

ISYE 530 Minitab Training 1 Homework

12)

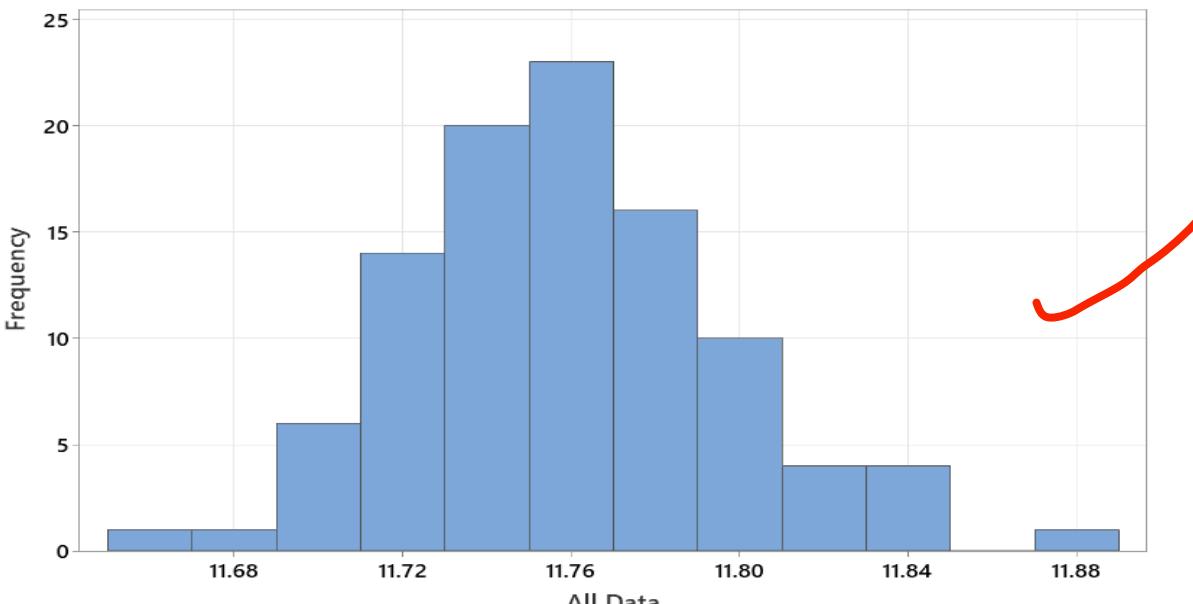
Stem-and-leaf of All Data N = 100

1	116 6
4	116 899
15	117 00001111111
33	117 2222223333333333
(23)	117 444444444555555555555555
44	117 666666667777777777
26	117 8888889999999999
11	118 001111
5	118 3
4	118 444
1	118
1	118 8

