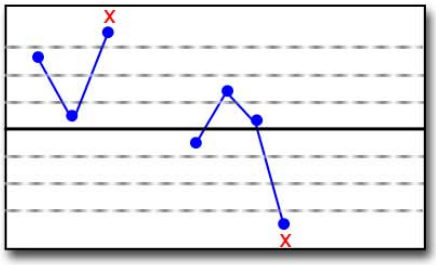
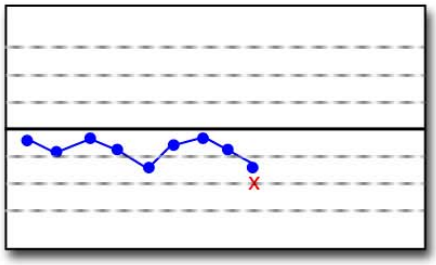
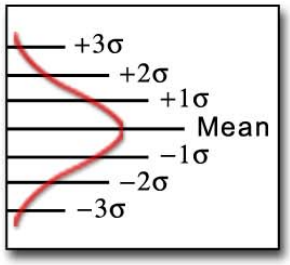
General Rules for Detecting Out of Control or Non Random Situations[1]

The WECO rules are based on probability. We know that, for a normal distribution, the probability of encountering a point outside ± 3 is 0.3%. This is a rare event. Therefore, if we observe a point outside the control limits, we conclude the process has shifted and is unstable. Similarly, we can identify other events that are equally rare and use them as flags for instability. The probability of observing two points out of three in a row between 2 and 3 and the probability of observing four points out of five in a row between 1 and 2 are also about 0.3%.

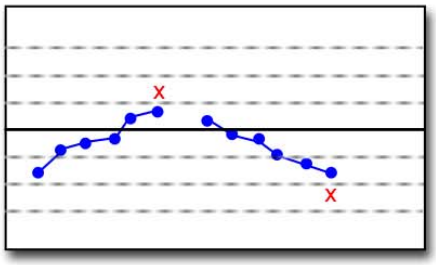


Any point outside of ±3σ

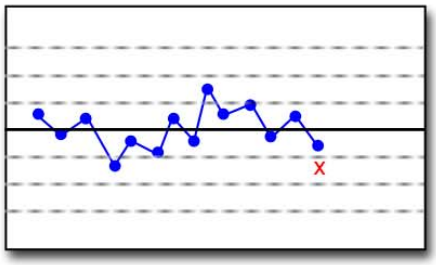


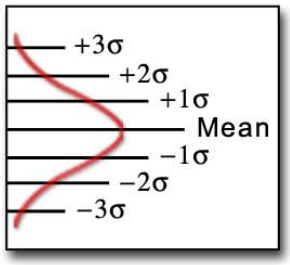


Eight consecutive points on one side between control line and 1σ.

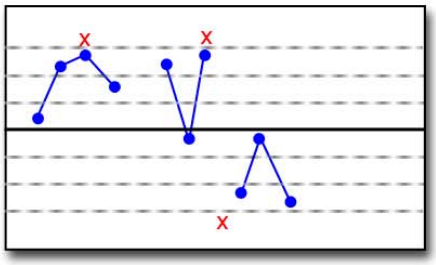


Six points on a row trending up or down.

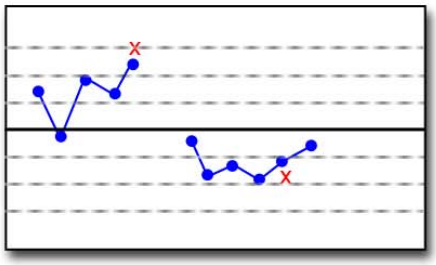


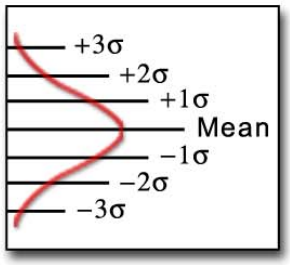


14 points in a row alternating up and down.



Two of the last three points are above or below 2σ.





Four of the last five points above or below 2σ.

[1]NIST/SEMATECH e-Handbook of Statistical Methods, http://www.itl.nist.gov/div898/handbook/, 2003.