Chapter 6 Homework

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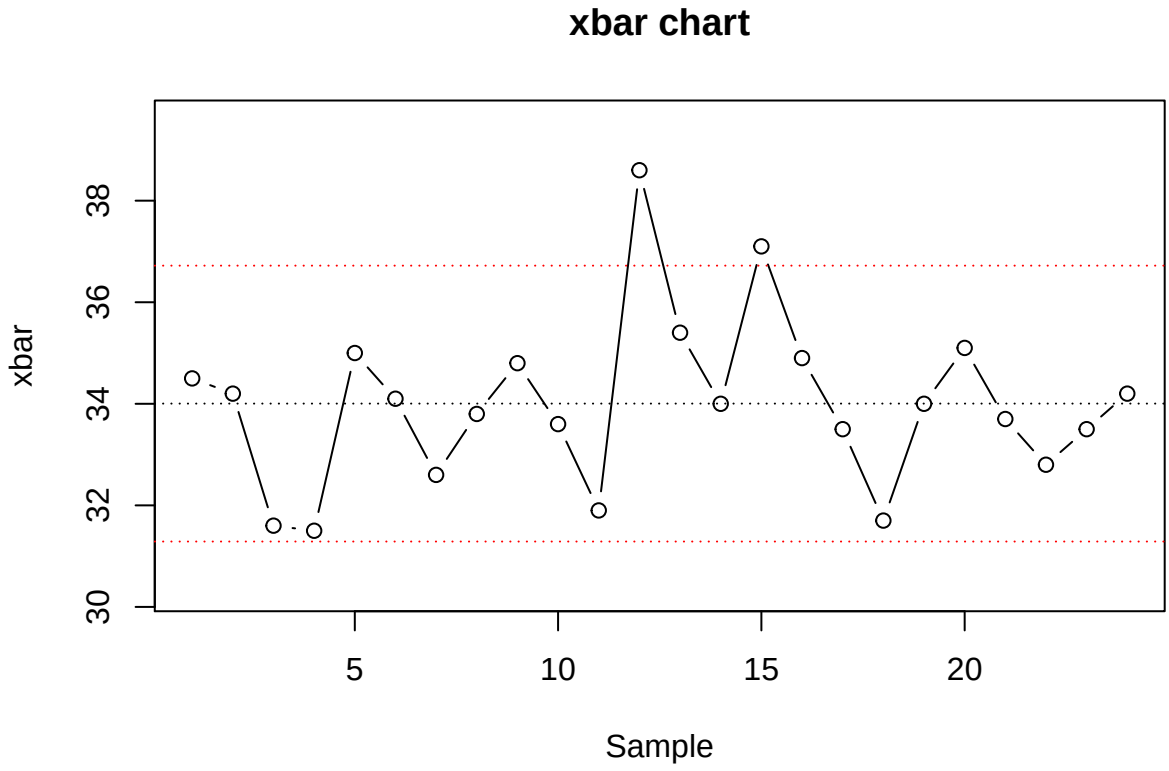
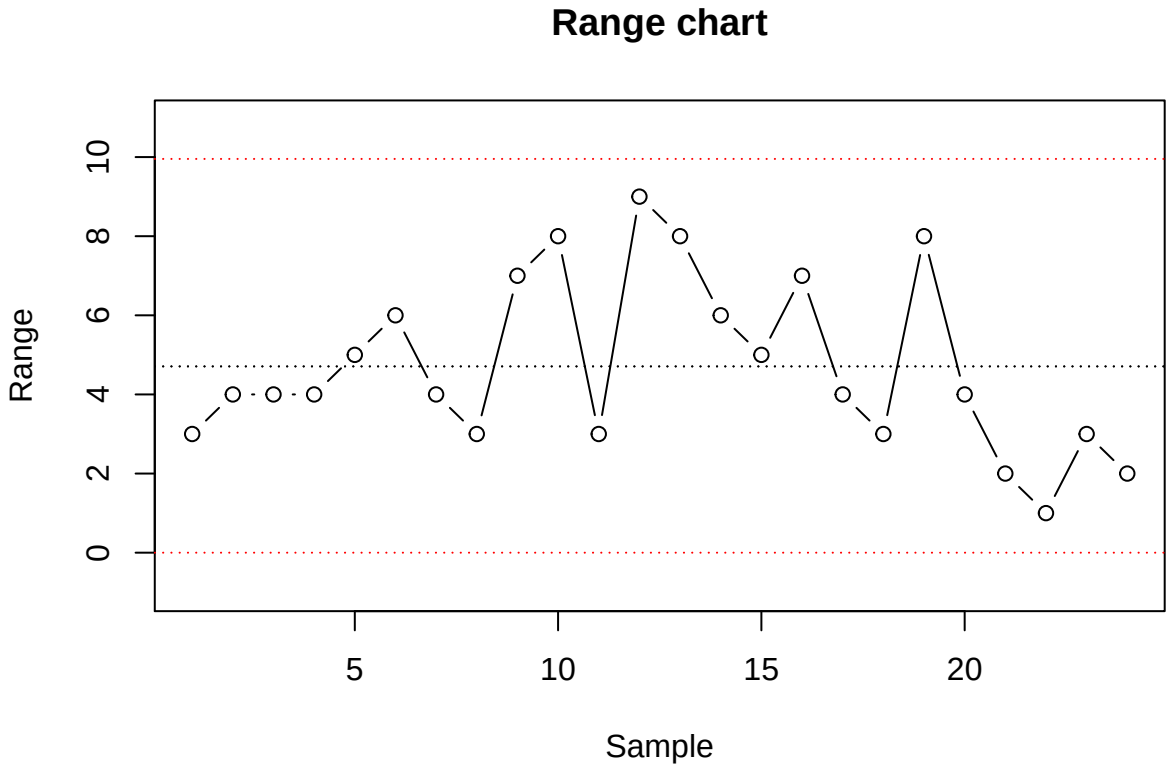
Chapter 6 exercises: 1-5