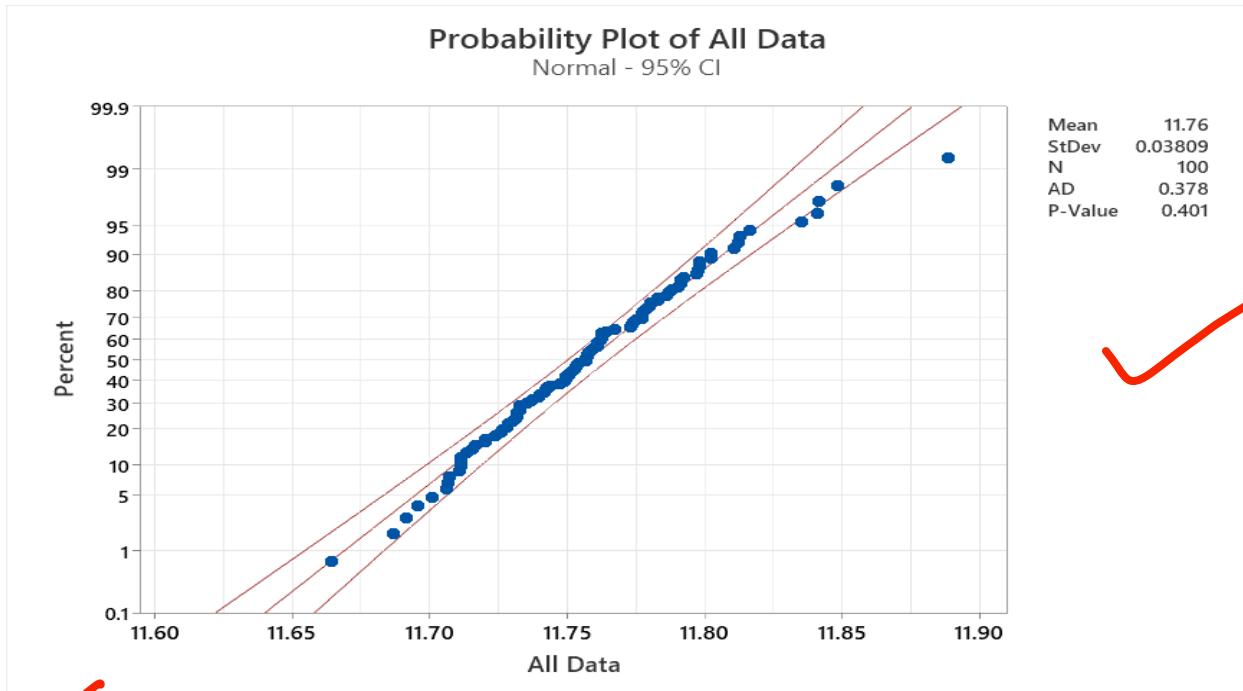
Leaf Unit = 0.01

b)

