

ISYE 530 Minitab Training 1 Homework

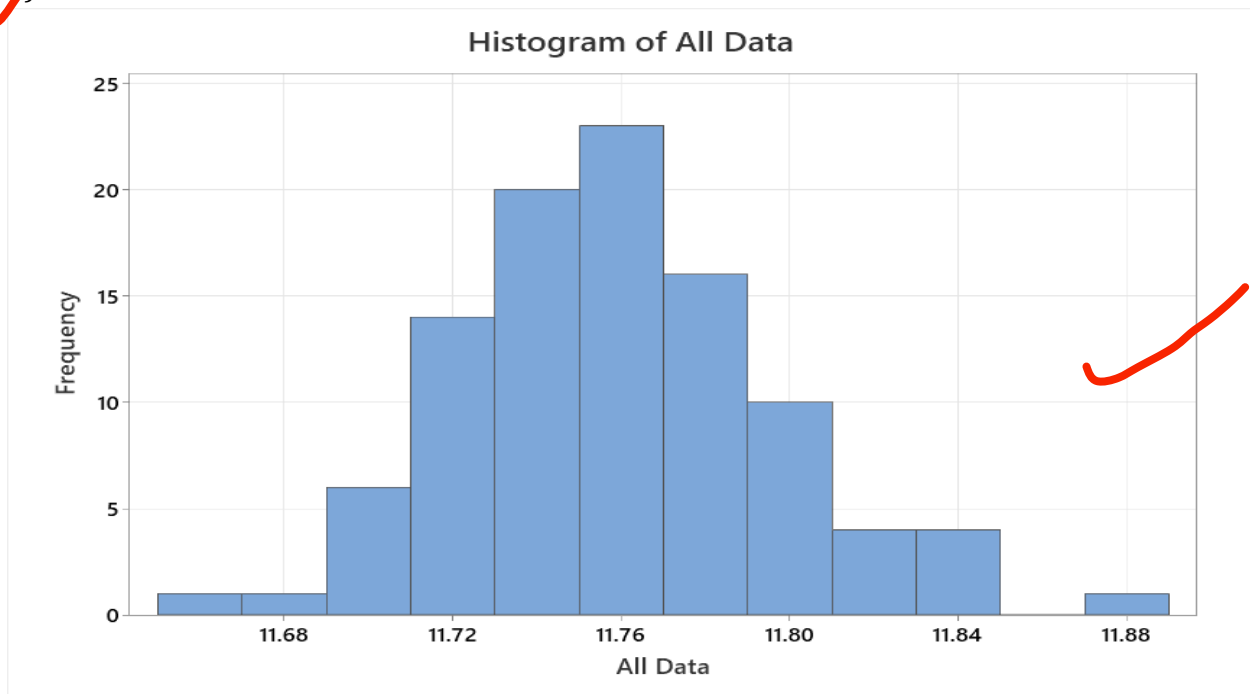
13)

