Practice Set 17 Statistical Quality Control

I. Darin is doing a quality control study of the 30 milligram parts first analyzed in chapter 11. This data has been reproduced below. Assume the data consisted of 12 three part samples. Also assume the process was in control when these samples were taken. Construct an $\bar{X}$ chart and an R chart for this data using a 99.74% (3 sigma) confidence interval.

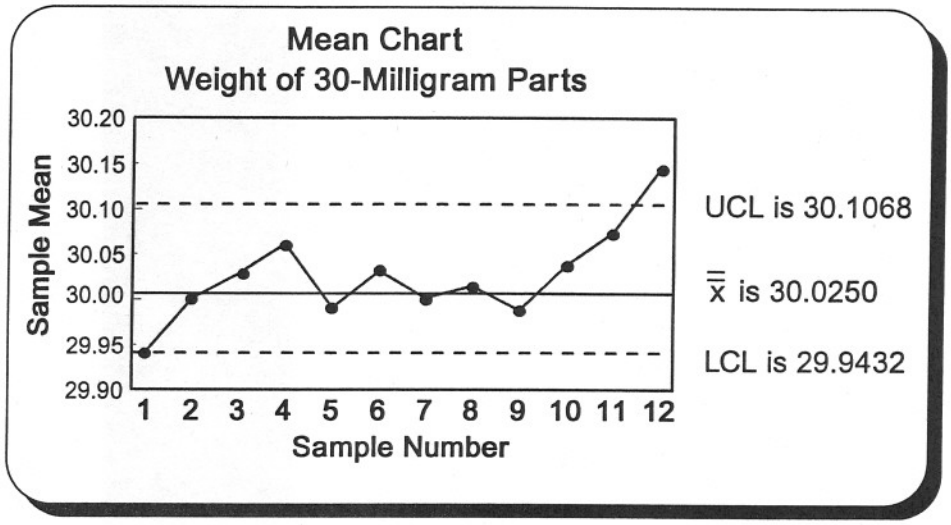
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	Totals
n = 3 N = 12	29.89	30.05	29.98	30.07	29.97	30.05	29.95	30.06	29.99	30.02	30.09	30.12	
	29.96	29.97	30.06	30.05	29.95	29.95	29.99	29.89	29.99	30.08	30.06	30.16	
	29.97	29.98	30.04	30.06	30.05	30.09	30.06	30.09	29.98	30.01	30.08	30.15	
Sample Mean	29.94	30.00	30.03	30.06	29.99	30.03	30.00	30.01	29.99	30.04	30.07	30.14	360.30
Sample Range	0.08	0.08	0.08	0.02	0.10	0.14	0.11	0.20	0.01	0.07	0.03	0.04	0.96

$$\bar{\bar{x}} = \frac{\sum \bar{x}}{N} = \frac{360.3}{12} = 30.0250$$

$$\bar{R} = \frac{\sum R}{N} = \frac{.96}{12} = .080$$

$$UCL = \bar{\bar{x}} + A_2\bar{R}$$
$$= 30.025 + 1.023(.08)$$
$$= 30.025 + .08184$$
$$= 30.10684$$

$$LCL = \bar{\bar{x}} - A_2\bar{R}$$
$$= 30.025 - 1.023(.08)$$
$$= 30.025 - .08184$$
$$= 29.94316$$



$$UCL = D_4\bar{R}$$
$$= 2.575(.08)$$
$$= 0.206$$

$$LCL = D_3\bar{R}$$
$$= 0(.08)$$
$$= 0$$