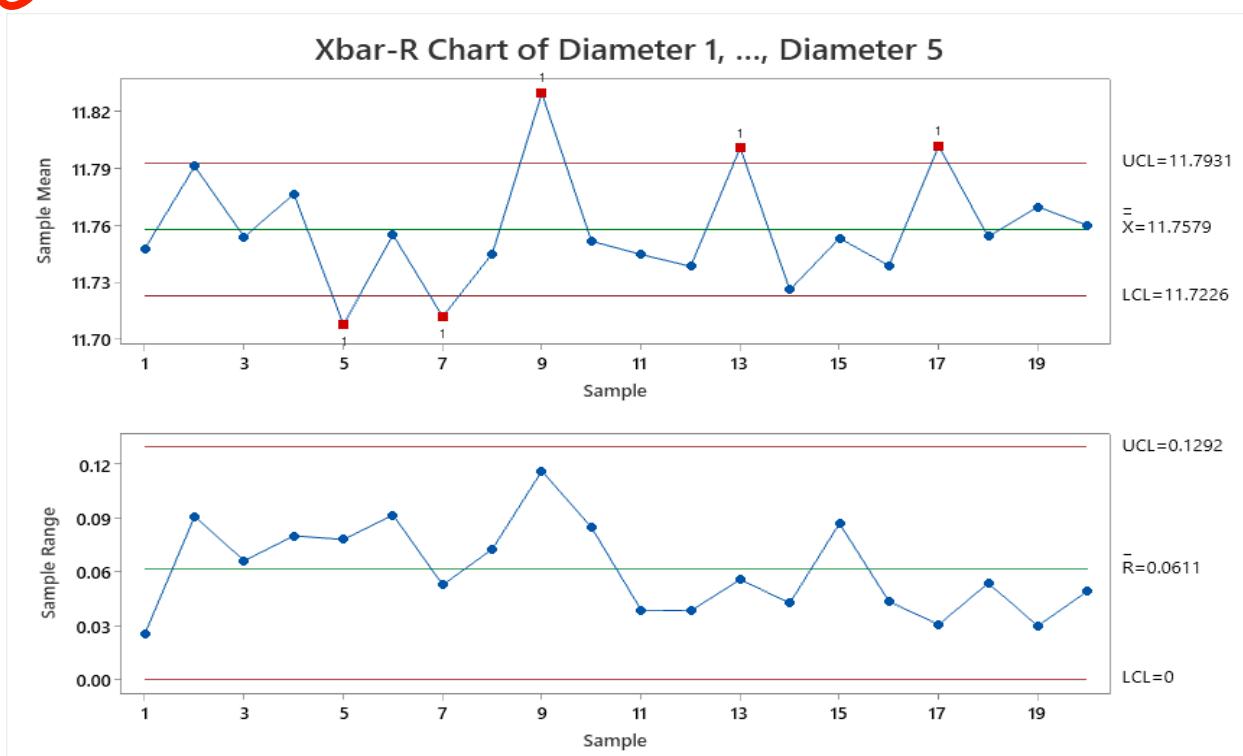
Histogram of All Data



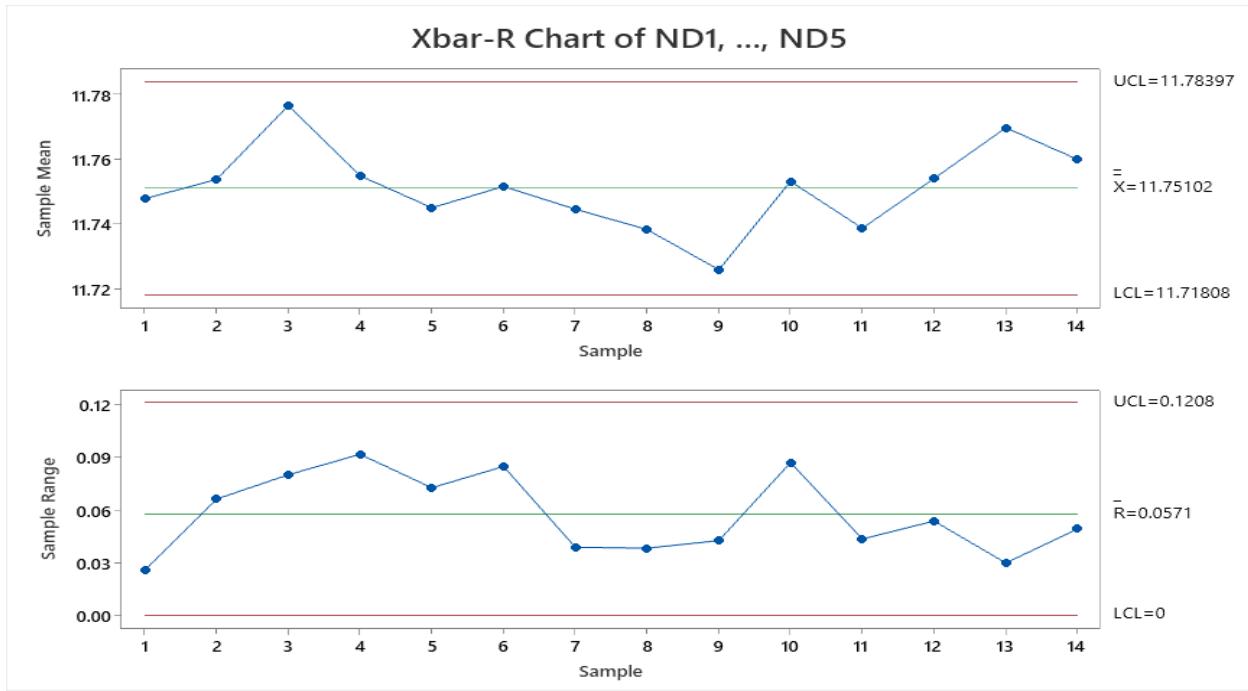
The normal probability plot shows points falling approximately along a straight line with no strong departures. In addition, the p-value of 0.401, indicates no evidence against normality. Therefore, it is reasonable to assume that the data follows a normal distribution.



