2. Stuart is investigating the relationship between Gross Domestic Product (GDP) and the size of the population for a particular country.
He takes a random sample of 9 years and records the size of the population, t millions, and the GDP, g billion dollars for each of these years.

The data are summarised as

$$n = 9 \quad \sum t = 7.87 \quad \sum g = 144.84 \quad \sum g^2 = 3624.41 \quad S_{tt} = 1.29 \quad S_{tg} = 40.25$$

(a) Calculate the product moment correlation coefficient between t and g

(3)

(b) Give an interpretation of your product moment correlation coefficient.

(1)

(c) Find the equation of the least squares regression line of g on t in the form $g = a + bt$

(4)

(d) Give an interpretation of the value of b in your regression line.

(1)

(e) (i) Use the regression line from part (c) to estimate the GDP, in billions of dollars, for a population of 7 000 000

(2)

(ii) Comment on the reliability of your answer in part (i). Give a reason, in context, for your answer.

(1)

Using the regression line from part (c), Stuart estimates that for a population increase of x million there will be an increase of 0.1 billion dollars in GDP.

(f) Find the value of x

(2)

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