AQA

LEVEL 3 MATHEMATICAL STUDIES

(1350)

Specification

For teaching from September 2014 onwards
For exams in May/June 2016 onwards

Subject content

3.1 Analysis of data
3.2 Maths for personal finance
3.3 Estimation
3.4 Critical analysis of given data and models (including spreadsheets and tabular data)
3.5 The normal distribution
3.6 Probabilities and estimation
3.7 Correlation and regression

Assessments

Paper 1

What's assessed:

- 3.1
- 3.2
- 3.3

Assessed:

- written exam: 1 hour 30 minutes
- 60 marks
- scientific calculator or graphics calculator allowed (see section 5.9 for more information on calculators).

Questions:

Copy of Preliminary material available in advance on eAQA and clean copy of Preliminary material to be provided in examination room.

Formulae sheet available.

No optional questions.

Paper 2A: Statistical techniques

What's assessed:

- 3.4
- 3.5
- 3.6
- 3.7

Students will be expected to draw on the mathematical content of Paper 1.

Students will be expected to develop and demonstrate confidence and competence in the understanding and application of mathematical modelling in the solution of problems related to the use of statistical techniques.

Assessed:

- written exam: 1 hour 30 minutes
- 60 marks
- scientific calculator or graphics calculator allowed (see section 5.9 for more information on calculators).

Questions:

Copy of Preliminary material available in advance on eAQA and clean copy of Preliminary material to be provided in examination room.

Formulae sheet available.

Statistical tables available.

No optional questions.

Subject content

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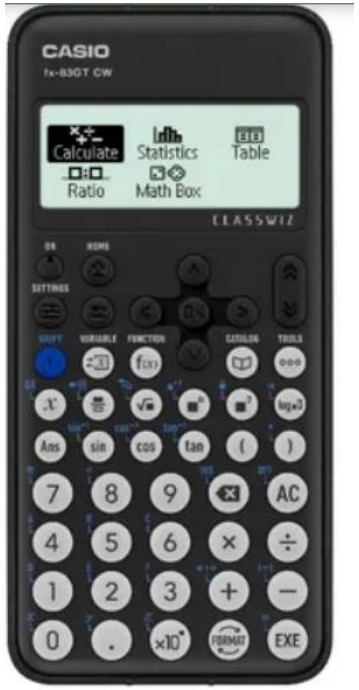
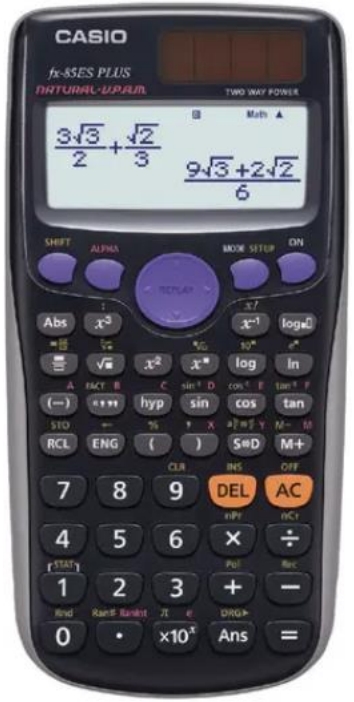
Equipment needed:

- Pen
- Pencil
- Ruler
- Scientific Calculator

(Mainly just the standard GCSE Maths equipment)





Welcome to Mathematical Studies!

- There's a load of information I could give you but …
- I think that's a boring way to start a course so we're going to get stuck in.
- I will say upfront that I'm still new to teaching this course before but I have done a lot of preparation and I'm genuinely excited about it!

Mathematical Studies

3. Estimation

Lesson 1

What to expect in estimating questions

- Be ready to be thrown at how ‘different’ these questions are compared to what you’re used to.
- You won’t be able to see the answer straight away.
- Expect them to take longer than most GCSE questions.
- Be prepared to write more – both mathematically and in words.

An example question:

How many items of luggage pass through **Heathrow** airport in a month?

Here's a framework to get us started

Fermi Framework

Fermi question:	
Stage 1: Assumptions – closing the questions down, ring-fence it, define it better, making it do-able. **1.** **2.** **3.** **4.**	
Stage 2: Questions- What info do you need?	**Stage 3: Estimate - answers to the questions**