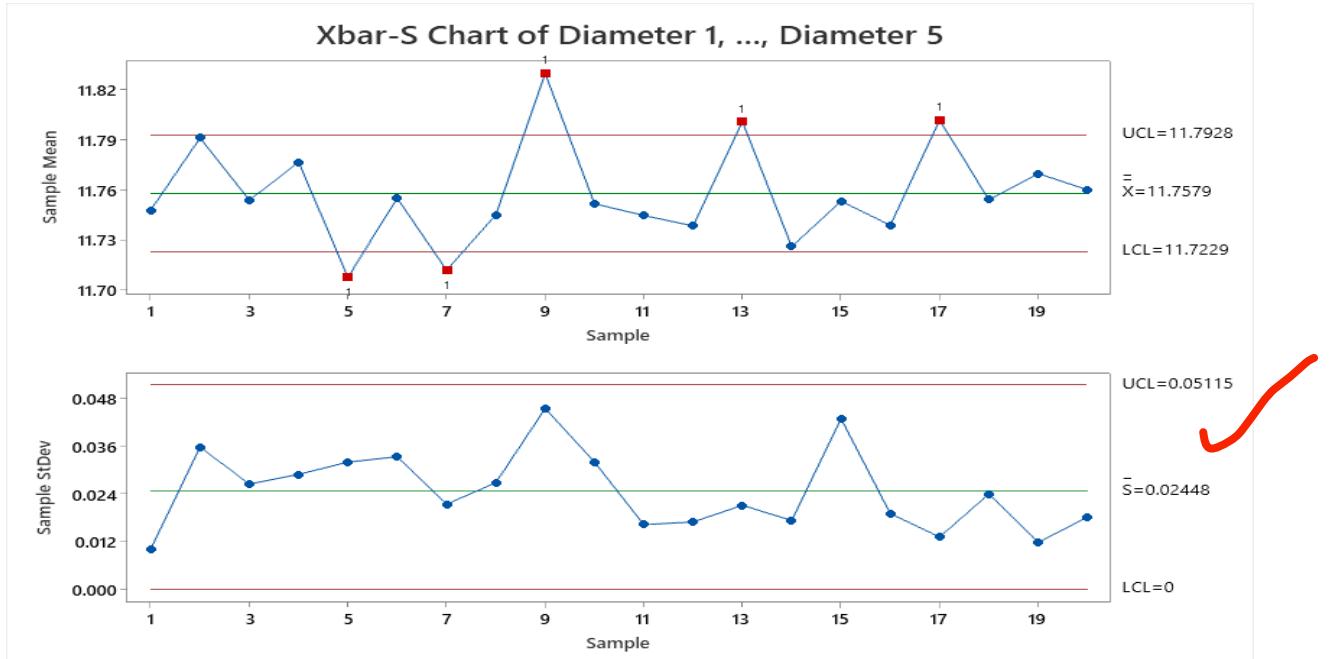
c)



