



**AS Mathematics Exam Questions by Topic**  
**Chapter 15d: Misc Statistical Reasoning and Large Dataset Questions**

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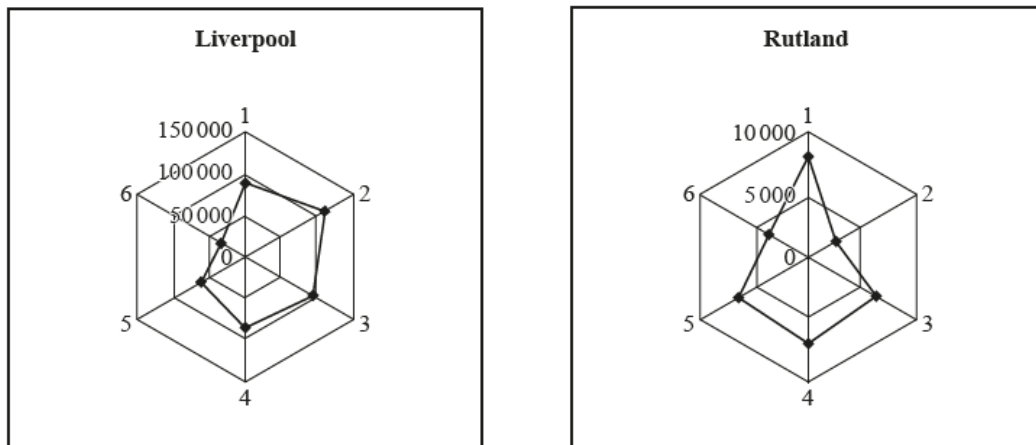
These questions are taken from the Specimen Exam materials and the real 2018 papers for the new syllabus AS and A-level mathematics courses and arranged by chapter of the textbooks by Goldie et al (available here: <https://amzn.to/39umfr5> and <https://amzn.to/3hE8kBL> ). There are a mixture of questions from OCR A, OCR B (MEI), Edexcel and AQA. Although the style of questions varies a little across the exam boards the content of the syllabus is almost identical so these are suitable for students preparing for any exam board.

Free problem sets for all other chapters, as well as video solutions, full past papers and other content for GCSE and A-level maths can be found at:

<https://mathsaurus.com/>

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13 The radar diagrams illustrate some population figures from the 2011 census results.



Each radius represents an age group, as follows:

Radius	1	2	3	4	5	6
Age group	0–17	18–29	30–44	45–59	60–74	75+

The distance of each dot from the centre represents the number of people in the relevant age group.

- (i) The scales on the two diagrams are different. State an advantage and a disadvantage of using different scales in order to make comparisons between the ages of people in these two Local Authorities. [2]
- (ii) Approximately how many people aged 45 to 59 were there in Liverpool? [1]
- (iii) State the main two differences between the age profiles of the two Local Authorities. [2]
- (iv) James makes the following claim.

“Assuming that there are no significant movements of population either into or out of the two regions, the 2021 census results are likely to show an increase in the number of children in Liverpool and a decrease in the number of children in Rutland.”

Use the radar diagrams to give a justification for this claim. [2]

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OCR A AS Sample Paper 1 Question 13:

- 13 Clara used some data from the 2011 UK census to summarise information on carbon emissions due to travel to work, in two Local Authorities. Her results are shown below.

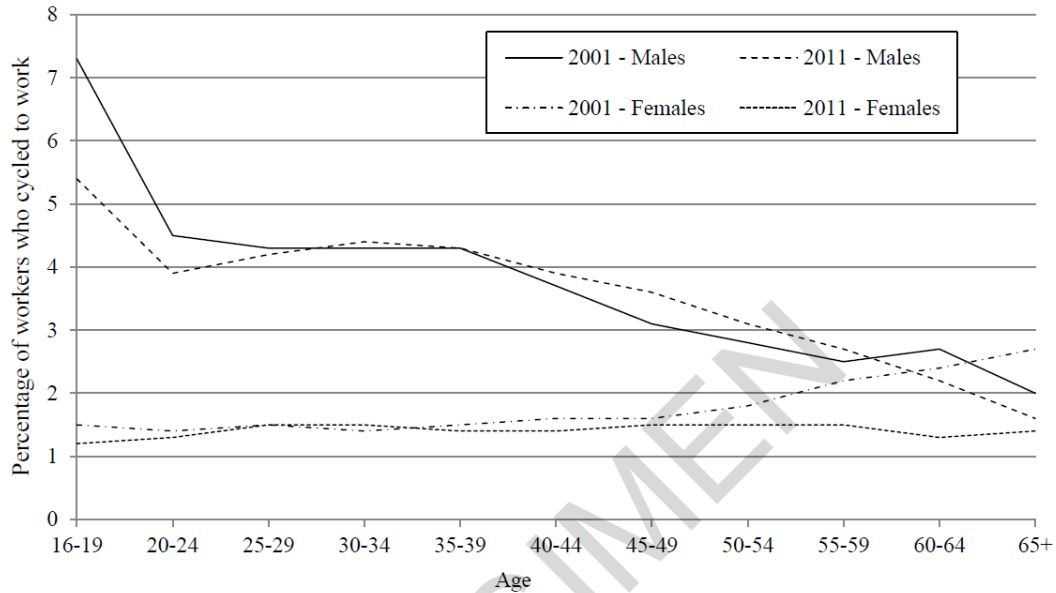
	Method of travel to work	Individual motorised transport	Shared motorised transport	Public transport	No motorised transport	Total
	Carbon emissions category	High	Medium	Low	None	
Local Authority A	Number of workers	174 374	42 112	61 483	76 024	353 993
	Percentage of workers	49.3	11.9	17.4	21.5	100
Local Authority B	Number of workers	39 433	9944	4614	16 232	70 223
	Percentage of workers	56.2	14.2	6.6	23.1	100

- (i) Clara calculated the values for the column headed “shared motorised transport” by doubling the value in the “passenger in a car or van” column of the original data set. Explain what assumption she has made and what other adjustment would need to be made to the data to take account of this. [2]
- (ii) Clara suggests that the average carbon emissions per worker due to travelling to work is larger in region B than in region A.
- (a) Use data from the table to support Clara’s suggestion. [1]
- (b) Use data from the table to argue against Clara’s suggestion. [1]

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OCR A Sample Paper 2 Question 9:

- 9 The diagram below shows some “Cycle to work” data taken from the 2001 and 2011 UK censuses. The diagram shows the percentages, by age group, of male and female workers in England and Wales, excluding London, who cycled to work in 2001 and 2011.



The following questions refer to the workers represented by the graphs in the diagram.

- (i) A researcher is going to take a sample of men and a sample of women and ask them whether or not they cycle to work. Why would it be more important to stratify the sample of men? [1]
- (ii) A research project followed a randomly chosen large sample of the group of male workers who were aged 30-34 in 2001. Does the diagram suggest that the proportion of this group who cycled to work has increased or decreased from 2001 to 2011? Justify your answer. [2]
- (iii) Write down one assumption that you have to make about these workers in order to draw this conclusion. [1]