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YEAR
3

LEVELS
2–4

Year 3 optional tests in mathematics

Teacher's guide

QCA

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Introduction

Since the introduction of the optional tests for years 3, 4 and 5 in 1997, there has been much development in the teaching of mathematics. In order to reflect the changes, including the use of the National Numeracy Strategy Framework for teaching mathematics, new optional tests were introduced in 2003. Most primary schools use these tests and teachers are accustomed to their administration and marking. These new optional tests are administered and marked in the same way, providing fresh material for pupil assessment while maintaining consistency for teachers.

The years 3, 4 and 5 optional tests in mathematics offer schools a way of monitoring and measuring pupils' progress in the years between the statutory tests in years 2 and 6. They form part of the government's drive to raise standards at key stage 2. The results will help schools plan for teaching and learning, in order to meet targets for achievement by the end of key stage 2.

This series can be used to track progression reliably not only between years 3, 4 and 5, but also to link it confidently to the tests at the end of key stages 1 and 2. During development of the tests, large numbers of pupils completed various components of the new tests, as well as the most recent statutory tests, to establish a statistical link between the optional tests and the statutory tests.

The balance of marks within the tests reflects the structure of the national curriculum.

Unlike the statutory tests, these optional materials are not due to be replaced annually and schools will need to store or reorder materials from year to year, as has been the case previously.

This guide will provide the user with information needed to administer and mark the tests. It also presents the necessary information to convert total marks to national curriculum levels and age standardised scores.

The structure and timing of the tests

There are two parts to each test: a written mathematics test and a mental mathematics test.

Written tests

A choice of two written tests is available: Test 3a is a levels 2–3 test awarding levels 2B to 3B, and Test 3b is a levels 3–4 test awarding levels 3C to 4C. Each written test contains 35 marks and has a recommended time limit of 45 minutes. They contain the same practice question. This means that it should be possible for you to administer both tests at the same time. **Pupils should sit only one written test**, since some questions are common to both. You should decide which test is most appropriate for each pupil.

In Test 3a, similar numbers of questions are aimed at level 2 and level 3. This test is for pupils who are working securely within level 2 or who are at the threshold of level 3.

In Test 3b, the main emphasis is on level 3 but approximately one-quarter of the questions assess level 4. This test is for pupils who are working securely within level 3 or who are at the threshold of level 4.

The following table may help you make your decision for each pupil.

Which written test should a pupil take?

Teacher assessment level	Written test
below level 2 level 2C	neither; use teacher assessment only
level 2B level 2A level 3C	Test 3a
level 3B level 3A level 4C	Test 3b
level 4B or above	consider using year 4 Test 4b, which provides a fuller assessment of level 4

Mental mathematics test

All pupils take the same mental mathematics test. It is a recorded test consisting of 15 timed questions with an administration time of approximately 20 minutes. The questions are designed to assess mental recall and mental agility. Each question is worth one mark. The test should be administered using the CD, although a transcript is provided on pages 17–19 in case of an equipment malfunction on the day of the test. Each question is repeated twice and pupils are given either 5 or 10 seconds to write their response. The test is similar in style to the mental mathematics test at the end of key stage 2. Schools requiring the test on audiotape are able to order one from the QCA Orderline on 08700 606015.

Mark schemes and analysing the results

Separate mark schemes for each written test are provided on pages 24–35. The mark scheme for the mental mathematics test is included on page 43.

Age standardised scores

Age standardised score tables are provided on pages 48–51. These scores take into account the pupil's age in years and completed months, giving an indication of how each pupil is performing relative to other pupils of the same age.

Grids for test analysis

QCA has produced national curriculum references for each question, which will allow teachers, if they wish, to analyse the performance of pupils in their class. These sheets are included in the Teacher pack. Further copies can be ordered from the QCA Orderline on 08700 606015. Teachers may also analyse performance using the DfES Pupil Achievement Tracker (PAT). The PAT software can be downloaded from www.standards.dfes.gov.uk/performance.

Organisation

Grouping pupils for the test

Both the mental and written tests can be administered to all pupils at the appropriate levels together, in small groups or individually. For the written tests, you may give help with reading. Your decision about grouping, therefore, should reflect the needs of pupils in your class and their ability to work independently.

Assistance

The test does not require the use of staff beyond those normally available in the classroom. However, any informed person, such as a language support teacher, a teaching assistant or special educational needs support staff member may administer it under the direction of the teacher. These staff should be aware of the guidance provided in the sections 'Assisting with the written tests' on page 14 and 'Guidance for teaching assistants' on pages 52–53. Details on how to administer the tests and their timing are also printed in the *Subject-specific guidance* on the reverse of the top sheet in the Pupil pack for ease of reference.

Special arrangements

The tests have been designed to be accessible to the majority of pupils working within the levels targeted by the tests. Schools are free to make adaptations to the tests which will improve accessibility for pupils for whom English is an additional language and for pupils with special educational needs, **provided any adaptations made do not invalidate the assessments**. These adaptations should be similar to those the pupils normally use in the classroom and should be based on the special arrangements for the end of key stage 2 statutory mathematics tests.

Examples of reasonable adaptations include:

- using readers, signers, amanuenses
- using tactile shapes and number cards
- photocopying onto coloured paper
- enhancing the shading on diagrams and/or emboldening lines on diagrams, charts and graphs to increase visual clarity
- enlarging diagrams, cutting them out, embossing or mounting them on card or other material according to normal classroom practice
- translating words or phrases in the tests that are likely to prove difficult for pupils for whom English is an additional language and also for some pupils who use British Sign Language or other sign-supported communication
- using mechanical and technological aids, including computers but not calculators
- allowing up to 25 per cent additional time as set out in the *Assessment and reporting arrangements* for key stage 2
- rest breaks, provided pupils remain supervised and do not discuss the tests.

Special arrangements should not provide an unfair advantage. It is important to ensure that any assistance given **does not alter the nature of the test questions**, and that any answer given is the pupil's own. Please refer to the *Assessment and reporting arrangements* booklet for further guidance.

Pupils with special educational needs

Support may be given to poor readers in the written mathematics tests by reading words, phrases or sentences that pupils find difficult. Instructions may also be clarified for them, **provided this does not give additional information or invalidate the assessment**; mathematical vocabulary cannot be changed or explained.

The most appropriate conditions for testing pupils with special educational needs are likely to be those in which they normally work well. The tests can be administered to small groups of pupils or, for some pupils, on an individual basis. Some pupils may need encouragement to continue working through the tests. As well as offering reassurance to the whole group, you may also need to be active in watching for pupils who have problems with reading the questions or with writing their responses.

Pupils learning English as an additional language

Pupils who are learning English as an additional language may be given access to the test in any way that is usual for them. If language support is available, the questions may be translated and pupils may respond in a language other than English. It is not intended that pupils are provided with a comprehensive written translation of the test. As with all pupils, you may read the questions aloud in English. You may also give a fuller explanation of the context of the questions, **but it is important to ensure that you do not give any additional interpretation of the mathematics or mathematical vocabulary in doing this**. It is particularly important when assessing pupils for whom English is an additional language that sufficient support is given for them to show their best attainment.

Modified versions of the tests

The optional mathematics tests are also available in braille and modified large print. These can be ordered from QCA's agency for the distribution of optional modified tests. Full details can be found on the NAA's test orders website. All orders must be placed as soon as possible, to ensure delivery of the tests by the end of April. Ideally, orders will be placed before the end of January in the year the pupil will be taking the test.

