

An overview of the National Reference Test



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Introduction

Ofqual is introducing the new National Reference Test to provide additional information to support the future awarding of GCSEs. The information from the test will be considered each year by Ofqual and the exam boards prior to GCSEs being awarded. The NRT will provide information on changes in performance over time and will be based on results from a nationally representative sample of students who will take the test shortly before taking their GCSEs. Currently, exam boards have limited evidence of how performance can change over time. The test will indicate if, over several years, there is a change in how students perform at the national level, which exam boards can then consider during awarding.

The test will provide additional information that we expect will significantly advance our ability to detect real changes in performance and so improve awarding. We will act cautiously as we build our understanding of the information that the test will provide and how this is used in awarding GCSEs.

Test design

There are separate tests for maths and English. They are based on the content and style for the new GCSEs in maths and English language.

The questions are not in exactly the same style as the new GCSE questions, but they are suitable for students who are studying for the GCSE. The questions used in the test do not reflect any particular exam board's style of GCSE questions. There are some example questions available at the end of this document.

Each test is divided into several booklets. Each student takes just one booklet, so no student takes the whole test. We can use this approach because we do not need to test every student on every area of the curriculum; we're not awarding each individual student a mark or a grade. We're only interested to measure the overall performance across the whole sample of students that take the test, and this means we can therefore keep the length of the test to an hour.

The reference test for maths, unlike the GCSE, is not tiered. Most of the questions are based on the GCSE content that all students taking the qualification have to study. There are a few questions at the end of each booklet that are based on the content that is only studied by those preparing to take the higher tier GCSE.

The reference test for English includes questions that require students to write longer responses as well others that can be answered with short, one sentence responses. There is no testing of spoken language in the English test.

The questions will remain largely the same from year to year to enable performance to be compared. Therefore, the questions used in the test have to remain confidential

and will not be published, and we will not be able to provide feedback on how individual students have performed.

Test development

We developed the specification for the test in 2014 and, having appointed the National Foundation for Educational Research (NFER) as our test supplier, agreed the test design with them in the summer of 2015.

In September and October 2015, NFER trialled questions that it had developed for the new test. This involved 175 schools and over 4000 students. Twice as many questions were trialled as would be eventually needed to enable the best questions to be selected for the final version of the test. In March 2016, we held a preliminary reference test. This involved over 300 schools, the same number that will be involved in the annual live test. More than 9000 students took the test, either in English or maths. Trialling the test in 2016 enabled us to confirm that all the operational arrangements worked well. It also enabled us to analyse a complete set of test data and to make sure that all the test questions functioned properly, to enable us to differentiate students' performance.

We were very pleased with the outcome of the preliminary reference test. The trial worked well and demonstrated that the test is now ready to be held each year.

Our biggest challenge in conducting the trial was to achieve the sample of schools we needed to ensure we had a representative sample of students taking the test. This is going to be even more important next year, when the test is 'for real'. We are very grateful to all the schools and students who agreed to take part. For the trial in 2016, schools agreed to take part voluntarily. The Government has introduced legislation that makes it mandatory for most schools, if selected for the sample, to take part. (There are similar arrangements in place for international testing such as PISA.) We hope that all schools will recognise that it is important they do take part in the test, if requested by NFER to do so, to achieve a nationally representative sample of students.

Annual testing

Each year in September, NFER will contact over 300 schools that it has selected to take part in the test. A different but representative sample of schools will be used each year. NFER will provide detailed instructions to these schools about how the test will be conducted and how students will be selected to take the test. More information is available in the document [Information to schools taking part](#).

At each school, NFER will select at random 30 students to take the maths test and another 30 students to take the English test. The students will be in year 11. No

student is asked to take a test in both subjects. The test will take each student an hour to complete. The results will be analysed only at the national level; there will be no results for individual schools or students. So, for example, no result can be recorded in students' school records. The only information will be for England as a whole.

We need all randomly selected students to take the test. This will provide the most statistically sound sample. However, under the legislation introduced by the government, head teachers can withdraw individual students from the test in exceptional circumstances. This may be appropriate for a specific reason such as accessibility or situations where taking the test may cause significant distress for the student. The test has been carefully designed to be accessible to all students who are due to sit their GCSEs in the summer, and all reasonable and appropriate access arrangements will be included in NFER's administration of the test.

The test will take place at the same time each year. In 2017, the test window will be between 20 February and 3 March. Schools can agree with NFER on which day the test will be held. We have chosen this period to ensure students will have covered most of their GCSE courses but not to be too close to when the GCSE exams take place. We do not want to disrupt students' final exam preparations. In order to minimise the burden on participating schools, a test administrator from NFER will come to the school on the day and carry out the test. The school will need to provide an exam room where the students can take the test and NFER's administrator will invigilate it. NFER will also mark the completed scripts.

