**Chapter 6 Bivariate Data SAC**

Full Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Multiple Choices**

1. **For the scatterplot below, the correlation is best described as (1)**

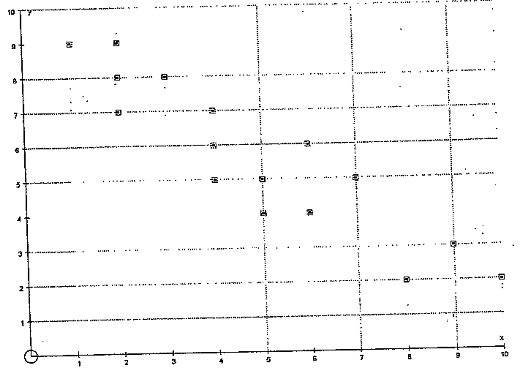
A Moderate negative

B Strong positive association

C No correlation

D Moderate positive association

E Weak Negative Association



1. **Estimate the strength of association in the scatterplot below: (1)**

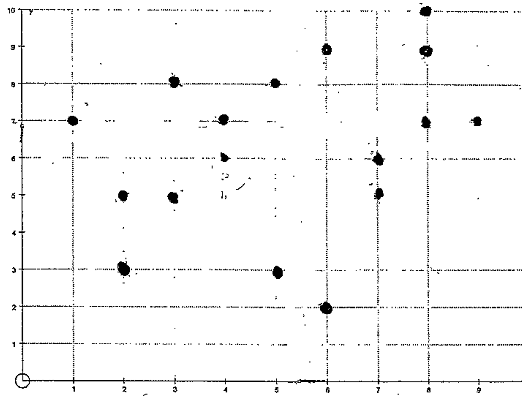
A -1

B 1

C 0.6

D 0.22

E 0



**The following data is used to answer questions 3 and 4**

**The rural school has investigated the relationship between the time spent travelling to school (minutes) and a student’s year ten average marks in math (%) for a sample of students. The results are given in the table below**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Travel time (mins)** | 10 | 33 | 18 | 43 | 34 | 30 | 24 | 47 | 44 | 41 | 17 | 45 | 39 | 31 | 23 | 11 | 14 | 25 | 16 | 17 |
| **Year 10 average (%)** | 51 | 78 | 97 | 56 | 90 | 70 | 64 | 67 | 37 | 46 | 95 | 67 | 31 | 57 | 43 | 99 | 98 | 82 | 40 | 67 |

1. **The Pearson’s Correlation Coefficient (r) for this data is: (1)**

A 0.16

B -0.678

C 0.149

D -0.402

E 0.456

1. **The Equation of the least square regression line (mx + b) for the set of data is: (1)**

A y = 86.85 – 0.715x

B y = 86.85 + 0.715x

C y = 0.715 – 86.85x

D y = 0.715 + 86.85x

E x = 0.715 – 86.85y

1. **The equation of the least squares regression line for a set of data showing the relationship between hours spend training for Taekwondo and the hours watching TV is**

**H =** - 0.244 **T +** 3.25

**H = Number of hours watching TV**

**T = Number of hours training**

**Ashley watches 150 minutes of TV. Using the equation, predict approximately how many hours he would have spent at training that day. (1)**

A 2.5 hours

B 120 mins

C 3 hours

D 100 mins

E 4.5 hours

**Short Answer Questions**

1. **For the following data, produce a scatter-plot to determine whether the plot shows a positive, negative or no apparent correlation (using eye estimation) (1)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | **7** | **11** | **6** | **32** | **20** | **4** | **16** | **2** | **10** |
| **Y** | 23 | **55** | **20** | **100** | **55** | **17** | **76** | **10** | **90** |

**Answer Here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Determine the q-correlation for the scatter-plot of question 1, and interpret the meaning. (2)**

**Answer Here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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1. **The following data table is graphed below and is used in question 3**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | **0** | **1.5** | **2** | **3.8** | **4** | **5** | **6.2** | **7.1** | **8** | **9.3** | **10.2** | **11.4** |
| **Y** | **23** | **27** | **29** | **31** | **37** | **42** | **46** | **49** | **52** | **58** | **61** | **66** |

**a) Using calculator, find the equation of the least square regression line for the set of observations in the table above. (1)**

**Answer Here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**b) Find the equation of the three-median regression line for the set of data. (5)**

**Answer Here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**c) What can you say about the overall difference between the least square regression line and the three-median regression line? (1)**

|  |
| --- |
|  |
|  |
|  |

1. **The test results for two general mathematics tests are compared in the table below.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test 1** | **56** | **77** | **75** | **87** | **65** | **43** | **23** | **45** | **78** | **66** |
| **Test 2** | **60** | **80** | **72** | **86** | **63** | **51** | **60** | **50** | **89** | **58** |

1. **Draw a back to back stem and leaf plot to data the Data (2)**

LEAF Test 1

LEAF test 2

STEM

1. **Calculate Pearson’s Correlation coefficient between Test 1 and Test 2 (let Test 1 be the independent variable). (1)**
2. **Interpret the results from question 4 b) (1)**
3. **Find r2 and interpret what this means? (2)**
4. **A science experiment was conducted where the reaction time was measured depending on the temperature. The following the data retrieved from the science experiment. Reaction time in Seconds, Temperature in degree Celsius**
5. **Using your best judgment draw a “line of best fit” on the graph. (1)**
6. **Determine two points on your “line of best fit” and use those points to work out the equation of your best fit line. (The equation is in the form of y = mx + c where m is the gradient and c is the y-intercept). (3)**
7. **From your best fit equation determine the temperature required to get a reaction time of 9 seconds (1)**
8. **From your best fit equation determine the reaction time if the temperature was 25 degree Celsius (1)**

**The Ultimate Question (Bonus)**

Three guys have $10 each and wanted to hire a motel room. The busboy tells them it will cost $30. They put money together and give the busboy $30. The busboy brings the money to the manager but he tells the boy that they get a $5 discount and return $5. The busboy returns the $5 to the 3 guys. Each guy takes $1 each, since they originally had $10 this means they only spend $9 each. The $2 left over of the discount money is given to the busboy.

The three guys started with $10 each a total of $30.

Each of the three guys only spent $9 and they gave away $2. There it is $9 x 3 + $2 = $29.

Why doesn’t the money they spent add up to the money they originally had?