Stem-and-leaf of All Data N = 100

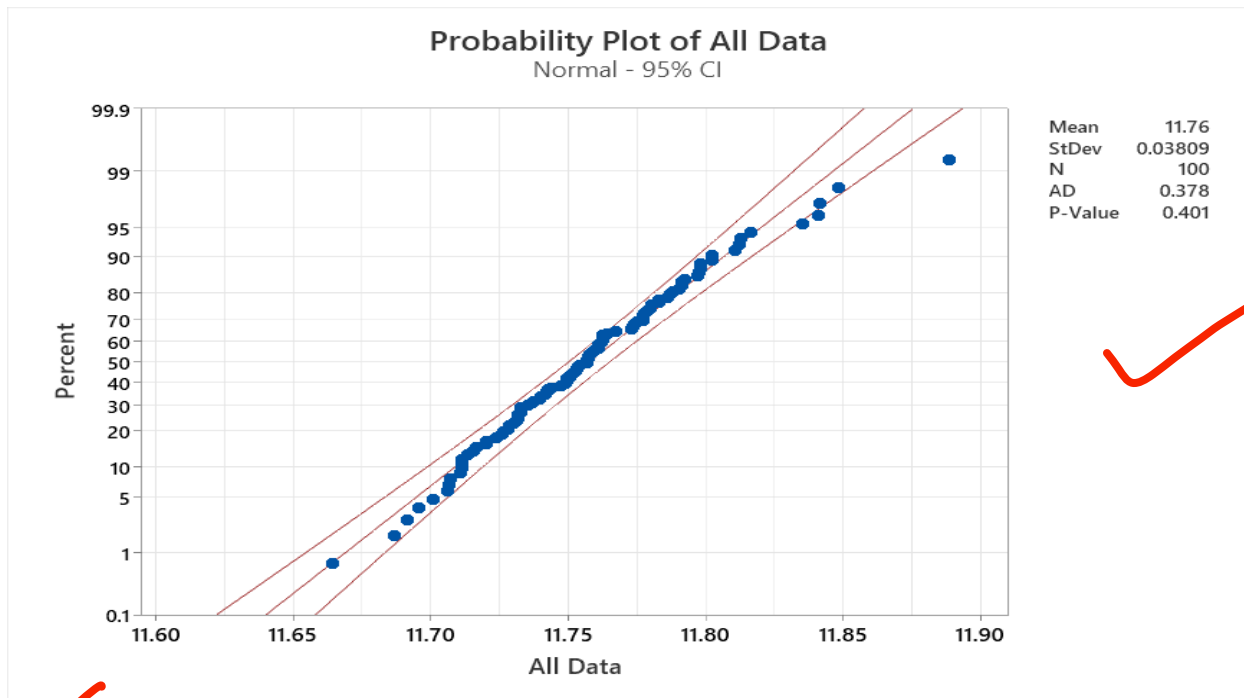
```
1   116 6
4   116 899
15  117 00001111111
33  117 2222222233333333333
(23) 117 44444444455555555555555
44  117 6666666666777777777
26  117 88888888999999999
11  118 0011111
5   118 3
4   118 444
1   118
1   118 8
```

Leaf Unit = 0.01

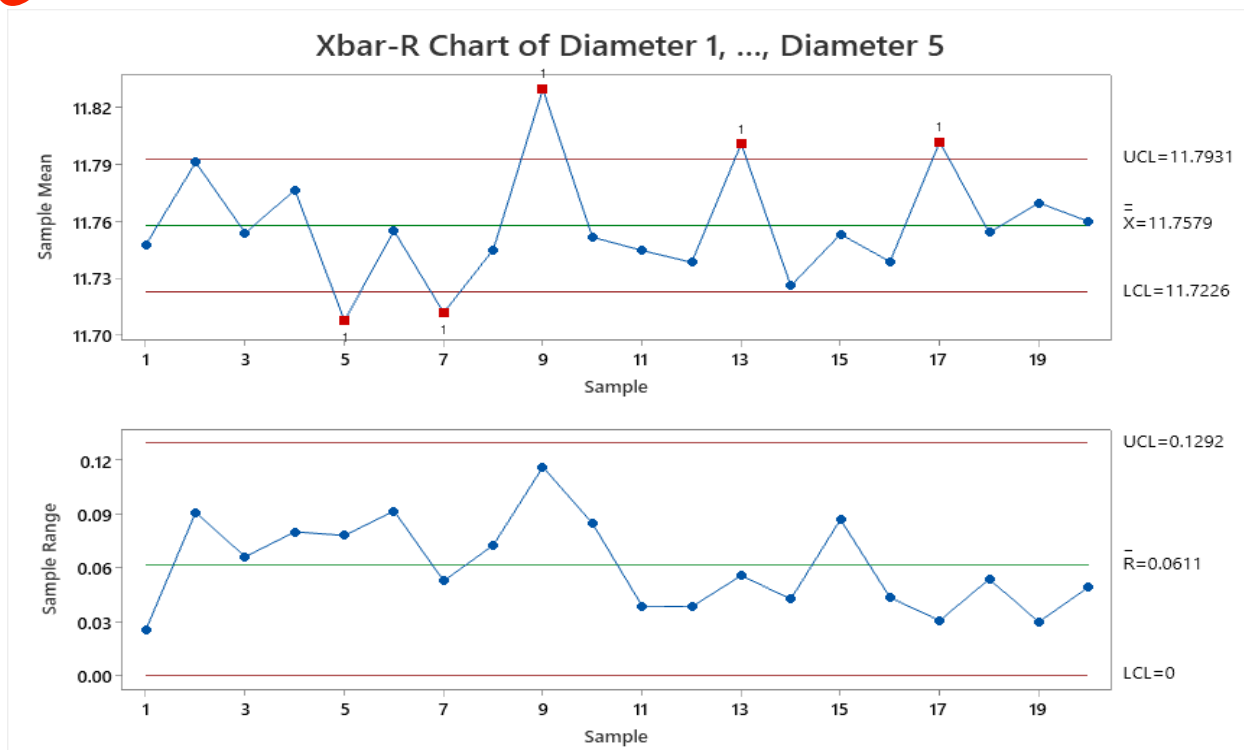
b)