Importantly, we do not want students to prepare specially for the test. There's no need to arrange for revision or any extra teaching. On the day, students will be encouraged to make their best effort in answering the questions. The questions that we use in the test have to remain confidential because we will use most of them again each year. That is how we can compare performance between years. But we have published a few examples to give students who will take the test, and their teachers, an idea of what they can expect. These are available at the end of this document.

From 2018, when exam boards publish GCSE results in August, Ofqual will intend to publish the national measures of performance on the test. The results of the reference test will set out the percentage of students in that year who are expected, based on the test, to achieve at least a grade 4, a grade 5 or a grade 7 in their GCSE. The test will show if these percentages change from year to year. And it is these changes, if any, that will be taken into account when GCSEs are being awarded.

In 2017, we will use the results from the GCSEs to establish the scores in the NRT that equate to the GCSE grade boundaries. The NRT will play no part in GCSE

awarding in 2017. So, for example, we will take the percentage of students in year 11 who achieved at least a grade 4 in the GCSE and determine the score in the NRT that the same percentage of students achieved. We will do this for each of the key grade boundaries for both maths and English language.

The first time that we will have 2 sets of data for comparison will be in 2018. We would expect to see an improvement in early NRT results as student and teacher familiarity with the new English language and maths GCSEs. This, alongside the need to compare the performance of student cohorts over several years, means information from the test will not be used by exam boards during awarding until at least 2019. From 2020, we expect to be able to use NRT results each year when GCSEs are awarded.

Example questions

The English test

In each of the English test booklets, there are 2 sections; the first is a reading test and the second a writing test. Each section carries 25 marks and we advise the students to spend broadly equal time in each section.

The reading test is based on an extract from a longer prose text, or two shorter extracts from different texts. The extracts are drawn from types of texts that can be used in GCSEs: high-quality, challenging texts from the 19th, 20th and 21st centuries, including literature and extended literary non-fiction, and other writing such as essays, reviews and journalism. Students are asked five or six questions that refer to the extracts. Some questions have one or two marks requiring short responses or require the student to select a response from options provided. These check for understanding of information, plot or key details in the text, or relate to the writer's methods or use of language and structure.

In each booklet, the reading test also includes a 6-mark question and a 10-mark question where longer, more in-depth responses need to be given. These focus on analysis and evaluation of particular aspects of the text. Where extracts from two texts are used, the questions require students to draw comparisons between the texts. Here are examples of types of questions that may be used in the reading test where two text extracts are provided to students. They don't relate to extracts from actual texts.

Look again at lines 1 – 4.

How do the children react when they see the garden?

1m

Re-read lines 6 – 15.

Why does Jack spend time with his neighbour?

Give **two** reasons.

1.

2.

2m

Look at Text A.

How does the writer use language to interest the reader in her news?

Remember to write about the effects of particular words and phrases.

6m

Think about both texts.

Compare the writers' attitudes to travelling and how they present these attitudes.

Remember to:

- compare the two writers' attitudes
- compare the ways the two writers express their attitudes
- support your ideas with references to **both** texts.

10m

The writing test is a single, 25 mark task. This is an extended piece of writing, responding to a stimulus. Again, the range of stimuli that we use is the same as can be used in the GCSE. For example, students may be asked to describe, narrate, give and respond to information, argue, explain or instruct.

Here's an example of the type of question that might be used:

Write the **opening** of a short story with the title ‘*The Journey*’.

You could:

- Focus on travelling somewhere
 - Write about an important change
 - Use a real or imagined situation
-

The maths test


The maths test includes questions on number, algebra, geometry and measures, ratio and proportion, and statistics and probability – the same curriculum as the GCSE. Each of the test booklets has 13 or 14 questions with a total of 50 marks and each student takes just one of the booklets.

Unlike the GCSE exams, the maths test is not a tiered assessment. Students take the same test booklets, whether they will be taking the foundation or higher tier at GCSE. Two or three questions at the end of each booklet are based on the topics studied for the higher tier GCSE so we know that some students may not be able to answer these questions, but they are all welcome to try.

There are some shorter questions, usually worth 2 or 3 marks, in which students are asked to carry out standard procedures. There are also some longer questions usually worth 4 to 6 marks that require the use of reasoning or problem solving skills. Some of these may be split into parts in which the answer to the first part can be used to help solve the second part. There are also some less structured questions that might require several steps of working to reach a final answer.

