Question 13 **(15 marks)**

Data have been collected for nine suburbs within a city about the number of mobile phone towers and the number of births in the last 12 months for each suburb.

	Suburb								
	1	2	3	4	5	6	7	8	9
Number of mobile phone towers (n)	4	6	7	8	6	10	5	8	7
Number of births in the last 12 months (b)	25	29	35	45	38	54	22	38	39

The data has a correlation coefficient of 0.92, and the equation of the least-squares line is $b = 5.13n + 1.31$.

(a) Interpret the gradient of the least-squares line in the context of the question. (2 marks)

(b) Explain the significance of the correlation coefficient in the context of the question. (2 marks)

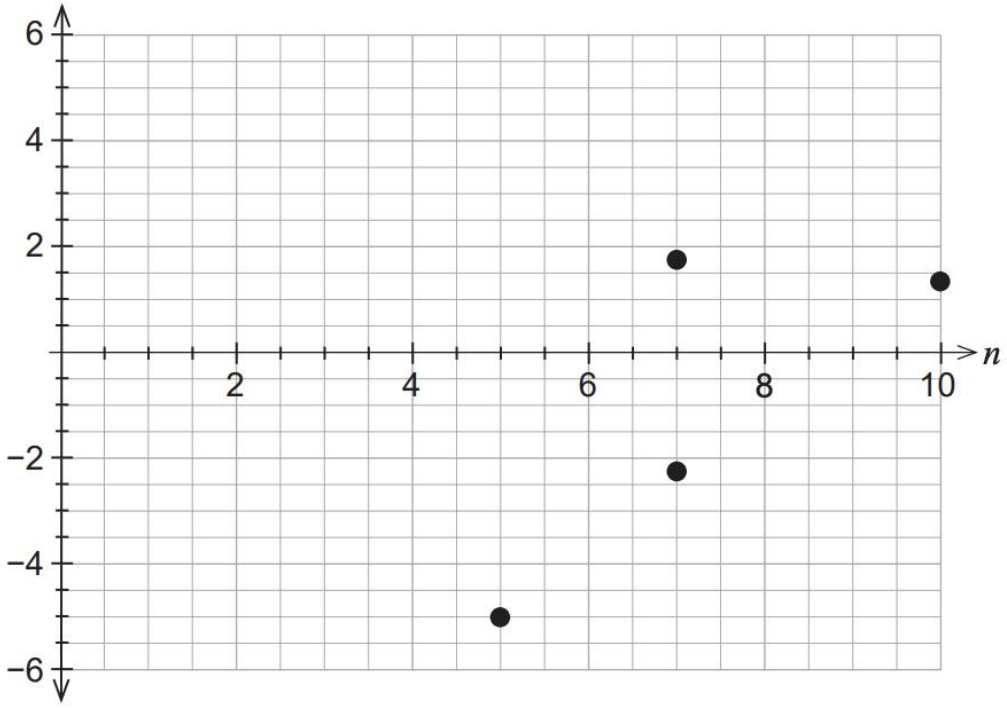
(c) (i) Predict the number of births for a suburb in this city that has nine mobile phone towers. (1 mark)

(ii) Comment on the validity of the prediction in part (c)(i). Justify your response.

(2 marks)

(d) Complete the residual plot below. (3 marks)

Residual



A spare grid is provided at the end of this Question/Answer booklet. If you need to use it, cross out this attempt and indicate that you have redrawn it on the spare grid.

(e) Based on the residual plot, comment on whether the least-squares line is a suitable model for these data. (2 marks)

(f) A 10th suburb has a data point (5,12) which has been verified as correct. State a practical explanation of how this could be a correct data point. (1 mark)

(g) A journalist has followed the mathematics involved in working with bivariate data and is writing a report for a newspaper. What is a valid statement that could be made about the observed association between the number of mobile phone towers and the number of births in the last 12 months for suburbs within the city? (2 marks)