Administering the written tests

This information is for anyone involved in administering the tests including teachers, other members of school staff and other adults who may assist with test administration. The term 'test administrator' is used to cover anyone who is responsible for, or involved with, test administration.

The tests should be carried out under test conditions; they may be held in a classroom, school hall or any other suitable accommodation. The room(s) where the tests are to be administered will need to be prepared appropriately.

Wall displays such as calendars, tables, charts, number lines or number squares should be covered or removed. However, it is not necessary to remove wall clocks.

Pupils should be seated in such a way as to prevent copying.

Equipment

Each pupil will need:

- a mathematics test booklet (**either** Test 3a for levels 2–3 **or** Test 3b for levels 3–4), available in multiple copies from the QCA Orderline
- a pen or pencil
- a sharp pencil for mathematical drawing
- a ruler marked in centimetres and half centimetres
- access to mirrors
- a rubber (optional).

Calculators are **not** allowed.

Encourage the pupils to cross out, rather than rub out, incorrect answers and to write their new answer by the side. Rubbing out not only takes time but also loses important information for marking and analysis. If rubbers are not provided, have a rubber available for pupils who wish to change answers where the changes may be clearer by rubbing out than by crossing out, for example for shapes they have drawn or shaded.

Please note:
Do not supply the pupils with any other support materials, for example clocks or clock faces, number lines or squares, addition squares, multiplication squares, calculators or any representation of money (toy or real).

Timing

The pupils should be given **45 minutes** to complete the written test. You may indicate to the pupils when they are halfway through the time allowed for the test and again a few minutes before they have to stop.

The levels and age standardised scores are calculated on the basis of the test being administered to this time limit. **If you wish to derive levels or age standardised scores from the tests, you must adhere to these timings.**

Introducing the written tests

Each pupil will need a copy of the appropriate test booklet and access to the equipment listed on page 11.

Tell the pupils that:

- they cannot talk and must not copy since this is a test to find out what they can do by themselves
- they will do a practice question together with you (which is the same in Test 3a and Test 3b), and then carry on by themselves
- there are different sorts of questions and they should try to answer as many as they can
- they should read each question carefully
- they should put their hand up if they need help with reading, but must not call out or ask any other pupil
- some questions are harder than others. If they cannot answer a question, they should go on to the next one, which might be easier, and go back to the difficult ones later if they have time
- they are not to worry if they cannot complete all the questions
- if they make a mistake, they should change their answer by crossing it out and writing the correct answer beside it. (If rubbers are not provided, have a rubber available for pupils to change answers where the changes may be clearer by rubbing than by crossing out, for example for shapes they have drawn or shaded.)
- they may only use the equipment provided for them
- they have **45 minutes** to do all they can in the test
- if they finish the test early, they should go back and check their answers.

Working through the written tests

Tell the pupils to write their name, class and school on the front cover of the booklet.

Ask the pupils to turn to page 2 of the booklet and look at the pictures of the three children Vijay, Dan and Sarah. Read the names of the three children and explain that they will feature in some of the questions in the booklet. Explain that some other children may also be mentioned in the test.

Tell the pupils to look at page 3. Read through with them the section 'Getting started' and then tell them to look at the practice question. Give them time to complete the practice question.

Ensure that the pupils have correctly placed their answer to the practice question in the answer box. The practice question is not part of the test and you can spend as much time as you like helping the pupils to understand the format, what they should do and how and where they should record their answers.

Explain that:

- each question always has its number in the black shape at the left-hand side
- there are other questions in the test booklet that are similar to the practice question but that none will be exactly like the practice question
- some of the questions have boxes in which to write answers but for others there may be a dotted line or pupils may be asked to complete a graph, chart or diagram
- a pencil icon always indicates the space where the pupils should record their answers. They can use any of the space on the page for working out but they should write their answer in the space indicated by the pencil icon
- they should read each instruction very carefully and ask for help with reading if necessary.

To ensure that the testing is carried out in a standard way in all schools, it is important that your introduction does not exceed this information.

Assisting with the written tests

You should:

- give help with reading words or sentences where necessary. You may need to be aware of pupils who do not ask for the help they need to read unfamiliar words.

In a minority of cases, a pupil may need to have the entire test read out to him or her. Where readers are used, they will need to be familiar with the following information.

You should **not**:

- give any help with the mathematics as this will invalidate the assessment
- suggest to the pupils the mathematical operation to use
- give clues which help the pupils to interpret what any question requires them to do, for example you may read out the word *angles* in question 26 in Test 3a and question 10 in Test 3b, but you must not give any clues about its meaning
- prompt the pupils to confirm or change answers by pointing, frowning, smiling, head shaking or nodding, offering rubbers, or asking leading questions
- suggest different representations from the one provided. For example, do **not** re-present questions on addition or subtraction vertically when they are presented horizontally in the test booklet.

Questions must **not** be rephrased. However, general instruction words used in the test may be explained or rephrased if they are not familiar to the pupils. For example, the word *complete* in question 7 in Test 3a may be explained since it is not a mathematical term and not part of what is being assessed. Similarly, words which are used in everyday contexts only may be explained or rephrased if they are not familiar, for example *cherries* in question 24 in Test 3a and question 8 in Test 3b.

Teachers of pupils with special educational needs or of pupils learning English as an additional language should refer to 'Special arrangements' on pages 9–10.

Administering the mental mathematics test

If the mental mathematics test is administered on the same day as the written test, allow a break of at least 15 minutes between them.

There is one mental mathematics test. It is a recorded test consisting of a practice question and 15 timed questions. The test has an administration time of approximately 20 minutes. It starts with instructions to the pupils followed by the questions. There will be two opportunities for you to pause the recording. These will be indicated by a bleep. The first pause comes near the beginning of the recording, once the instructions have been given. This will allow clarification of any of the instructions not understood by the pupils. The second pause is after the practice question. After this second pause, the recording should be allowed to play without interruption.

The mental mathematics test is organised in two sections. In the first section, pupils are given 5 seconds in which to answer each of the questions. In the second section, the time is increased to 10 seconds per question. Each section includes easy and more difficult questions, arranged so that the easier questions are at the beginning of the section. This means that there are a number of relatively difficult questions early in the test with some relatively easy questions later. Pupils should be made aware that questions will vary in difficulty.

Equipment

You will need:

- a CD player
- a CD of the mental mathematics test.

Each pupil will need:

- a copy of the year 3 mental mathematics pupil answer sheet (photocopiable from page 54 of the *Teacher's guide* or available in multiple copies from the QCA Orderline)
- a pen or pencil.

Please note:
Pupils should have only pens or pencils. They should **not** have rubbers, rulers, calculators or any other mathematical equipment for the mental mathematics test. Access to paper for working out answers is **not** allowed **but the pupils may jot things down outside the answer box on their answer sheets if this helps them.**

They should be made aware that they must answer in the allocated time for each question and that recording extensive written working may slow down their responses.

Introducing the mental mathematics test

Ensure that each pupil has a copy of the mental mathematics pupil answer sheet. Tell the pupils to write their name, class and schoool in the box at the top of it.

