

OCR

A Level

A Level Mathematics

Understanding the Large
Dataset

Name:

M M E

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Total Marks:

Understanding the Large Dataset- Questions

OCR

- 1) A demographer is investigating the dependency ratio (DR) for a Local Authority (LA) in the East Midlands. An error means that the only information they have is the year, 2001, and the DR, 55.63%. The formula for the dependency ratio is

$$DR = \frac{\text{Number of People Aged } (0 - 14) + \text{Aged } (> 65)}{\text{Number of People Aged } 15 - 64} \times 100$$

- i) Determine the name of the Local Authority. [5]
- ii) Find the DR for the same LA in 2011. [2]
- iii) For this LA, assuming the DR changes linearly, in what year will the DR = 0%. [3]
- iv) In 2001 the state pension was £72.50 per person and £102.15 in 2011. Assuming it is given to everyone aged 65 and above, calculate the percentage increase or decrease in pay out for this LA from 2001 to 2011. [3]
- v) Produce a box-plot showing the 2001 DR for each LA in the East Midlands and comment on outliers. [5]
- vi) For this region, comment on whether the median or mean would be the most appropriate measure of the average DR. [1]
- vii) Calculate the mean DR for each region for both 2001 and 2011. Plot these DR on a scatter plot and comment on how the distribution has changed over the 10 years. [6]
- viii) For 2011, determine the LA with the highest DR and the LA with the lowest DR. Using your knowledge, or research, comment on why these DR each LA are as such. [2]

- 2) In your new role as Transport & Travel Coordinator at the Tamworth University you have been tasked with investigating people's method of travel. You can remove those who are *Not in employment*.
- i) Produce and comment on two pie-charts showing how methods of travel have changed in the West Midlands from 2001 to 2011. [3]
 - ii) For Tamworth create a linear regression model, with respect to time, for each of the travel types, modelling how each type has changed. [3]
 - iii) Determine the number of people who will travel to the university by *car or van*. [1]
 - iv) The university has banned people traveling to it by car or van. Split the people in the proportions of the other methods. Calculate how many people, following this ban, will be travelling to university by bicycle. [4]