6. A research student is investigating the maximum weight, y grams, of sugar that will dissolve in 100 grams of water at various temperatures, x °C, where $10 \leqslant x \leqslant 80$

The research student calculated the regression line of y on x and found it to be

$$y = 151.2 + 2.72x$$

(a) Give an interpretation of the gradient of the regression line.

(1)

(b) Use the regression line to estimate the maximum weight of sugar that will dissolve in 100 grams of water when the temperature is 90 °C.

(2)

(c) Comment on the reliability of your estimate, giving a reason for your answer.

(2)

Using the regression line of y on x and the following summary statistics

$$\sum y = 3119 \qquad \sum y^2 = 851\,093 \qquad \sum x^2 = 24\,500 \qquad n = 12$$

(d) show that the product moment correlation coefficient for these data is 0.988 to 3 decimal places.

(7)

The research student's supervisor plotted the original data on a scatter diagram, shown on page 23

With reference to both the scatter diagram and the correlation coefficient,

(e) discuss the suitability of a linear regression model to describe the relationship between x and y.

(2)

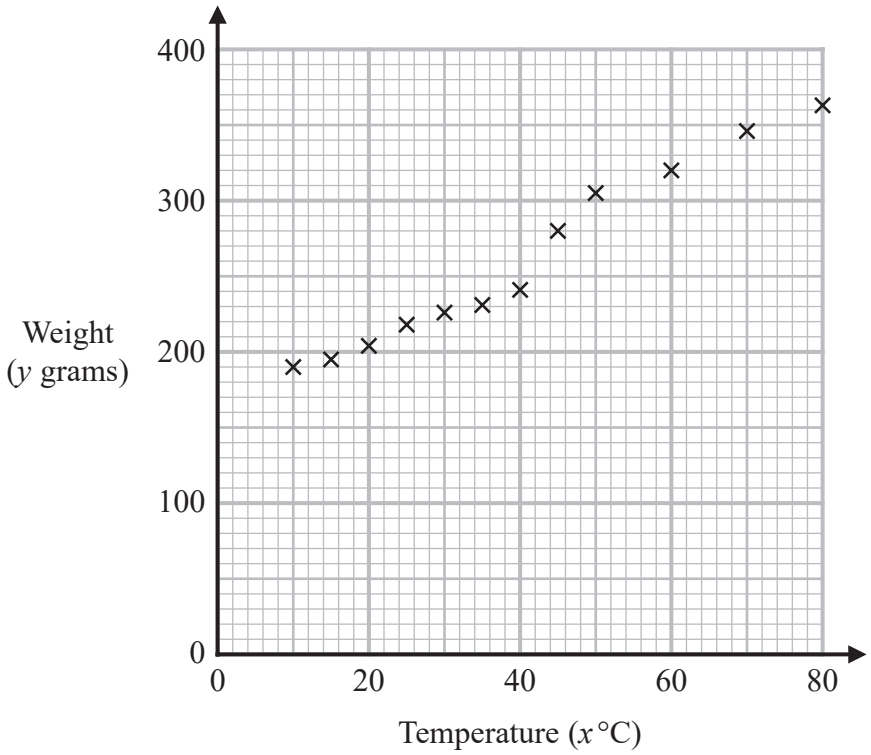
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(Total for Question 6 is 14 marks)

TOTAL FOR PAPER IS 75 MARKS

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