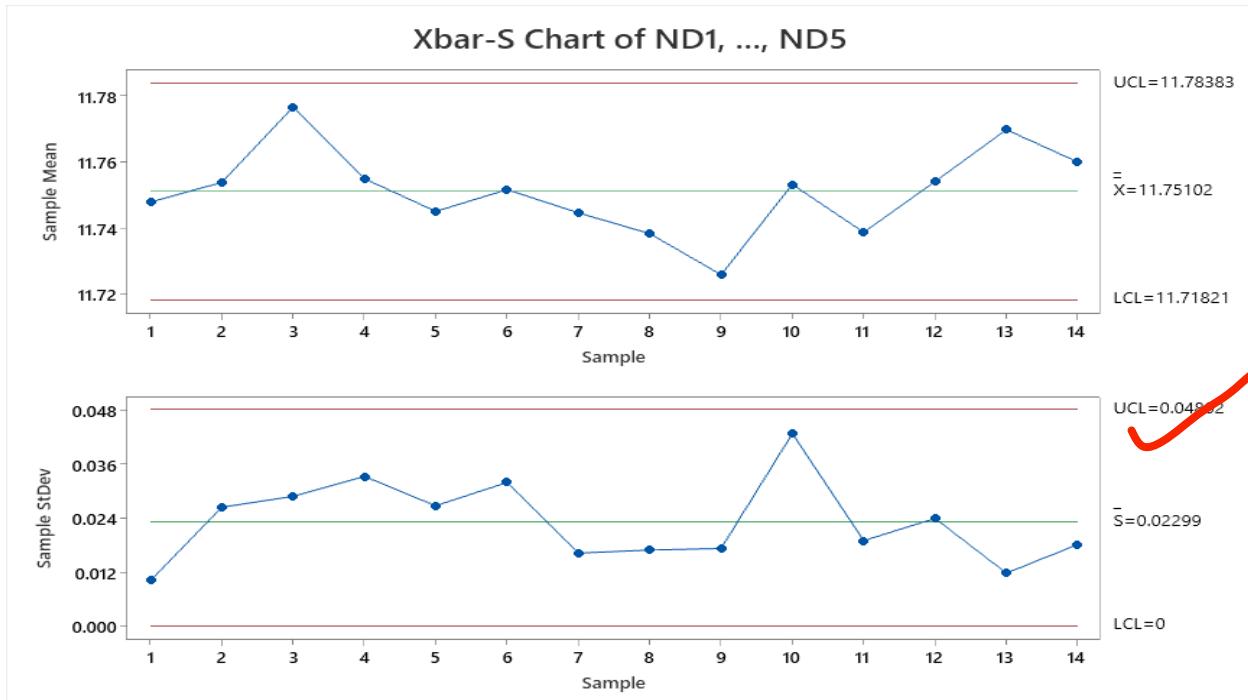
Note: 6 data points were deleted assuming it to be assignable cause (2, 5, 7, 9, 13, 17).



d)



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



e)

