SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics

STAT-319-Term073-Quiz1-A

Name: ID: Sec.: Serial:

The following observations represent the diameter (in centimeters) of circular wheels

19.3	19.4	19.7	19.9	20.5	20.8	20.9	21.1	21.3	21.4
21.5	21.7	21.9	22.0	22.2	22.5	22.6	22.8	23.0	23.2

Given that $\sum X_i = 427.7$, $\sum X_i^2 = 9173.19$ answer the following:

a. Find the sample **mean** and **Variance and** P_{57}

I. Sample Mean $= \overline{X} = \frac{\sum X_i}{n} = \frac{427.7}{20} = 21.385$ **(1-Point)**

II. Sample Variance $= S^2 = \frac{\sum X_i^2 - n\left(\overline{X}\right)^2}{n-1} = \frac{9173.19 - 20(21.385)^2}{20-1}$ **(2-Points)**

$= \frac{26.8255}{19} = 1.4119$ **(1-Point)**

III. $P_{57} \Rightarrow \alpha = 57 \Rightarrow R_\alpha = \frac{57}{100}(20+1) = 11.97$ **(1-Point)**

$P_{57} = X_{(11)} + 0.97\left(X_{(12)} - X_{(11)}\right)$

$= 21.5 + 0.97(21.7 - 21.5)$ **(2-Points)**

$= 21.5 + 0.194$

$= 21.694$ **(1-Point)**

b. Do the data satisfy the empirical rule? Explain clearly.

$\overline{X} = 21.385$, $S = \sqrt{S^2} = \sqrt{1.4119} = 1.1882$ **(2-Points)**

$\left[\overline{X} - S, \overline{X} + S\right] = \left[21.385 - 1.1882, 21.385 + 1.1882\right]$ **(2-Points)**

$= \left[21.1968,\ 22.5732\right]$

There are (12) observations in this interval **(1-Point)**

Their percentage $= \frac{12}{20} * 100\% = 60\% \neq 68\%$ **(1-Point)**

So, the data don't satisfy the empirical rule. **(2-Points)**

c. Using the 19.0 - 19.9 as the first class complete the following frequency table

Classes	Frequency	Relative Frequency	Midpoint
19.0- 19.9	4	0.20	19.45
20.0-20.9	3	0.15	20.45
21.0- 21.9	6	0.30	21.45
22.0- 22.9	5	0.25	22.45
23.0- 23.9	2	0.10	23.45
Total	20	1.00	
(1-Point)	**(1-Point)**	**(1-Point)**	**(1-Point)**