6.1





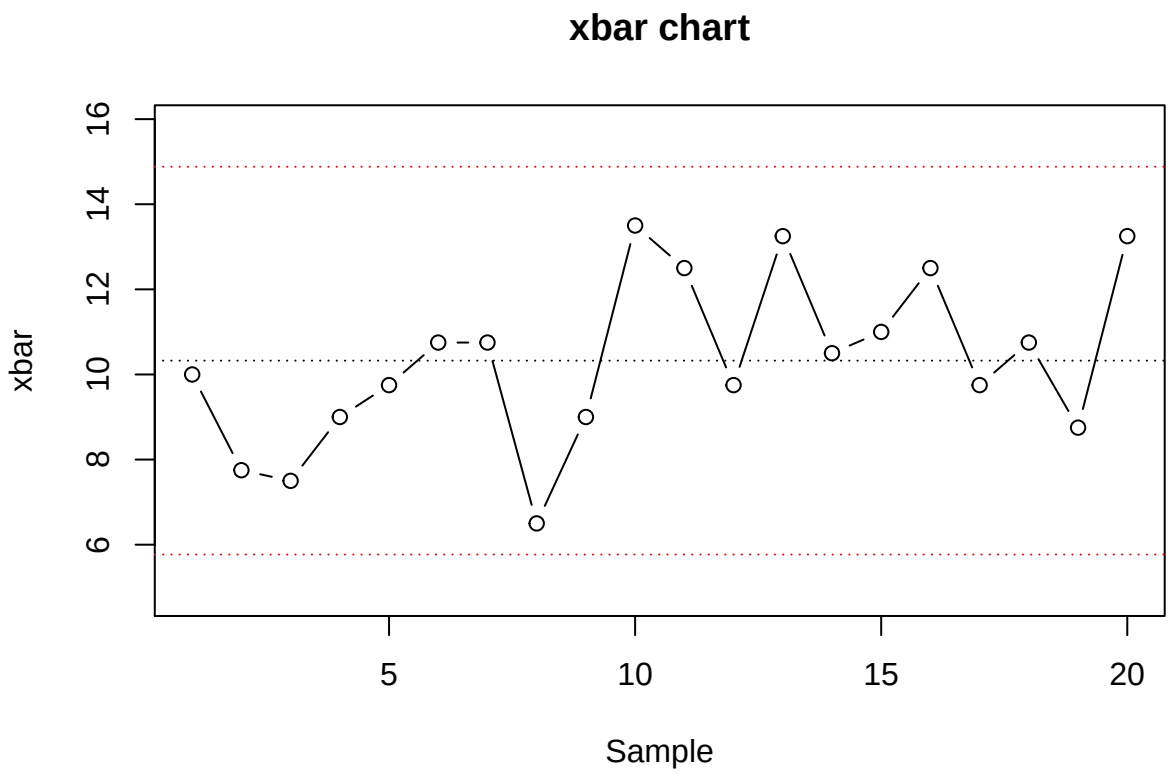
The process appears to be in statistical control, with only two samples exceeding the control limits.