Students can use a GCSE-compatible calculator for all questions, and are provided with formulae if they would be given in a GCSE exam.

Here are four examples of questions that are similar to those we are using in the maths test. They vary in the level of demand as well as coming from different areas of the curriculum.

1	<p>In July, Michael ran five races. Here are his times to the nearest hundredth of a second.</p> <p>12.45 12.49 12.55 12.61 12.48</p>	
----------	---	---

a	Work out the mean of Michael's times for July.	2 marks
Answer		seconds
.....		

b	Work out the range of Michael's times for July.	1 mark
Answer		seconds
.....		

C

In September, Michael ran another five races.
These five races have a mean time of 12.67 seconds and a range of 0.11 seconds.

Tick (✓) one box to complete Michael's sentence correctly.

1
mark



- ...quicker on average and more consistent.
- ...slower on average and more consistent.
- ...quicker on average and less consistent.
- ...slower on average and less consistent.

2

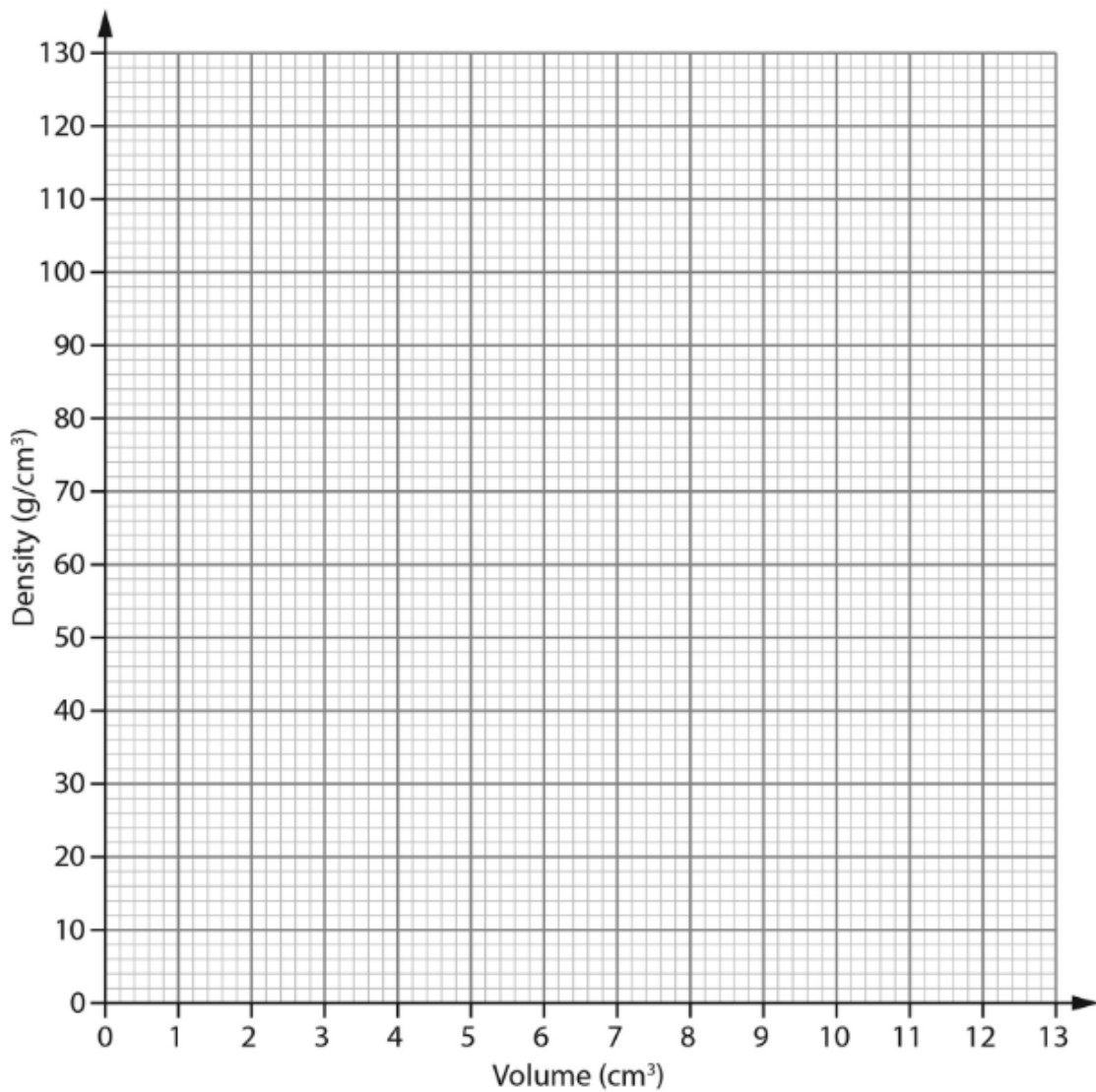
Karen has some objects, each with a mass of 240 grams.
Here is a table showing the volume and density of each of Karen's objects.