Ensure the pupils understand that:

- they must complete the test on their own without copying or discussing questions with other pupils
- they will be told how long they have to answer each group of questions and that the time given will increase from 5 to 10 seconds as the test progresses through the two sections
- for some of the questions, the information they will need is included in or beside the answer box on the pupil answer sheet
- they are not allowed to use a calculator or any other mathematical equipment
- they should work out the answer to each question in their head but they may jot things down outside the answer box if it will help them
- if they want to change their answer they should put a cross through their first answer. They are not allowed to rub out any answers
- they should answer as many questions as they can. If they find a question too difficult, they should put a cross in the answer box and wait for the next question
- they should not interrupt the test by asking any questions once the test has started.

Working through the mental mathematics test

When you are ready, start the recording. Instructions will be given to the pupils. The recording will indicate, with a bleep, where you should pause the recording and answer any questions.

When the bleep is heard, pause the recording and answer any questions that the pupils have, ensuring that the instructions are clearly understood. It is important that the 'pause' function is used rather than the 'stop' function. This will ensure that the correct place is maintained within the recording.

Restart the recording. The pupils will be asked a practice question. After a 5-second pause for the pupils to write their answer a bleep will sound, indicating that you should pause the recording again to answer any questions.

After pausing the recording, ensure that the pupils have correctly placed their answer to the practice question on the answer sheet and that they are aware of the information provided to the right of the answer box for some questions.

When they are ready to begin the test, tell the pupils that you will not be able to stop the recording again, or answer any questions, once the recording has restarted.

Restart the recording and the test will begin. At the end of the test, pupils will be told to put down their pens and pencils, and you should stop the recording and collect in the answer sheets.

In the case of an equipment malfunction, the test will need to be read to the pupils. Instructions and a copy of the transcript for introducing the mental mathematics test in such an event are included in the following section.

Emergency use of the transcript

This section contains a transcript for the teacher-read version of the year 3 mental mathematics test. It should be used **only** in the event of equipment failure. In such an event, you should follow the instructions below.

1. You must have access to a clock or watch that measures accurately in seconds.
2. Give out the appropriate equipment as stated on page 15 and read through with the pupils 'Introducing the mental mathematics test' on page 16.
3. Read out the following script, **using exactly these words:**

Listen carefully to the instructions I am going to give you. When I have finished reading them, I will answer any questions. However, you will not be able to ask any questions once the test has begun.

I will start by reading a practice question. Then I am going to ask you 15 questions for the test. On your sheet there is an answer box for each question, where you should write the answer to the question and nothing else. You should work out the answer to each question in your head, but you may jot things down outside the answer box if this helps you. Do not try to write down your calculations because this will waste time and you may miss the next question. For some of the questions, important information is already written down for you on the sheet.

I will read out each question twice. Listen carefully both times. You will then have time to work out your answer. If you cannot work out an answer, put a cross in the answer box. If you make a mistake, cross out the wrong answer and write the correct answer next to it.

There are some easy and some harder questions, so don't be put off if you cannot answer a question.

4. Pause and answer any questions that the pupils have.

5. Read out the following:

*Here is the **practice** question to show you what to do.*

I will read the question twice, and you will have 5 seconds to work out the answer and write it in the answer box.

What is four add three?

6. Repeat the question.

What is four add three?

Wait 5 seconds (measured accurately using a clock or watch), then read out the following:

Now put down your pen or pencil.

7. Ensure that the pupils have correctly placed their answers to the practice question on their answer sheet. Remind the pupils that, for some questions, information is provided in or beside the answer box. When they are ready to begin the test, tell the pupils that you will not be able to answer any further questions, or interrupt the test, once you have started reading the questions.

8. The questions follow. They must be read out exactly as written. Start by stating the question number, then read out each question twice in quick succession before leaving the 5- or 10-second response time. **These timings must be strictly adhered to.**

9. At the end of the test, tell the pupils to put down their pens or pencils, then collect their answer sheets.

Mental mathematics test questions

'Now we are ready to start the test.

For the first group of questions you will have 5 seconds to work out each answer and write it down.'

1	What is eleven take away three?
2	How many tens are in thirty?
3	What is half of sixteen?
4	How many days are there in a week?
5	Write one hundred and seventy-six to the nearest ten.
6	Multiply nine by five.
7	Sarah has twenty pounds. She spends eleven pounds. How much money does she have left?
8	What is the sum of twelve and twenty-one?
9	What number do you add to thirty-four to make fifty?
10	Divide one hundred by five.

'For the next group of questions you will have 10 seconds to work out each answer and write it down.'

11	What number is double fifteen?
12	Look at your answer sheet. Put a ring around each odd number.
13	What number is halfway between seventy-six and eighty-four?
14	How many grams are there in two kilograms?
15	What is three-quarters of twelve?

'Now put down your pen or pencil. The test is finished.'

Marking the tests

You should mark the test in accordance with the guidance given. The *General guidance for marking* on pages 22–23 should be used in conjunction with the mark schemes, and you should read this before you begin marking.

The mark schemes help to identify the appropriate answers and tell you how many marks to allocate to each answer. Marking spaces have been provided in the right-hand margin of the test booklet beside each question. It is recommended that you fill in the marking spaces as follows:

1	Mark awarded
0	Question attempted but no mark awarded
–	Question omitted

These codes correspond with those used for filling in the *Grids for test analysis*.

If a pupil has altered an answer or the answer is not clear, try to establish what the original intention was. You may, on occasion, need to talk with the pupil individually to check this. Be sure to ask questions that do not suggest the required answer, for example *What is your answer here?*

For the written tests, we recommend that you mark the same double-page spread for the whole class before turning to the next double-page spread. This will make it easier for you to concentrate on a small section of the mark scheme at a time and on the *Supplementary marking guidance* (where appropriate). It also means that you are more likely to gain diagnostic information about particular questions to inform your teaching. The mark schemes have been designed to facilitate marking double-page spreads.

The structure of the mark schemes

The marking information for each question is set out in the form of tables, which start on page 24.

The 'Question' column on the left-hand side of each table provides a quick reference to the question number and the question part.

The 'Mark' column indicates the total number of marks available for each question part.

For some questions the code U1 is shown in the mark column. The 'U' indicates that there is a Using and applying mathematics element in the question. The number, 1, shows that one mark can be attributed to using and applying mathematics in this question.

The 'Requirement' column may include two types of information:

- a statement of the requirements for the award of each mark, with an indication of whether credit can be given for correct working
- examples of some different types of correct response.

The 'Additional guidance' column indicates alternative acceptable responses, and provides details of the range of acceptable answers. This column may also indicate unacceptable responses which should not be awarded a mark.

In order to ensure consistency of marking, the most common marking errors and difficulties are addressed in the *General guidance for marking* with the action the marker should take. Unless otherwise specified in the mark scheme, markers should apply these general guidelines in all cases.

The *Supplementary marking guidance* on pages 36–41 provides further instructions for the marking of questions containing a working mark and questions requiring a written explanation. The section includes examples of acceptable and unacceptable responses to the questions.

It is important that marking is carried out accurately according to the appropriate mark scheme to ensure consistency of results.

