**FUNDAMENTALS OF BUSINESS STATISTICS – NOV 2014 SOLUTIONS**

**SECTION A**

**QUESTION**

1. C
2. C
3. D
4. A
5. C
6. A
7. A
8. C
9. C
10. C
11. B
12. B
13. C
14. D
15. B
16. B
17. C
18. B
19. C
20. A

**(1 mark each, a total of 20 marks)**

**SECTION B**

**QUESTION 1**

1. Let  be the event that a banking hall is full and cannot accommodate any more customers**.**

**(1/2 mark)**

Let be the event that customers are turned away.

**(1/2 mark)**

Events and are equivalent. Therefore , that is the proportion of customers turned away is 6%.

**(2 mark)**

. Therefore on average 8 customers will be turned away.

**(1 marks)**

1. Any common mistakes when writing questions for a questionnaire are
2. Asking biased questions
3. Using confusing words
4. Asking double-barreled questions
5. Ordering questions improperly
6. Using double negatives

**(1 mark each, a total of 4 marks)**

1. Cluster sampling is a sampling technique that selects a preexisting or natural group ( a cluster) and uses members in the group (cluster) for the sample.

**(2 marks)**

Advantages:

1. Can reduce costs;
2. Can simplify field work;
3. It is convenient;

**(1 mark each, a total of 2 marks)**

Disadvantages :

1. The cluster areas may not be representative of the population.
2. Sampling is not random

**(1 mark each, a total of 2 marks)**

1. A sample is used to get information about a populations because
2. It saves the researcher time and money
3. It enables the researcher to get information that he or she might not be able to obtain otherwise
4. It enables the researcher to get more detailed information about a particular subject.

**(1 mark each, a total of 2 marks)**

Most samples differ somewhat from the population mean because of sampling error.

**(2 marks)**

1. A scatter plot is a graph of the ordered pairs (x,y) of numbers consisting of the independent variable x and the dependent variable y.

**(1 mark)**

It is important because it is a visual way to describe the nature of the relationship between the independent and dependent variables.

**(1 mark)**

**(A total of 20 marks)**

**QUESTION 2**

1. Three data sets: The sample standard deviation, where

**(1 mark)**

(i)

(ii)

**(2 marks each, a total of 6 marks)**

The three different standard deviations show that the variation in the three samples is different.

1. No, the researcher cannot be sure the one variable causes the other.

**(1 mark)**

Correlation of two variables means that the variables are associated with each other directly or through other variable(s). Association is therefore wider than causation.

1. **marks)**
2. (i) Let be event that the respondent was a female.

Let be event that the respondent answered yes.

**(1 mark)**

.

But and . **(2 marks)**

Therefore **( 1 mark)**

**Alternatively**

There are females, but only of them responded yes.

**(1 mark)**

Hence . **(2 marks)**

1. Let be event that the respondent was a male.

Let be event that the respondent answered no.

**(1 mark)**

But and . **(2 marks)**

Therefore **( 1 mark)**

**Alternatively**

There are respondents who answered no, but only of them are male.

**(1 mark)**

Hence . **(2 marks)**

1. (i)

**(4 marks )**

(ii) The number of Life and household policies increased steadily over the period 2008 to 2012. However the number of Motor policies decreased over the period.

**( 2 marks)**

**QUESTION 3**

1. Four ways statistics can be abused are :
2. Suspect samples
3. Ambigous averages
4. Changing the subject
5. Detached statistics
6. Implied connections
7. Misleading graphs

(**1 mark each, a total of 4 marks**)

1. A coin is tossed times: Each time the outcome is a head (H) or tail (T). Sample space is therefore composed of:

(2 **marks)**

(2 **marks)**



(6  **marks)**

1. Estimating the standard deviation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Frequency (f) | Mid point () | f |  |
| 5.5 – 10.5 | 1 | 8 | 8 | 64 |
| 10.5 -15.5 | 2 | 13 | 26 | 338 |
| 15.5 -20.5 | 3 | 18 | 54 | 972 |
| 20.5 -25.5 | 5 | 23 | 115 | 2645 |
| 25.5 – 30.5 | 4 | 28 | 112 | 3136 |
| 30.5 – 35.5 | 3 | 33 | 99 | 3267 |
| 35.5 – 40.5 | 2 | 38 | 76 | 2888 |

Totals 20 490 13310

(**4 marks** for table computations)

( **2 marks)**

**QUESTION 4**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Subject** | **Age** | **Savings** |  |  |  |
| A | 43 | 128 | 5504 | 1849 | 16384 |
| B | 48 | 120 | 5760 | 2304 | 14400 |
| C | 56 | 135 | 7560 | 3136 | 18225 |
| D | 61 | 143 | 8723 | 3721 | 20449 |
| E | 67 | 141 | 9447 | 4489 | 19881 |
| F | 70 | 152 | 10640 | 4900 | 23104 |
| **Totals** | **345** | **819** | **47634** | **20399** | **112443** |

**(5 marks)**

## 

## 

(**2 marks)**

The correlation coefficient suggests a strong positive relationship between age and

savings. (1 **mark)**

1. They have the same sign.

(2 **marks)**

1. True or False
2. True
3. False, Median is affected less than the mean because the median is the center or middle value of the data set
4. False, the statement is true for the median and not the mode.
5. False, the midrange is not a measure of variation
6. False, the person scored better than 75% of the class

(2 **marks each, a total of 10 marks)**

**QUESTION 5**

(**6 marks**)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | y | x2 | y2 | xy |
| 1 | 134.8 | 1 | 18171.04 | 134.8 |
| 2 | 160.8 | 4 | 25856.64 | 321.6 |
| 3 | 200.9 | 9 | 40360.81 | 602.7 |
| 4 | 256.2 | 16 | 65638.44 | 1024.8 |
| 5 | 256.2 | 25 | 65638.44 | 1281 |
| 6 | 290 | 36 | 84100 | 1740 |
| 7 | 380 | 49 | 144400 | 2660 |
| 8 | 704 | 64 | 495616 | 5632 |
| 9 | 839 | 81 | 703921 | 7551 |
|  |  |  |  |  |
| 45 | 3221.9 | 285 | 1643702 | 20947.9 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | A | -45.2111 |  |  |
|  | B | 80.64 |  |  |

Therefore

**(8 marks)**

**(c )** Assume independence of events, I.e. event of having one account type is independent of having another account type.

1. Let = event of having account type NdiDhilu. Then

**( 1 mark)**

Probability of three people having account type =

independence

**(1 marks)**

Let event of having account type NdiDhilu. .

Let event of having account type Mpamba. .

Let event of having account type Yabooka. .

Let event of having account type Yobheba. .

**(1 mark)**

Let event of having two people with same account type.

Therefore contains compound events , , and . In addition, the compound events are mutually exclusive

**(1 mark)**

Events mutually exclusive

**(2 marks)**