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| **MATHEMATICS DEPARTMENT** | |  |
| **Course:** **ATMAA** | |
| **Topic Title**: **Skills Test 4** | |
| Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date: \_\_\_\_\_\_\_\_\_\_2016 | | |
| Special Instructions: Calculator Allowed | Time Allowed: 20 mins | | |
|  | Marks: / 9 | | |

**Question 1 (1 mark)**

Calculate Pearson’s correlation coefficient for the data in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***X*** | 23 | 8 | 49 | 43 | 36 | 58 | 9 | 28 | 42 | 10 |
| ***Y*** | 32 | 28 | 41 | 23 | 24 | 10 | 38 | 29 | 16 | 40 |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  | | | | | | |  |  | |

**A** 0.54 **B** 0.56 **C** -0.56 **D** 0.58 **E** -0.58

**Question 2 (1 mark)**

Calculate the coefficient of determination for the data in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***X*** | 21 | 5 | 46 | 36 | 42 | 56 | 10 | 30 | 45 | 37 |
| ***Y*** | 31 | 30 | 43 | 17 | 24 | 8 | 43 | 27 | 12 | 13 |

**A** 23% **B** 25% **C** 28% **D** 32% **E** 36%

**Question 3 (1 mark)**

A student adds up the time, in hours, spent studying for each topic and the test scores for each topic, as a percentage. She finds the correlation coefficient to be 0.87. To the nearest whole percentage, what percentage of the variation in her test scores can be explained by the variation in time spent studying?

**A** 70% **B** 72% **C** 76% **D** 80% **E** 83%

**Question 4 (1 mark)**

Two random variables have been observed and calculated to be connected by the equation

y = 44.92 + 0.11x.

The coefficient of determination is 0.42. Find the value of Pearson’s product-moment correlation coefficient, correct to two decimal places.

**A** 0.65 **B** -0.65 **C** ±0.65 **D** 0.72 **E** ±0.72

**Question 5 (1 mark)**

Data is collected on people aged between 10 and 21. A line of best fit is used to predict results. Predicting results for which age would be an example of interpolation?

**A** 7 years old **B** 18 years old **C** 24 years old **D** 26 years old  **E** 35 years old

**Question 6 (1 mark)**

Data is collected on people aged between 18 and 50. A line of best fit is used to predict results. Predicting results for which age would be an example of extrapolation?

**A** 18years old **B** 24 years old **C** 30 years old **D** 48 years old  **E** 60 years old

**Question 7 (1 mark)**

The regression line modelling the amount of chemical (kg) produced by a reactor is measured against the temperature (ºC) of the reactants. The regression line modelling the results has the equation:

Amount of chemical produced = 15.50 + 1.17 × temperature

Use the model to predict, to the nearest kilogram, the quantity of chemical produced at 60ºC.

**A** 34kg **B** 64kg **C** 86kg **D** 133kg **E** 180kg

**Question 8 (1 mark)**

The regression line modelling the amount of chemical (kg) produced by a reactor is measured against the temperature (ºC) of the reactants. The regression line modelling the results has the equation:

Amount of chemical produced = 83.76 – 0.79 × temperature

Use the model to predict to the nearest degree the temperature you would expect to produce 59 kg of chemical.

**A** 18°C **B** 31°C **C** 37°C **D** 42°C **E** 52°C

**Question 9 (1 mark)**

The regression line connecting weight of a certain young animal to age was found to have the equation

Weight (kg) = 20 + 2.5 × age in months

Calculate the residual for an animal that is 4 months old and weighs 39 kg

**A**  0 kg **B** 6 kg  **C** 9kg  **D** 12kg  **E** 16kg