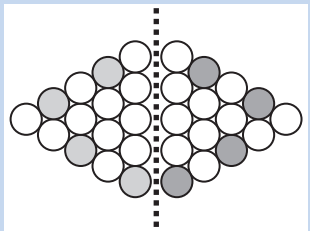
General guidance for marking

What if ...	*Marking procedure*
... the pupil reverses digits when recording?	Reversed digits are acceptable if they are clearly recognisable as the digit intended; for example, a reversed 2 must clearly show the characteristics of a 2 rather than a 5.
... the pupil writes a transposed number as the answer?	Transposed numbers should not be awarded the mark; for example, an answer of '16' when the correct answer is '61' should not be marked as correct.
... the pupil's response is numerically equivalent to the answer in the mark scheme?	The mark scheme will generally specify which equivalent responses are allowed. If this is not the case, award the mark unless the mark scheme states otherwise.
... the pupil's answer is correct but the wrong working is shown?	Always award the mark for a correct response unless the mark scheme states otherwise.
... the pupil has responded in a non-standard way?	Calculations and written responses do not have to be set out in any particular format. Pupils may provide evidence in any form, provided that its meaning can be understood. Diagrams, symbols or words are acceptable for explanations or for indicating a response. Any correct method of setting out working, however idiosyncratic, should be accepted.
... the correct response has been crossed (or rubbed) out and not replaced?	Mark, according to the mark scheme, any legible crossed out work that has not been replaced. If the work has been replaced, then do not consider the crossed out work.
... the pupil has worked out the answer correctly and then written an incorrect answer in the answer box?	Give precedence to the answer given in the answer box over any other workings. However, there may be cases where the incorrect answer is due to a transcription error, in which case you may check the pupil's intention and decide whether to award the mark.
... more than one answer is given?	If all answers given are correct (or a range of answers is given, all of which are correct), award the mark unless the mark scheme states otherwise. If both correct and incorrect responses are given, do not award the mark unless the mark scheme states otherwise. This includes multiple-choice style questions, where, for example, pupils are required to indicate the correct answer(s) from a list of four or five options.

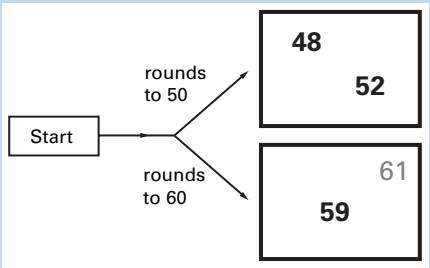
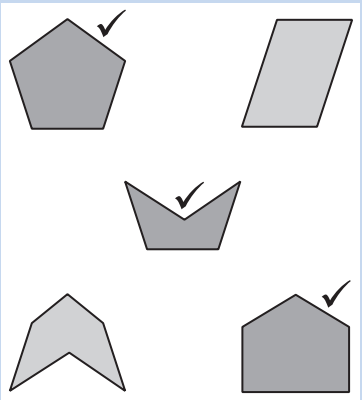
What if ...	*Marking procedure*
... the pupil's response does not match closely any of the examples given in the mark scheme?	Judge whether the response corresponds with the requirements in the 'Requirement' column of the mark scheme. Refer also to the 'Additional guidance' column and to the *Supplementary marking guidance* (where appropriate).
... there appears to be a misread of numbers affecting the working?	This is when the pupil misreads the information given in the question and uses different information without altering the original intention of the question. In one-mark questions, no mark should be awarded. However, in two-mark questions that have a working mark, one mark should be awarded if the working is applied correctly using the misread numbers, provided that the misread numbers are comparable in difficulty to the original numbers. For example, if '243' is misread as '234', both numbers may be regarded as comparable in difficulty.
... no answer is given in the expected place, but the correct answer is given elsewhere?	Where a pupil has shown understanding of the question, award the mark. In particular, where a word or number response is expected, a pupil may meet the requirement by annotating a graph or labelling a diagram elsewhere in the question.
... the pupil's answer correctly follows through from earlier incorrect work?	'Follow-through' marks may be awarded only when specifically stated in the mark scheme. Either the correct response or an acceptable 'follow-through' response should be marked as correct.

Mark scheme for Test 3a

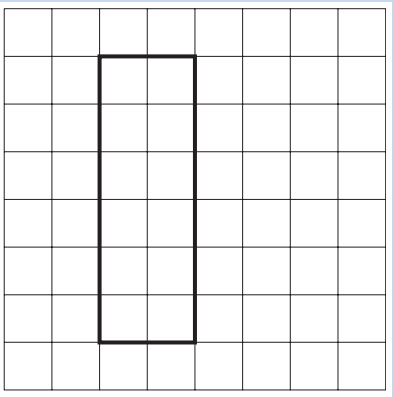
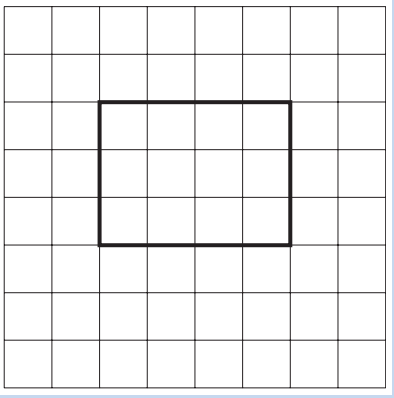
Test 3a questions 1–7

Question	Requirement	Mark	Additional guidance
Practice	29	***None***	
1	59	***1m***	
2	Coins circled as shown:  **OR** 	***1m***	*Accept any other clear way of indicating the correct coins, such as ticking.* *Accept an answer that indicates both correct responses, provided they have been clearly identified as two separate combinations.*
3	11	***1m***	
4	60	***1m***	
5	A **AND** D	***1m***	***Both*** *letters must be correct for the award of the mark.* *Letters may be given in either order.* *Accept unambiguous indications on the diagram, eg measurements for A and D marked correctly on the diagram.*
6	Boxes completed as shown: **89** **91** **98** **108** **121**	***1m***	***All five*** *numbers must be in the correct order for the award of the mark.* *Accept unambiguous indications, eg lines drawn from numbers to boxes.* *Transcription errors are acceptable only if they do not result in a wrongly ordered list.*
7	Reflection completed as shown: 	***1m***	***All four*** *correct circles must be indicated for the award of the mark.* *Accept any other clear way of indicating the correct circles, such as ticking.*

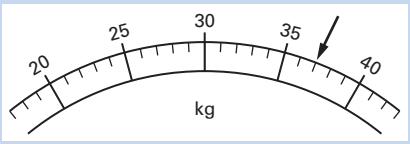
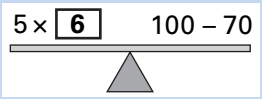
Test 3a questions 8–13

Question	Requirement	Mark	Additional guidance
8	Any pair of numbers with a product of 20, eg **1** × **20** **OR** **2** × **10** **OR** **4** × **5**	**1m**	*Accept numbers written in either order.* *Accept any other pair of numbers with a product of 20, eg 0.5 x 40*
9	Sorting diagram completed as shown: 	**1m**	***All three** numbers must be correct for the award of the mark.* *Disregard any additional numbers written on the diagram.*
10a **10b**	31 12:30	**1m** **1m**	*Accept 12:30pm **OR** 12:30am **OR** 0:30 **OR** the correct time written in words, eg half past twelve.*
11	42 **37** 32 **27** 22	**1m**	***Both** numbers must be correct for the award of the mark.*
12	One number circled as shown: 10 **(20)** 30 40 50	**1m** U1	*Accept any other clear way of indicating the correct number, such as ticking or underlining.*
13	Three pentagons ticked as shown: 	**1m**	***All three** pentagons must be ticked for the award of the mark.* *Accept any other clear way of indicating the correct shapes, such as circling.*