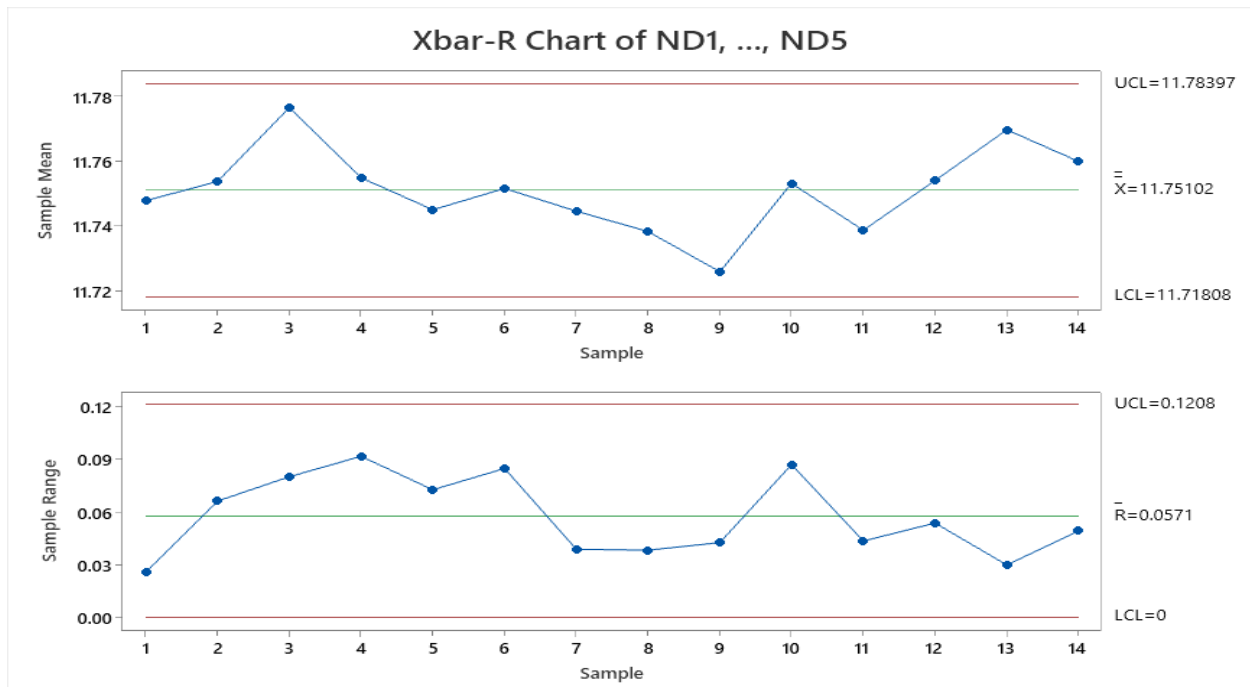
The normal probability plot shows points falling approximately along a straight line with no strong departures. In addition, the p-value of 0.401, indicates no evidence against normality. Therefore, it is reasonable to assume that the data follows a normal distribution.



