

- 11 The pre-release material contains information about the Median Income of Taxpayers and the Percentage of Pupils Achieving at Least 5 A*– C grades, including English and Maths, at the end of KS4 in different areas of London.

Alex is investigating whether there is a relationship between median income and the percentage of pupils achieving at least 5 A* – C grades, including English and Maths, at the end of KS4. Alex decides to use the first 12 rows of data for 2014–5 from the pre-release data as a sample. The sample is shown in **Fig. 11.1**.

Area	Median Income of Taxpayers	Percentage of Pupils Achieving at Least 5 A*– C grades including English and Maths
City of London	61100	#N/A
Barking and Dagenham	21800	54.0
Barnet	27100	70.1
Bexley	24400	55.0
Brent	22700	60.0
Bromley	28100	68.0
Camden	33100	56.4
Croydon	25100	59.6
Ealing	24600	62.1
Enfield	25300	54.5
Greenwich	24600	57.7
Hackney	26000	60.4

Fig. 11.1

- (a) Explain whether the data in **Fig. 11.1** is a simple random sample of the data for 2014–5. [1]
- (b) The City of London is included in Alex’s sample.

Explain why Alex is not able to use the data for the City of London in this investigation. [2]

Fig. 11.2 shows a scatter diagram showing Percentage of Pupils against Median Income for all of the areas of London for which data is available.

Median income and Percentage of Pupils achieving at least 5 A*–C grades including English and Maths at the end of KS4 2014–5

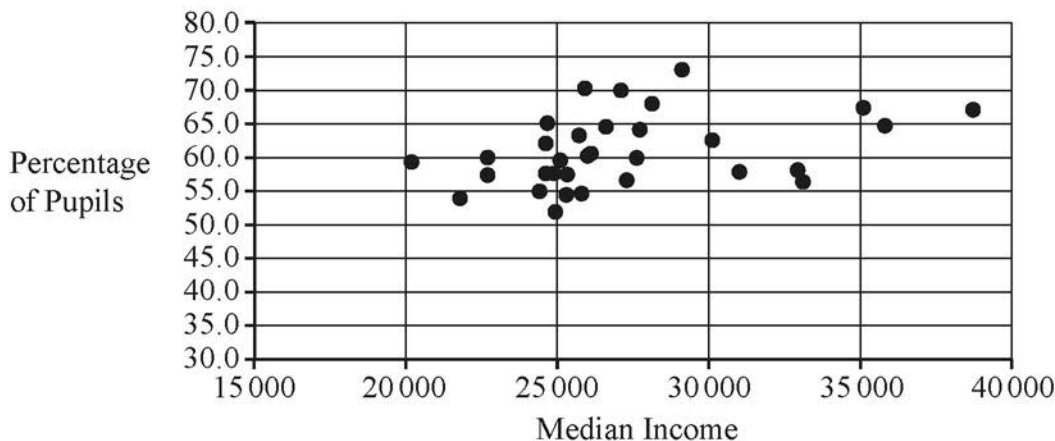


Fig. 11.2

Alex identifies some outliers.

(c) On the copy of **Fig. 11.2** in the Printed Answer Booklet, ring three of these outliers. [1]

Alex then discards all the outliers and uses the LINEST function on a spreadsheet to obtain the following model.

$$P = 0.0009049M + 37.38,$$

where P = percentage of pupils and M = median income.

(d) Show that the model is a good fit for the data for Hackney. [1]

(e) Use the model to find an estimate of the value of P for City of London. [1]

(f) Give **two** reasons why this estimate may not be reliable. [2]

Alex states that more than 50% of the pupils in London achieved at least a grade C at the end of KS4 in English **and** Maths in 2014–5.

(g) Use the information in **Fig. 11.2** together with your knowledge of the pre-release material to explain whether there is evidence to support this statement. [1]