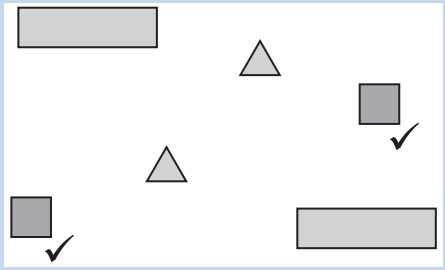
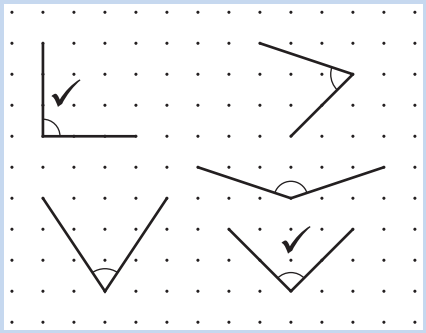
Test 3a questions 14–15

Question	Requirement	Mark	Additional guidance
14	Award **TWO** marks for all five remaining combinations of t-shirts and shorts. t-shirt / shorts R / B **R / R** **Y / B** **Y / R** **B / B** **B / R** If the answer is incorrect, award **ONE** mark for four different correct combinations.	**Up to 2m** U1	*Accept combinations listed in any order.* *Accept colours written in full on table.* *If both marks are awarded, record by entering 1 in each marking space.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*
15	Any rectangle with an area of 12 squares, eg  **OR** 	**1m**	*Accept slight inaccuracies in drawing provided the intention is clear.* *Vertices must be closer to correct grid point than any other grid point.* *Accept rectangles with measurements not drawn wholly on grid, eg 12 × 1 rectangle.* *Award the mark if a correctly drawn rectangle is separated into individual centimetre squares.*

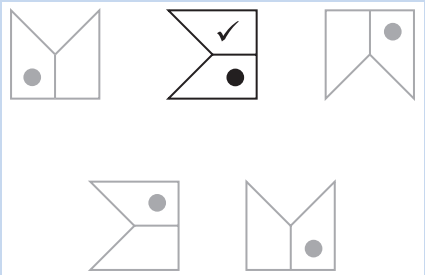
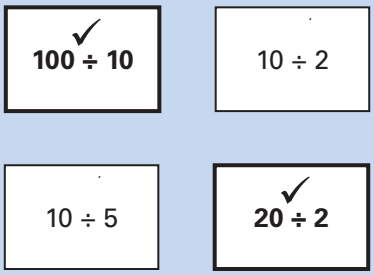
Test 3a questions 16–21

Question	Requirement	Mark	Additional guidance
16	Award **TWO** marks for the correct answer of 25p If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg 90 – 35 – 30 = wrong answer **OR** 35 + 30 = 65 90 – 65 = wrong answer 'Supplementary marking guidance' on page 36 shows some responses which are acceptable and unacceptable for the mark.	**Up to 2m**	*Accept £0.25p **OR** £0-25p **OR** £0:25p **OR** £0 25p* *If both marks are awarded, record by entering 1 in each marking space.* *Accept for **ONE** mark 0.25p **OR** £25p as evidence of appropriate working.* *The working must be carried through to reach an answer for the award of **ONE** mark.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*
17	56	**1m**	
18	Arrow drawn to 37 as shown: 	**1m**	*Arrow should be closer to 37 than to 36 or 38 for award of the mark.* *Arrow need not touch the line, provided the intention is clear.*
19	Box completed as shown: 	**1m**	
20	Three numbers circled as shown: **8** **24** 5 30 **12**	**1m**	***All three** numbers must be correct for the award of the mark.* *Accept any other clear way of indicating the correct numbers, such as ticking or underlining.*
21a	Chart completed as shown: Class / Boys / Girls / **Total** A: 28 B: 31 C: 29 D: **25**	**1m**	*Accept alternative unambiguous indications, eg correct answer written elsewhere on page.*
21b	**C** and **D**	**1m**	***Both** letters must be correct for the award of the mark.* *Letters may be given in either order.* *Accept unambiguous indications on the chart.*

Test 3a questions 22–27

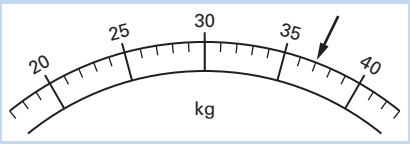
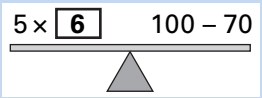
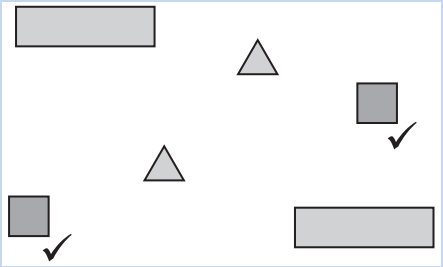
Question	Requirement	Mark	Additional guidance
22	Two shapes ticked as shown: 	**1m** U1	***Both** shapes must be correct for the award of the mark.* *Accept any other clear way of indicating the correct shapes, such as circling.*
23	Calculation completed as shown: **4** 4 + 5 **6** = 1 0 0	**1m**	***Both** numbers must be correct for the award of the mark.*
24	33	**1m**	
25	**11** boys and **10** girls	**1m** U1	*Answers must be in the correct order.*
26	Two angles ticked as shown: 	**1m**	***Both** angles must be correct for the award of the mark.* *Accept any other clear way of indicating the correct angles, such as circling.*
27	Award **TWO** marks for the correct answer of £1.90 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg 340 – 150 = wrong answer **OR** £2 + £1 + 20 + 20 = £3.40 £3.40 – £1.50 = wrong answer 'Supplementary marking guidance' on page 37 shows some responses which are acceptable and unacceptable for the mark.	**Up to 2m**	*Accept £1.90p **OR** £1.90 pence **OR** £1-90 **OR** £1:90 **OR** £1 90* *If both marks are awarded, record by entering 1 in each marking space.* *Accept for **ONE** mark £190p **OR** £190 **OR** £19.0 **OR** £19.0p as evidence of appropriate working.* *The working must be carried through to reach an answer for the award of **ONE** mark.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*

Test 3a questions 28–30

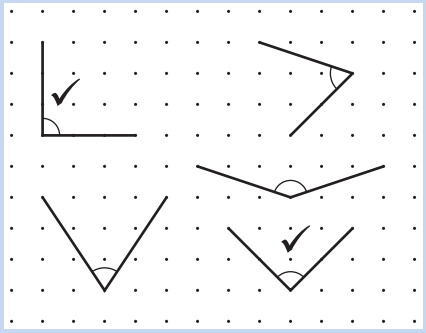
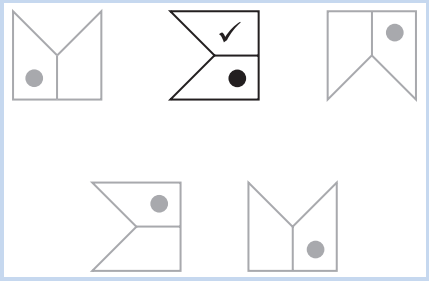
Question	Requirement	Mark	Additional guidance
28	One shape ticked as shown: 	**1m**	*Accept any other clear way of indicating the correct answer, such as circling.*
29	Two divisions ticked as shown: 	**1m**	***Both** divisions must be correct for the award of the mark.* *Accept any other clear way of indicating the correct divisions, such as circling.* *Accept '10' written in both correct boxes, provided that any answers written in the other two boxes are also correct.*
30	4	**1m**	***Do not** accept four triangles shaded without 4 written in the answer box.*
Maximum 35 marks			

