ASSIGNMENT-1

(STAT-101)

Student's Name:

CRN No. :

Student ID:

Note: 1. All the questions are compulsory.

2. Due date: February 19, 2016 until 11:59 P.M.

3. Points:

	Section-I	1×5=5
	Section-II	1×5=5
	Section-III	5×3=15
	Total	25

Section-I

State whether the following statements are True or False.

(5 marks, *1 Mark Each*)

1) Outliers are the values that lie very far away from the vast majority of the other values.
   a). True√
   b). False

2) Eye colors is an example of ordinal level of measurement data.
a). True
b). False √

3) A Statistic is a numerical measurement made using the of population data set.
a). True
b). False √

4) The 50^{th} percentile value is equal to the median.
a). True √
b). False

5) The standard deviation of data is affected by the values of outliers
a). True √
b). False

Section-II

(Multiple Choice Questions) *(5 marks, 1 Mark Each)*

1) The first quartile value (Q_1) in the data {13,15,12,20,30} is equal to
   a) 12
   b) 15
   c) 13
   d) 20

2) A market researcher selects 500 drivers under 30 years of age and 500 drivers over 30 years of age. So the suitable type of sampling is:
   a) Systematic
   b) Convenience
   c) Stratified
   d) Cluster

3) Which one of the following is **not** one of the measures of the center

a) Mean
b) Standard deviation
c) Mode
d) Median

4) If the mode = median = mean, the distribution will be :

a) Symmetric
b) Positively skewed
c) Negatively skewed
d) Not symmetric

5) Let $P(B) = 0.3, P(A/B) = 0.2$, if A and B are independent, then $P(A \text{ and } B) = ?$

a) 0.5
b) 0.06
c) 0.3
d) 0.2

Section-III

Answer the following Essay Type Questions **(3X5 =15 Marks)**

1) The marks of 20 students in a statistics test that had a maximum possible mark of 100 are given below:
47 56 73 81 75 71 75 65 78 40 66 80 90 82 75 55 66 96 78 49
   a) Find the mean, mode, median, variance and standard deviation of this original set of data values.
   b) Construct a frequency distribution with 6 classes

ANSWER:

a) First we arrange the data in ascending order
40,47,49,55,56,65,66,66,71,73,75,75,75,78,78,80,81,82,90,96

Mean:

$$\bar{x} = \frac{\Sigma x}{N} = \frac{40+47+49+55+56+65+66+66+71+73+75+75+75+78+78+80+81+82+90+96}{20}$$

$$= \frac{1398}{20} = 69.9$$

Mode = 75 (because appears in the data set maximum times than others.)

$$\text{Median} = \left(\frac{n+1}{2}\right)^{th} item = \left(\frac{20+1}{2}\right)^{th} item = (10.5)^{th} item$$

$$= \frac{73+75}{2} = 74$$

$$\text{Variance} = \sigma^2 = \frac{\Sigma(x-\bar{x})^2}{N} = 200.09 \quad \text{(For Population)}$$

$$s^2 = \frac{\Sigma(x-\bar{x})^2}{n-1} = 210.62105 \quad \text{(For Sample)}$$

$$\text{Standard Deviation} = \sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = 14.14532 \quad \text{(For Population)}$$

$$s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}} = 14.51279 \quad \text{(For Sample)}$$

b)

Class	Frequency
40-49	3
50-59	2
60-69	3
7079	7
80-89	3
90-99	2

2) Use the frequency table below to solve the following questions

a) Construct the cumulative frequency table and relative frequency Histogram.

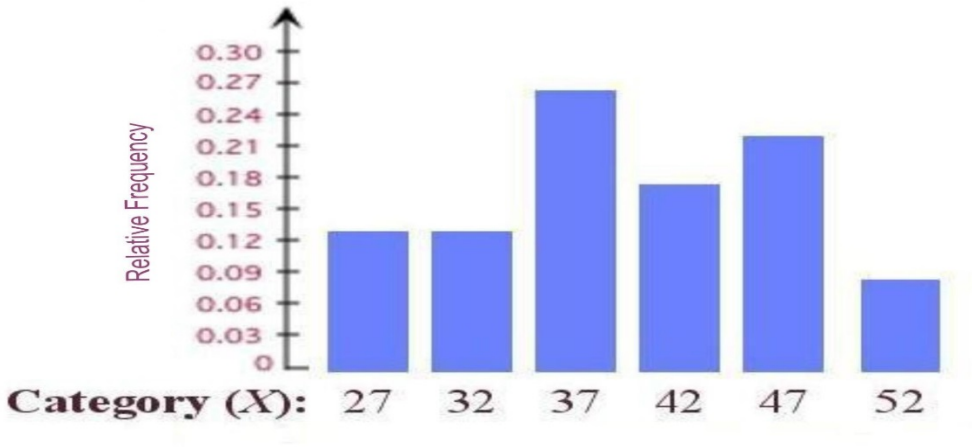
b) Determine the value of the sample mean and standard deviation.

Class	Frequency
25-29	3
30-34	3
35-39	6
40-44	4
45-49	5
50-54	2

ANSWER:

a)

Class	Frequency	Cumulative Frequency	Relative Frequency
25-29	3	3	3 ÷ 23 = 0.13
30-34	3	6	3 ÷ 23 = 0.13
35-39	6	12	6 ÷ 23 = 0.26
40-44	4	16	4 ÷ 23 = 0.17
45-49	5	21	5 ÷ 23 = 0.22
50-54	2	23	2 ÷ 23 = 0.09



b)

Class	Mid-Point (x)	Frequency (f)	f.x	x^2	$f.x^2$
25-29	27	3	81	729	2187
30-34	32	3	96	1024	3072
35-39	37	6	222	1369	8214
40-44	42	4	168	1764	7056
45-49	47	5	235	2209	11045
50-54	52	2	104	2704	5408
	Total	23	906		36982

Mean = $\bar{x} = \frac{\Sigma(f.x)}{\Sigma f} = 39.3913$

S.D. = S= $\sqrt{\frac{\Sigma f.x^2 - n(\bar{x})^2}{n-1}} = 7.66775$

3) Let the sample space, $\Omega = \{a,b,c,d,e,f,j\}$, A={a,b,c}, and B={b,e}. Find the following
   a) $P(A)$
   b) $P(A \text{ and } B)$
   c) $P(A \text{ or } B)$
   d) $P(B/A)$
   e) P(Ā)

ANSWER:

a) $P(A) = \frac{3}{7}$
b) $P(A \text{ and } B) = \frac{1}{7}$
c) $P(A \text{ or } B) = \frac{4}{7}$
d) $P(B/A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{1}{3}$
e) $P(\bar{A}) = \frac{4}{7}$