1 Assumptions and simplifications
2 What information is needed?
3 Estimate that information & calculate
4 Check

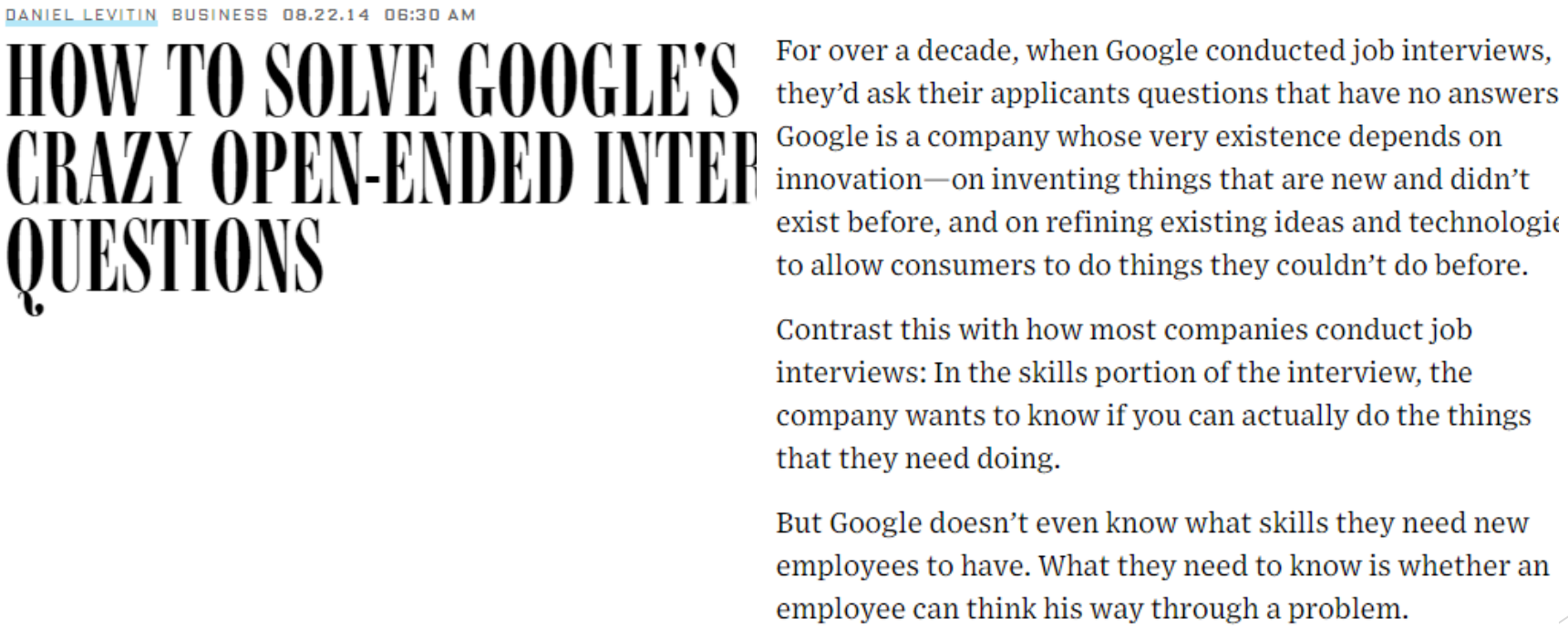
The answer isn't the most important part

You've heard this before at GCSE.

It really is true here.

Getting the 'right' answer by itself will **not** get you all the marks.

Why would anyone want the ‘wrong’ answer?



DANIEL LEVITIN BUSINESS 08.22.14 06:30 AM

HOW TO SOLVE GOOGLE'S CRAZY OPEN-ENDED INTER QUESTIONS

For over a decade, when Google conducted job interviews, they’d ask their applicants questions that have no answers Google is a company whose very existence depends on innovation—on inventing things that are new and didn’t exist before, and on refining existing ideas and technologie to allow consumers to do things they couldn’t do before.

Contrast this with how most companies conduct job interviews: In the skills portion of the interview, the company wants to know if you can actually do the things that they need doing.

But Google doesn’t even know what skills they need new employees to have. What they need to know is whether an employee can think his way through a problem.

Source: https://www.wired.com/2014/08/how-to-solve-crazy-open-ended-google-interview-questions/

Easy to be overwhelmed

- Start small
- Don’t get bogged down in details – round things brutally
- State your assumptions and/or simplifications
- Over estimates and under estimates will help balance out

Estimation task

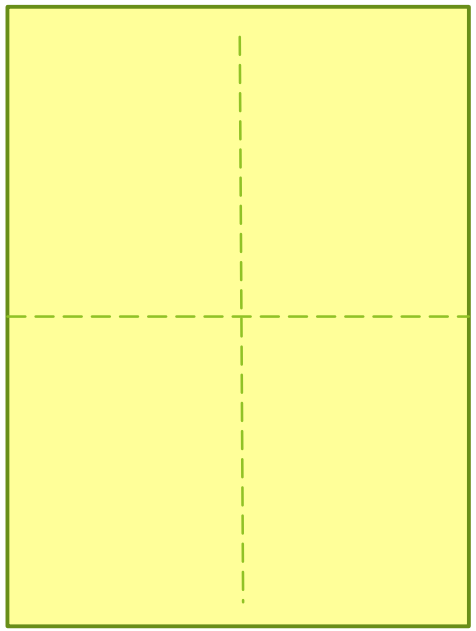
It used to be claimed that the population of the world could stand on the Isle of Wight.

Was that true?

Is it true now?

Isle of Wight

Could the population of the world fit on the Isle of Wight?



1 Assumptions and simplifications
2 What information is needed?
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4 Check

Assumptions and simplifications

- Take some time to think about these.

1 Assumptions and simplifications
2 What information is needed?
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Assumptions and simplifications

Could include:

- Ignoring roads, buildings etc
- Assume all people take the same space
- The island is a more simple shape

- Getting them into position won't be a problem
- No-one will be born and no-one will die during the activity

What information is needed?

- Take some time to think about these.

1 Assumptions and simplifications
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What information is needed?

- How many people in the world?
- How big is the Isle of Wight?
- How many people can fit in a given space?

How could we estimate those?

- Take some time to think about these.

1 Assumptions and simplifications
2 What information is needed?
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4 Check

Calculations

What calculations could be done to reach a conclusion?

(There is more than one route through this.)

1 Assumptions and simplifications
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Conclusions

- Have we answered the question, stating our assumptions and simplifications clearly?
- Did splitting your page into quarters help?
- When else would population density matter?