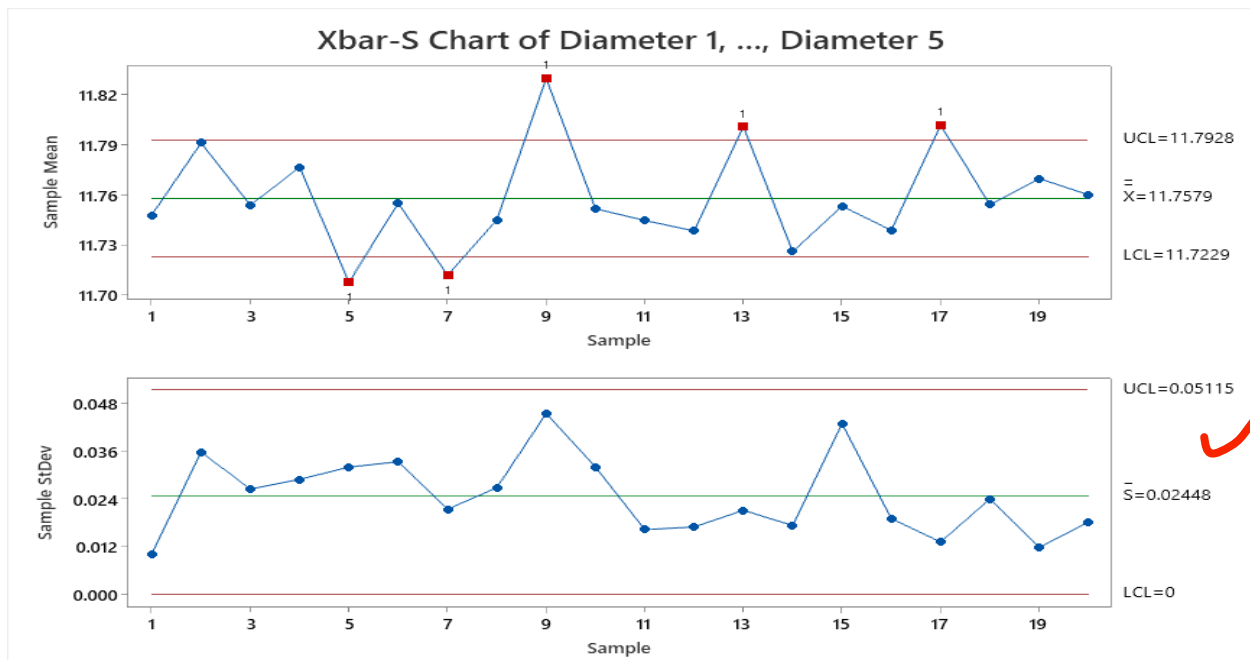
c)



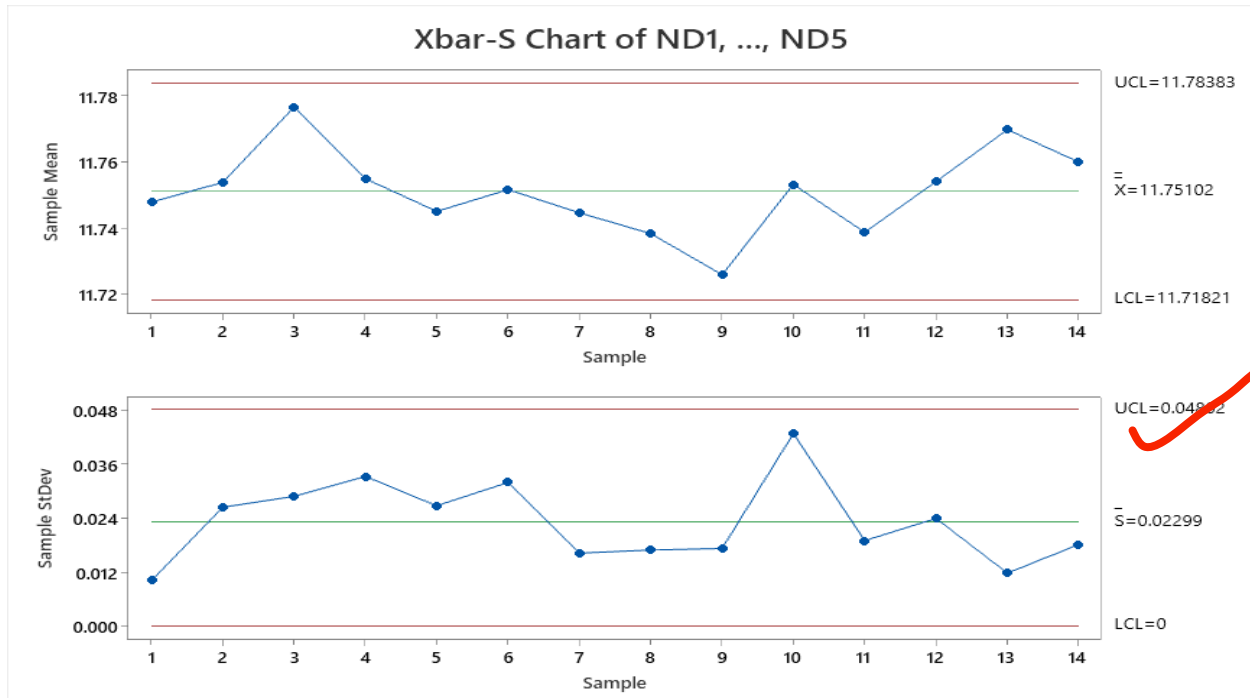
Note: 6 data points were deleted assuming it to be assignable cause (2, 5, 7, 9, 13, 17).