Object	A	B	C	D	E	F
Volume (cm ³)	2	3	4	6	8	12
Density (g/cm ³)	120	80	60	40	30	20

a

Draw a graph showing Karen's data on the grid below.

2
marks



b	Object G has a volume of 5 cm^3 and a density of 42 g/cm^3 .
----------	--

Use your graph to explain why Object G does not have a mass of 240 grams.	<i>1 mark</i>
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.....

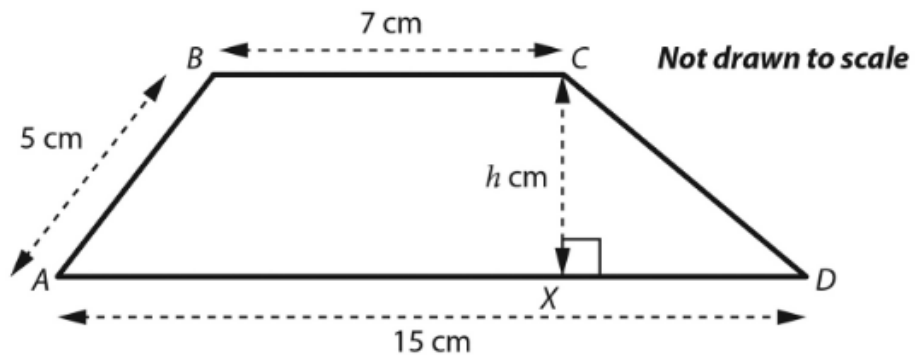
c	Karen says, "The density of an object is directly proportional to its volume."
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Explain how the shape of your graph shows that Karen is wrong.	<i>1 mark</i>
--	-------------------

.....

3

Here is a diagram showing a trapezium, $ABCD$.



$AD = 15$ cm, $BC = 7$ cm and $AB = 5$ cm.

The point X is the foot of the perpendicular from the point C to the line AD .

The area of the trapezium is 44 cm².

The ratio $AX : XD$ is $2 : 1$

a

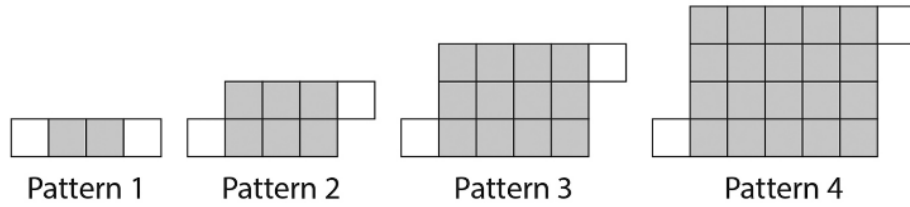
Show that the height of the trapezium, h , is 4 cm.

2
marks

b	Work out the perimeter of trapezium <i>ABCD</i> . Give your answer to one decimal place.	3 marks
Answer		cm

4

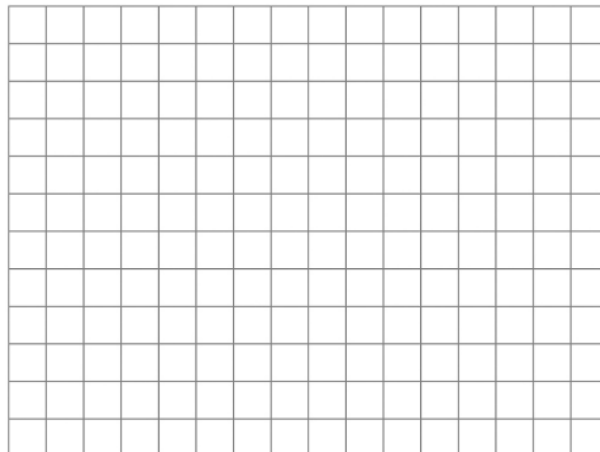
Here are some patterns made from white and grey tiles.



a

Draw Pattern 5 on the grid below.

1
mark



b

Pattern n requires $an^2 + bn + c$ tiles.
Work out the values of a , b and c .
You **must** show all your working.

4
marks

Answer $a =$ $b =$ $c =$

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