**In-Class Exercise on Control Charts Implementations**

Topic: The relationship between α and β

(Note: please make sure watch the recorded lecture if you are working on it by yourself.)

1. Explain the difference between α and β errors.

|  |  |  |
| --- | --- | --- |
|  | Decision to Reject | Decision to Accept |
| The statement is true |  |  |
| The statement is false |  |  |

1. Please make correct identifications on the following scenarios. What type of errors have they committed? Or have they committed any?
2. The process average did not change, but the process was interrupted due to one sample fell outside of the control limits.
3. The process average shifted to the right (i.e., increased), but the process was not interrupted because all samples thus far looked within the control limits.
4. The process average shifted to the left (i.e., decreased), the process was interrupted due to one sample average fell below the lower control limit.
5. The process average did not change, the process was not interrupted.
6. Not all stoppages turn out to be errors. When does a process stoppage become an α error? Similarly, when does a process non-stoppage becomes a β error?

Please use the following tool to answer the questions below: <https://www.desmos.com/calculator/apynpxfduq>

1. Please explain how does the sensitivity of a control chart change in the following scenarios:
2. When the sample size n increases, what happens to α?
3. When the sample size n increases, what happens to β?
4. When the control distance k increases, what happens to α?
5. When the control distance k increases, what happens to β?
6. What role does LSL and USL play in analyzing the sensitivity of a process?