d)



Note: 6 data points were deleted assuming it to be assignable cause (2, 5, 7, 9, 13, 17).



e)

$$(\bar{X}, R) : \quad \hat{\mu} = \bar{\bar{X}}$$

$$\hat{\mu} = \bar{\bar{X}} = 11.75102 \approx 11.751$$

$$\hat{\sigma} = \frac{\bar{R}}{d_2}$$

$$\hat{\sigma} = \frac{0.0571}{2.326}$$

$$\hat{\sigma} = 0.0245485881$$

$$\hat{\sigma} \approx 0.0245$$

$$(\bar{X}, S) : \quad \hat{\mu} = \bar{\bar{X}}$$

$$\hat{\mu} = \bar{\bar{X}} = 11.75102 \approx 11.751$$

$$\hat{\sigma} = \frac{\bar{S}}{c_4}$$

$$\hat{\sigma} = \frac{0.02299}{0.94}$$

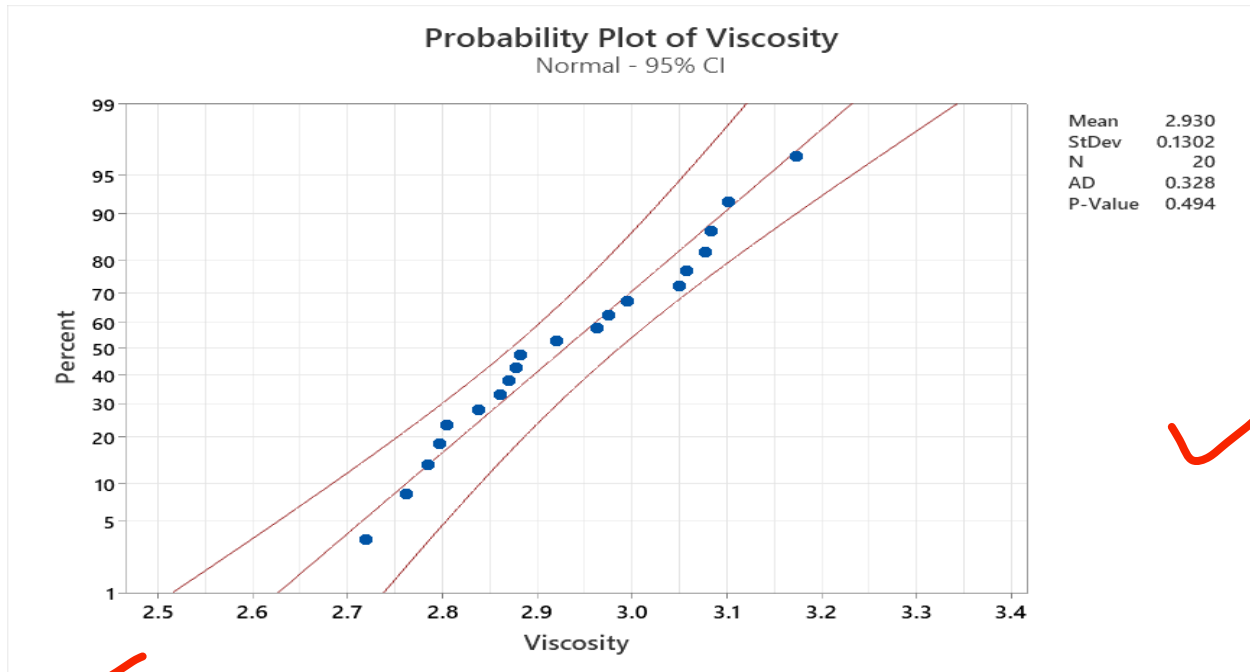
$$\hat{\sigma} = 0.024457447$$

$$\hat{\sigma} \approx 0.0245$$

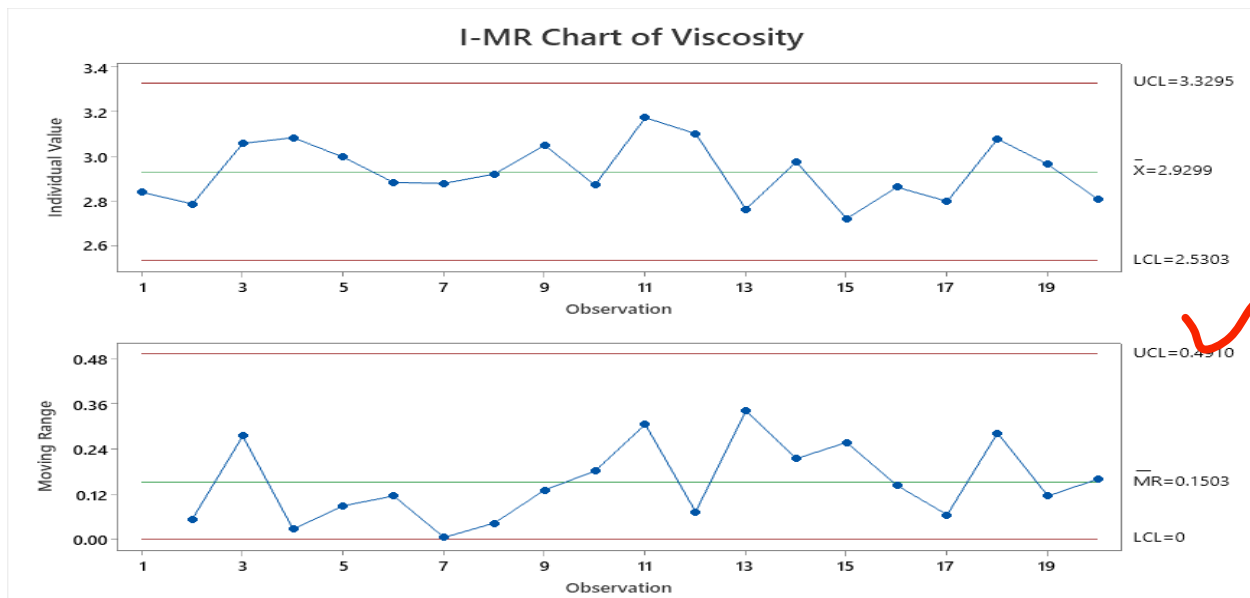
$$\hat{\sigma}(\text{from } \bar{R}) \approx \hat{\sigma}(\text{from } \bar{S}) \approx 0.0245$$

2a) The normal probability plot shows points falling approximately along a straight line with no strong departures. In addition, the p-value of 0.494, indicates no evidence against

normality. Therefore, it is reasonable to assume that the viscosity measurements follow a normal distribution.



b)



The Individuals and Moving Range charts show no points outside the control limits and no nonrandom patterns. Therefore, the process appears to be in statistical control.

c)

$$\bar{X} = 2.9299$$

$$UCL_X = 3.3295$$

$$LCL_X = 2.5403$$

$$\hat{\mu} = \bar{X}$$

$$\hat{\mu} = 2.9299 \approx 2.930$$

$$\overline{MR} = 0.1503$$

$$UCL_{MR} = 0.4918$$

$$LCL_{MR} = 0$$

$$\hat{\sigma} = \frac{\overline{MR}}{d_2}$$

$$\hat{\sigma} = \frac{0.1503}{1.128}$$

$$\hat{\sigma} = 0.133244$$

$$\hat{\sigma} \approx 0.133$$