Mark scheme for Test 3b

Test 3b questions 1–6

Question	Requirement	Mark	Additional guidance
Practice	29	***None***	
1	56	***1m***	
2	Arrow drawn to 37 as shown: 	***1m***	*Arrow should be closer to 37 than to 36 or 38 for award of the mark.* *Arrow need not touch the line, provided the intention is clear.*
3	Box completed as shown: 	***1m***	
4	Three numbers circled as shown: **8** **24** 5 30 **12**	***1m***	***All three*** *numbers must be correct for the award of the mark.* *Accept any other clear way of indicating the correct numbers, such as ticking or underlining.*
5a	Chart completed as shown: Class / Boys / Girls / **Total** A: 𝍸 𝍸 III / 𝍸 𝍸 𝍸 / 28 B: 𝍸 𝍸 IIII / 𝍸 𝍸 𝍸 II / 31 C: 𝍸 𝍸 𝍸 / 𝍸 𝍸 IIII / 29 D: 𝍸 𝍸 III / 𝍸 𝍸 II / **25**	***1m***	*Accept alternative unambiguous indications, eg correct answer written elsewhere on page.*
5b	**C** and **D**	***1m***	***Both*** *letters must be correct for the award of the mark.* *Letters may be given in either order.* *Accept unambiguous indications on the chart.*
6	Two shapes ticked as shown: 	***1m*** U1	***Both*** *shapes must be correct for the award of the mark.* *Accept any other clear way of indicating the correct shapes, such as circling.*

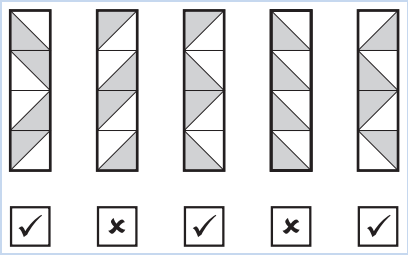
Test 3b questions 7–12

Question	Requirement	Mark	Additional guidance
7	Calculation completed as shown: **4** 4 + 5 **6** = 1 0 0	**1m**	***Both** numbers must be correct for the award of the mark.*
8	33	**1m**	
9	**11** boys and **10** girls	**1m** U1	*Answers must be in the correct order.*
10	Two angles ticked as shown: 	**1m**	***Both** angles must be correct for the award of the mark.* *Accept any clear way of indicating the correct angles, such as circling.*
11	Award **TWO** marks for the correct answer of £1.90 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg 340 – 150 = wrong answer **OR** £2 + £1 + 20 + 20 = £3.40 £3.40 – £1.50 = wrong answer 'Supplementary marking guidance' on page 37 shows some responses which are acceptable and unacceptable for the mark.	**Up to 2m**	*Accept £1.90p **OR** £1.90 pence **OR** £1-90 **OR** £1:90 **OR** £1 90* *If both marks are awarded, record by entering 1 in each marking space.* *Accept for **ONE** mark £190p **OR** £190 **OR** £19.0 **OR** £19.0p as evidence of appropriate working.* *The working must be carried through to reach an answer for the award of **ONE** mark.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*
12	One shape ticked as shown: 	**1m**	*Accept any other clear way of indicating the correct answer, such as circling.*

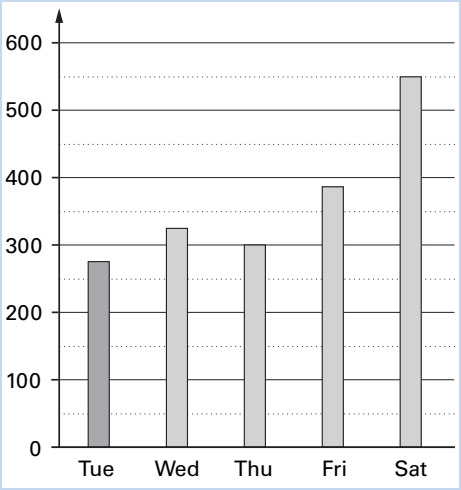
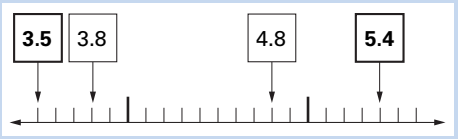
Test 3b questions 13–20

Question	Requirement	Mark	Additional guidance
13	Two divisions ticked as shown: ✓ **100 ÷ 10** 10 ÷ 2 10 ÷ 5 ✓ **20 ÷ 2**	**1m**	***Both** divisions must be correct for the award of the mark.* *Accept any other clear way of indicating the correct divisions, such as circling.* *Accept '10' written in both correct boxes, provided that any answers written in the other two boxes are also correct.*
14	4	**1m**	***Do not** accept four triangles shaded without 4 written in the answer box.*
15	159	**1m**	
16	19	**1m**	
17	120	**1m**	
18	Award **TWO** marks for the correct answer of 8 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg 157 ÷ 20 = wrong answer **OR** 157 – 20 – 20 – 20 – 20 – 20 – 20 – 20 = wrong answer, with answer rounded incorrectly or not rounded at all. 'Supplementary marking guidance' on page 38 shows some responses which are acceptable and unacceptable for the mark.	**Up to 2m**	*If both marks are awarded, record by entering 1 in each marking space.* *Award **ONE** mark for 7 **OR** for a correct calculation that has not been rounded up, eg 7 remainder 17 **OR** $7\frac{17}{20}$* *The working must be carried through to reach an answer for the award of **ONE** mark.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*
19	700	**1m**	
20a **20b**	Calculation completed as shown: 3 **4** × 2 = **6** 8 **OR** 3 **9** × 2 = **7** 8 Calculation completed using one of the above solutions not used to answer 20a.	**1m** **1m** U1	

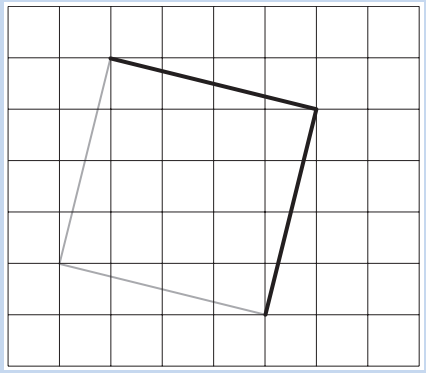
Test 3b questions 21–22

Question	Requirement	Mark	Additional guidance
21	An explanation which shows that the number of children who did **not** walk to school is more than the number of children who walked, eg: ■ '44 children walked which is fewer than the number who did not walk' ■ '6 more children did not walk than walked' ■ '19 and 25 added is less than 27 and 23 added, so more children did not walk' ■ '27 + 23 = 50 and 19 + 25 = 44' ■ 'The total for the bottom two boxes is greater than the total for the top two boxes'. 'Supplementary marking guidance' on pages 40–41 shows some responses which are acceptable and unacceptable for the mark.	***1m*** U1	***Do not*** *award the mark for circling 'No' alone.* *If 'Yes' is circled but a correct unambiguous explanation is given, then award the mark.* *Accept one or more calculation errors provided that the correct pair of numbers have been added together, eg 27 + 23 = 40 and 19 + 25 = 44* ***Do not*** *accept vague or arbitrary explanations, eg:* ■ *'On the results, you can see more children walked than did not walk'* ■ *'Because the diagram says so'* ■ *'Because 25 is greater than 23'.*
22	Award **TWO** marks for boxes ticked and crossed as shown:  If the answer is incorrect, award **ONE** mark for four out of five boxes correctly completed.	***Up to 2m***	*Accept alternative unambiguous indications, such as* ***Y*** *or* ***N****.* *For* ***TWO*** *marks accept:* ☑ ☐ ☑ ☐ ☑ *If both marks are awarded, record by entering 1 in each marking space.* *Award* ***ONE*** *mark by entering 1, 0 in the marking spaces.*

