product is and why people would buy it. (Think Steve Jobs and the iPhone - did people really think we needed "smartphones" back in 2007?)

Now your dream product has gone into production and the manager is asking you, as the statistical expert, to use statistical methods to ensure quality control. You will need to write a professional memo to your business/company owner describing the production quality so far and prioritizing any control measures necessary to guarantee high quality products. You should include your statistical data in the professional memo. See the CA Starter video in the LiveBinder.

A. **Construct a quality control chart and compute upper and lower control limit bounds**.
   a. You will generate a random dataset of N samples of defective proportions by completing the following steps:
      i. You will start with a random number by combining the last 2 digits of the year in which you were born plus the day of the month in which you were born. For example, if you were born October 3, 1990, your number would be 90 + 3 = 93. (If your number exceeds 100, subtract 100 from the total.) Call this X and it will seed your random number generation.
      ii. Choose a number of samples, N. (N should be between 5 and 10 samples.)
      iii. In Excel, type =RAND()*X in a cell. Repeat N times. This will generate the proportion of defective products (out of 100) for your N samples.
   b. Use Excel to create a p-chart for a sample size, 100, and the number of samples, N. See video in livebinder for creating the p-chart.
   c. What is your Lower Control Limit (LCL) and Upper Control Limit (UCL).

B. Achieve goals through planning and prioritization.
   a. Name at least 3 measures could be taken now to address the data points that are out of control?
   b. What measures could be taken now to address the data points that out of control?
   c. What recommendations would you suggest to optimize quality in future production?

1. Describe your product, its use and societal value in at least one paragraph. Humor is encouraged.

2. You will generate a random dataset of N samples of defective proportions by completing the following steps:

   a) You will start with a random number by combining the last 2 digits of the year in which you were born plus the day of the month in which you were born. For example, if you were born October 3, 1990, your number would be 90 + 3 = 93. (If your number exceeds 100, subtract 100 from the total.) Call this X and it will seed your random number generation.
   b) Choose a number of samples, N. N should be between 5 and 10.
   c) In Excel, type =RAND()*X in a cell. Repeat N times. This will generate the proportion of defective products (out of 100) for your N samples.

3. Use Excel to create a p-chart for a sample size, 100, and the number of samples, N. Share your p-chart. See video in the Live Binder.

4. Share Lower Control Limit (LCL) and Upper Control Limit (UCL).

5. Is the product in control? If not in control, what sample(s) was outside of the limits, ie below LCL or above UCL?

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* Aai, Aaii, Aaiii. My dream product is a TV that can change between a computer monitor and a TV or video display. Wouldn't it be great to have a computer monitor the size of your TV screen? Oh, also it will be touch sensitive. After all, a computer mouse is a thing of the past! I will call this product the "Do-It-All-Display"!

11
21
43
9
31
62
7
16
45
21

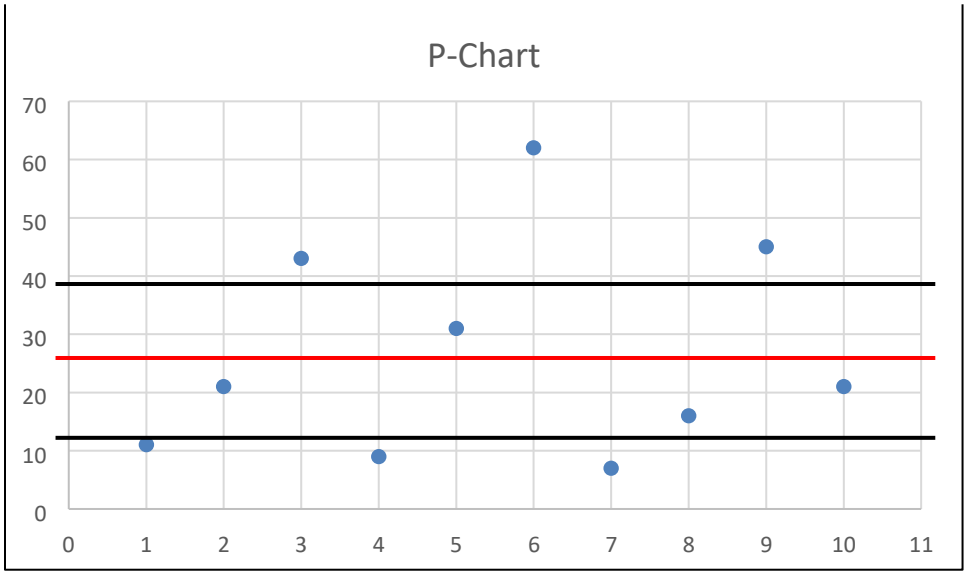
So, we are now in production mode and the first line of "Do-It-All-Display" products have been made!! I will create an imaginary random dataset to represent the number of defective Displays out of N samples.
My year is 1962 and month day is 1. (January, 16, 1962)

a) X = 62+1 = 63
b) N = 10

Using RAND()*63, my 10 sample proportions are:
Ab. p-chart:

Sample number	Number of Defects	Number in Sample	Percent of defects	Average of Defects	Above or Below accepted value
1	11	100	0.11	26.60%	Below
2	21	100	0.21	26.60%	
3	43	100	0.43	26.60%	Above
4	9	100	0.09	26.60%	Below
5	31	100	0.31	26.60%	
6	62	100	0.62	26.60%	Above

7	7	100	0.07	26.60%	Below
8	16	100	0.16	26.60%	
9	45	100	0.45	26.60%	Above
10	21	100	0.21	26.60%	



Ac. Upper Control Limit = 39.88%

Lower Control Limit = 13.34%

Sample Summary	
Total defects	266
Total sampled	1000
average proportion	0.266
standard error of the proportion	0.04419

Standard Deviations above and below average	3

Probability of outside of Tolerance (1-confidence interval)	0.00270
Upper Limit	39.86%
Lower Limit	13.34%

Ba. The process is not in control. There are 3 samples that are above the acceptable % defective. In this case, it is okay that there are 3 samples that have a defective % less than the lower control limit, since less defective products is okay!