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

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

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

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

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

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

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

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

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

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

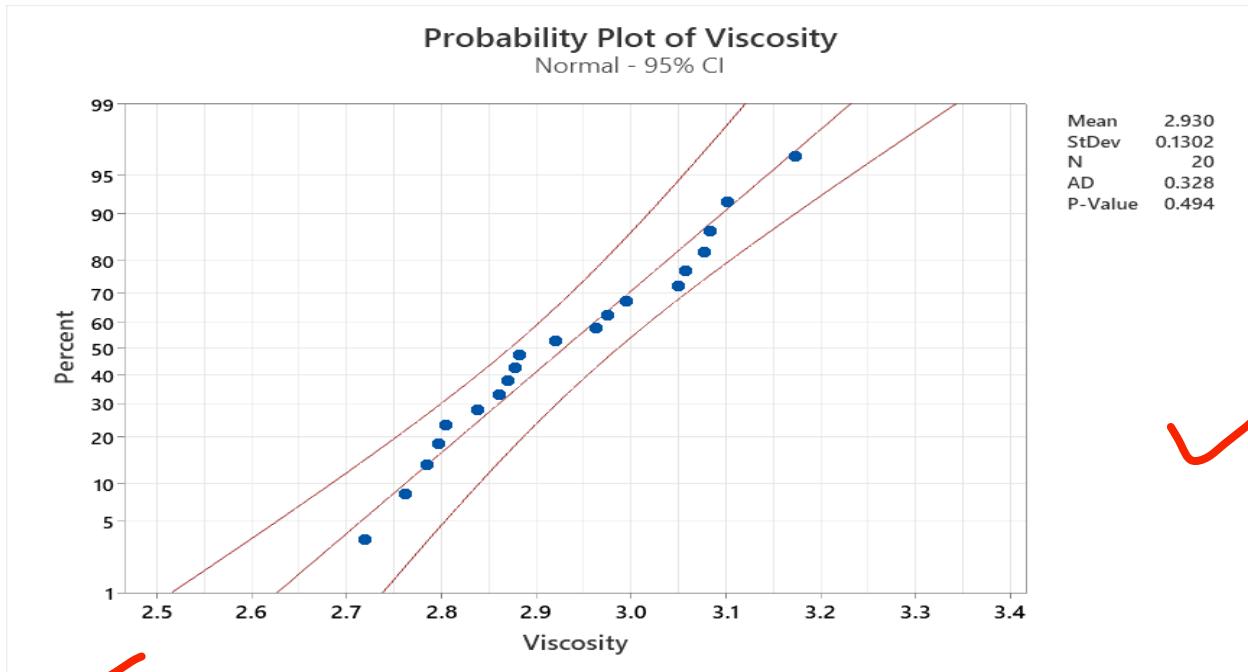
$$\hat{\sigma} = 0.024457447$$

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

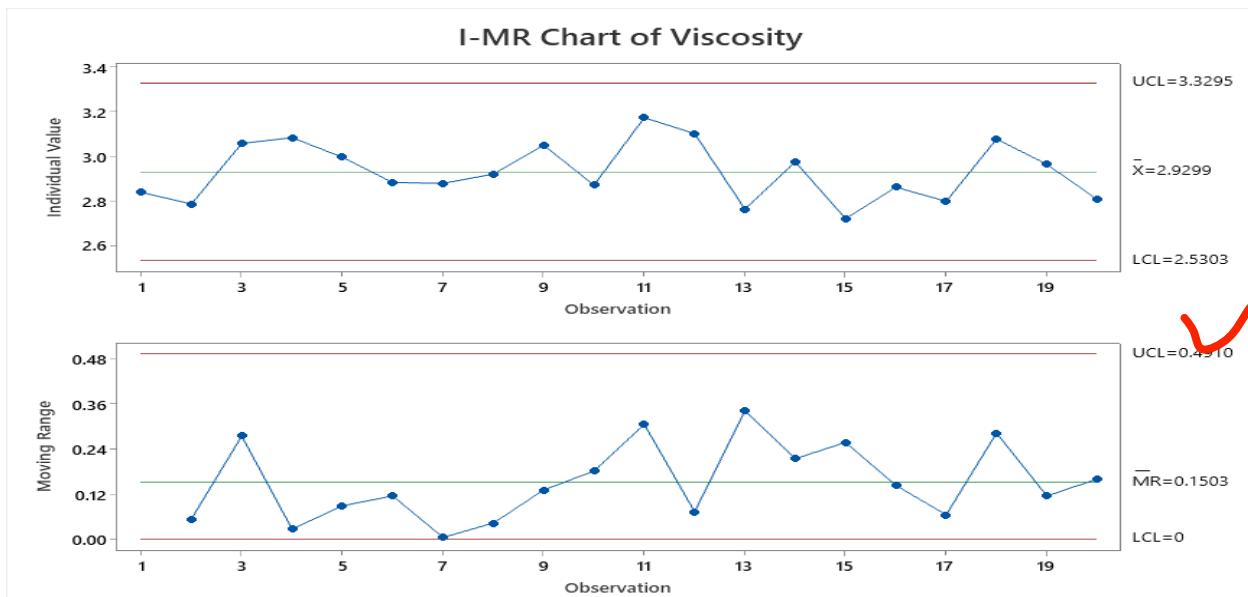
$$\hat{\sigma}(\text{from } \bar{R}) \approx \hat{\sigma}(\text{from } \bar{S}) \approx 0.0245$$

- ✓ 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)

$$\bar{X}=2.9299$$

$$UCL_X=3.3295$$

$$LCL_X=2.5102$$

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

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

$$\overline{MR}=0.1503$$

$$UCL_{MR}=0.4918$$

$$LCL_{MR}=0$$

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

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

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

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