Test 3b questions 23–25

Question	Requirement	Mark	Additional guidance
23a	Bar for Tuesday drawn on graph as shown:  	***1m***	*Bar should be closer to 275 than to 250 or 300 for the award of the mark, ie accept bar length between 42mm and 46mm exclusive.* *Accept slight inaccuracies in drawing, eg width of bar, provided the intention is clear.*
23b	Answer in the range 155 to 175 inclusive.	***1m***	
24	Boxes completed as shown:  	***1m***	***Both*** *numbers must be correct for the award of the mark.*
25	£8.91 **OR** 891p	***1m***	*Accept £8.91p* ***OR*** *£8.91 pence* ***OR*** *£8-91* ***OR*** *£8:91* ***OR*** *£8 91* ***OR*** *891* ***OR*** *8.91* ***Do not*** *accept £891p* ***OR*** *8.91p*

Test 3b questions 26–28

Question	Requirement	Mark	Additional guidance
26	Award **TWO** marks for the correct answer of 9 If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg 38 + 7 = 45 45 ÷ 5 = wrong answer **OR** a 'trial and improvement' method, eg 12 × 5 – 7 = 53 7 × 5 – 7 = 28 10 × 5 – 7 = 43 'Supplementary marking guidance' on page 39 shows some responses which are acceptable and unacceptable for the mark.	***Up to 2m***	*If both marks are awarded, record by entering 1 in each marking space.* *A 'trial and improvement' method must show evidence of improvement, but a final answer need not be reached for the award of **ONE** mark.* *Award **ONE** mark by entering 1, 0 in the marking spaces.*
27	8	***1m***	
28	Square completed as shown: 	***1m***	*Accept slight inaccuracies in drawing provided the intention is clear.* *Vertex must be within 3mm of the correct grid point.*
Maximum 35 marks			

Supplementary marking guidance for Tests 3a and 3b

This section includes examples of responses to two types of questions – those containing a working mark (pages 36–39) and those that require an explanation (pages 40–41).

Questions containing a working mark

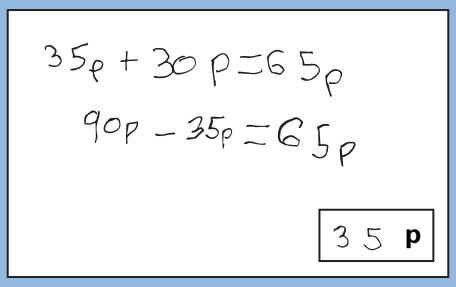
For the award of one mark, pupils are required to:

- show a complete and correct method which reaches an answer, **or**
- record an answer that is accepted as evidence of a complete and correct method.

Examples of responses from Test 3a question 16

1 mark | **0 marks**

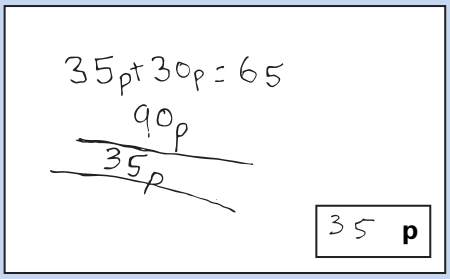
Bola correctly calculated that the two items bought together cost 65p. She then tried to calculate the money left over by finding the number that must be subtracted from 90 to make 65, but made an error when attempting this calculation, which led to an incorrect answer of 35p. However, she has shown evidence of appropriate working by recording a sequence of steps that would have led to the correct answer if no arithmetic error had been made. She can be awarded one mark. Charlie also calculated the cost of the items as 65p. However, it is not clear from his subsequent working that he identified the need to subtract 65p from 90p. Charlie's method cannot be regarded as complete or correct, so he cannot be awarded one mark.



Bola

1

0

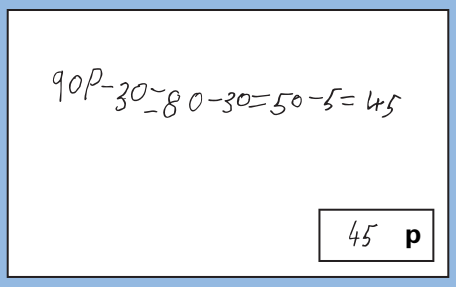


Charlie

0

0

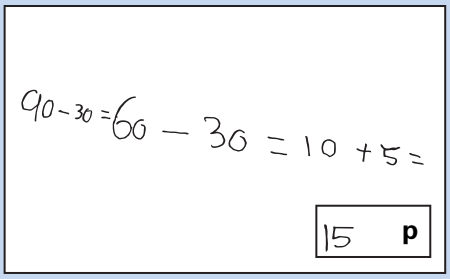
Tariq and Elaine have both counted back from 90p to obtain an answer. Tariq subtracted the cost of the two items bought in three steps, ie –30p, –30p and –5p. He made an arithmetic error when he subtracted 30p from 90p, leading to an incorrect final answer of 45p. However, his method is complete and viable so can be awarded one mark. Elaine used a method similar to Tariq but, instead of subtracting 5p as the final step in her calculation, she added 5p. She cannot be awarded one mark since the final step in her method was not appropriate to solve this problem.



Tariq

1

0



Elaine

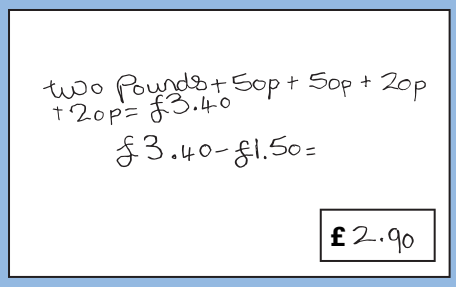
0

0

Examples of responses from Test 3a question 27 and Test 3b question 11

1 mark	0 marks

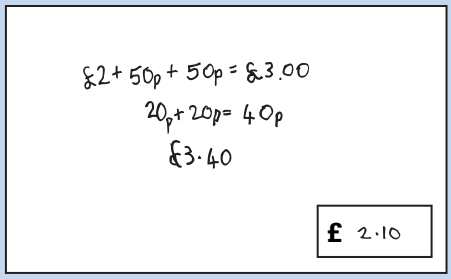
Yasmin has shown clearly how she calculated £3.40, the amount of money Dan has. She then correctly recorded a subtraction to find the difference between £3.40 and £1.50, the amount that Vijay has. She made an error in her subtraction which led to an incorrect answer of £2.90. However, her working is complete and correct so she can be awarded one mark. Sean has also shown clearly how he calculated the amount that Dan has. However, he has not shown his working for the second step of the problem that led to his answer of £2.10. It is likely that he subtracted £1.50 from £3.40 mentally, but this cannot be assumed since his answer is incorrect. Therefore his method cannot be regarded as complete and cannot be awarded one mark.