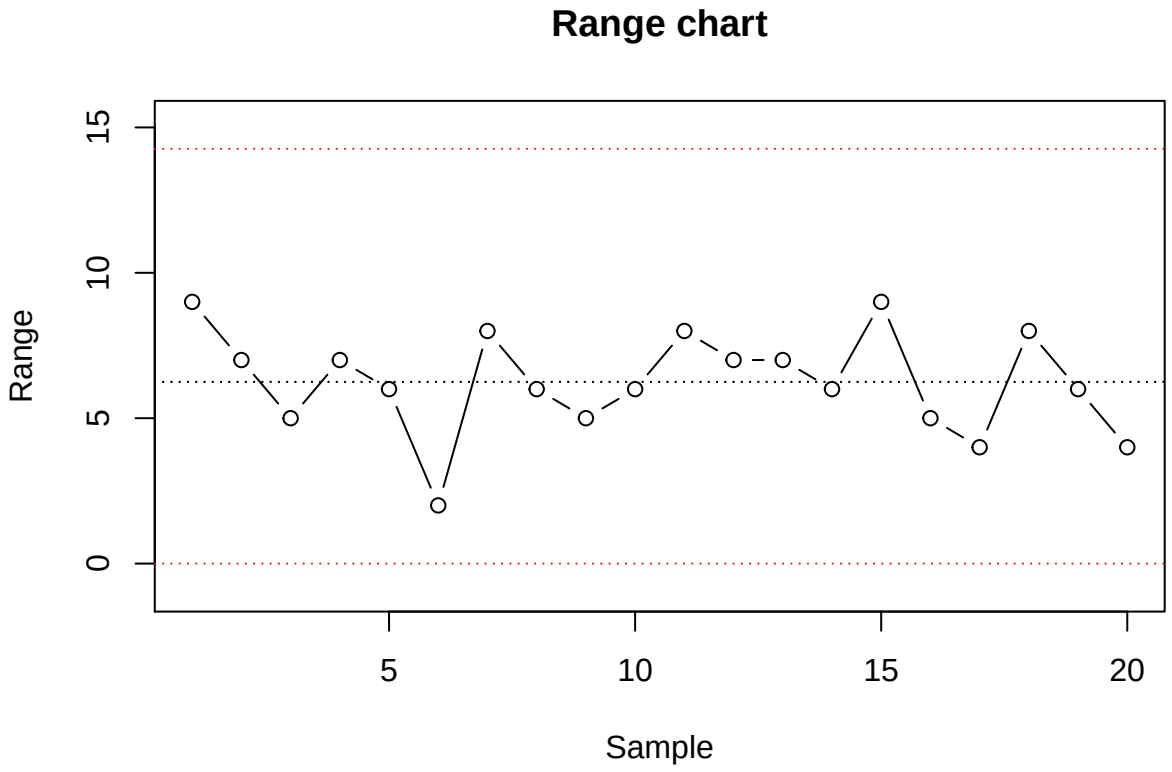
We'd like to know the percentage non-conforming if the specification is 30 ± 10.
The proportion non conforming is approx 0.001528. We can calculate this value by

$$p = P(x < 30 - 10) + P(x > 30 + 10) = \Phi(\frac{20 - 34.0041667}{2.024219}) + 1 - \Phi(\frac{40 - 34.0041667}{2.024219}) = 0.001528$$

where 2.024219 is equal to $\frac{\bar{R}}{d_2}$ and d_2 is a table value equal to 2.326. And so the percentage non-conforming is $100p = 0.1528002$. We expect less than 1 percent fallout with this process.

6.2





Looking at the $\bar{x}$ chart and the R chart it appears that the process is in statistical control although there could be a pattern on the xbar chart that might be of concern.
The percent nonconfomring would be 3.453136×10^{-86}.

Running the shapiro-wilk test on the data there doesn't appear to be evidence to reject that the data is normally distributed.

6.3