Yasmin

1

0

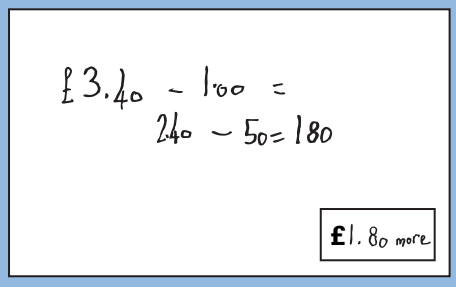


Sean

0

0

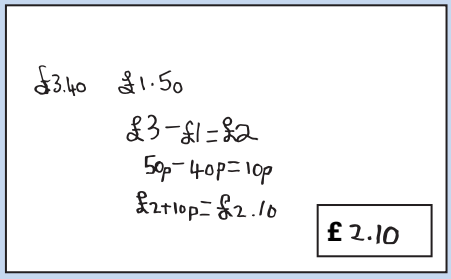
Sunil's working shows that he mentally calculated that Dan has £3.40. He then attempted to subtract the £1.50 that Vijay has in steps of £1.00 then 50p. He made an error in his final calculation, leading to an answer of £1.80 instead of £1.90. Sunil can be awarded one mark since, despite the arithmetic error, we can assume that his method was correct. Nicki has correctly recorded the two amounts on the first row of her working. She then partitioned the two amounts into pounds and pence but, in row three, subtracted the smaller number from the larger, leading to the incorrect answer of £2.10. Nicki's method is not entirely correct and therefore she cannot be awarded one mark.



Sunil

1

0



Nicki

0

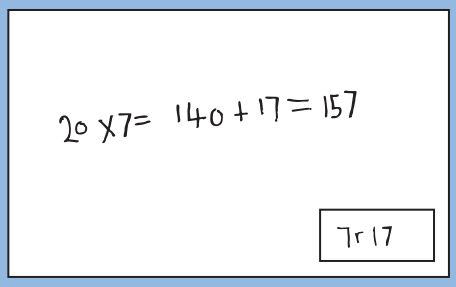
0

Examples of responses from Test 3b question 18

1 mark	0 marks

James has recorded the answer '7 remainder 17', but has failed to round this answer to reach 8. This shows sufficient evidence of an appropriate method for the award of one mark. James has also recorded a complete and correct method but, since he has given the answer '7 remainder 17', this is not required for the award of the mark. The first three rows of Georgina's working show that she has attempted to work with multiples of 20 to reach 157; the fourth line shows the number of eggs in the final tray. However, she has failed to show in her working how she would determine the total number of trays required.
Therefore her method is incomplete and cannot be awarded one mark.

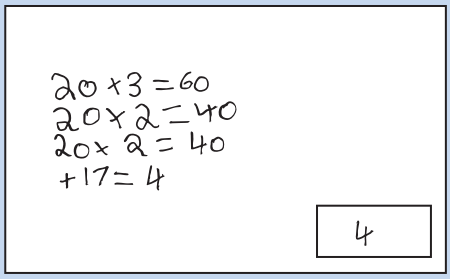
James



1

0

Georgina

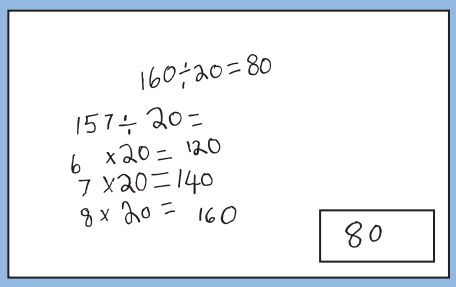


0

0

Helen has shown ample evidence that she was able to identify the steps necessary to solve the problem. On its own, 157 ÷ 20 would have been sufficient for the award of one mark. However, Helen has expanded her working further to show that 8 × 20 = 160 and that the division could be refined to 160 ÷ 20 to take account of interpreting the remainder. She made an error in calculating the answer to the rounded division but her method is complete and correct. Martin has correctly counted in twenties up to 160, thereby taking account of all 157 eggs. However, his answer of 160 shows that he failed to recognise that he needed to count the number of twenties to reach the number of trays used. Martin's method is incomplete so cannot be awarded one mark.

Helen



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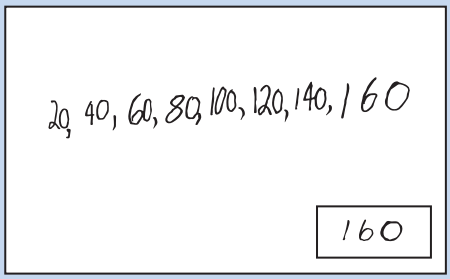
Martin



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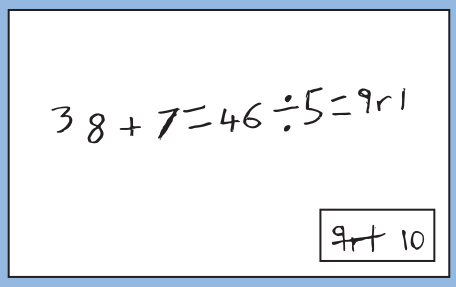
Examples of responses from Test 3b question 26

1 mark	0 marks

Jemma has used her knowledge of inverse operations by working backwards from the answer of 38 to record evidence of appropriate working. She made an arithmetic error in adding 7 to 38, which led to difficulties with interpreting the answer to the division '46 ÷ 5'. Despite this difficulty and the arithmetic error in the first stage of her calculation, Jemma has recorded a complete and viable method and so can be awarded one mark. Bertie started off well by adding 7, the inverse of 'subtract 7', mentally to 38 to obtain 45. However, he then multiplied 45 by 5 instead of dividing 45 by 5. His working shows an incorrect method and he cannot be awarded the mark.

Jemma



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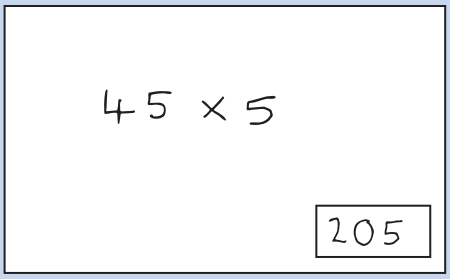
Bertie



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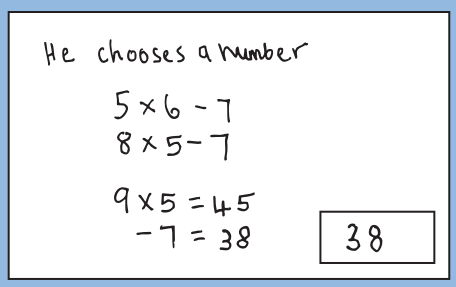
Kerry used a 'trial and improvement' method using two different numbers, 6 and 8. She does not show the answers to these trials, but it is reasonable to assume that she realised that they were less than 38 and this led her to work out that 9 provided the correct solution. Unfortunately, she failed to write 9 in the answer box, instead choosing the answer to her final calculation. However, her method is complete and correct so she can be awarded one mark. Faisal made two attempts at finding the required number using a method similar to Kerry's, but he has not shown sufficient evidence of moving towards the correct solution to be awarded the mark. Indeed, his first attempt trialling 10 is closer to the solution than his second attempt trialling 6. A third attempt at trialling 7 or 8 would have brought him closer to the correct solution and he could then have been awarded one mark even though he gave no answer.

Kerry



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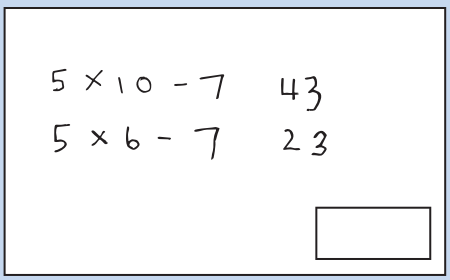
Faisal



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Questions requiring an explanation

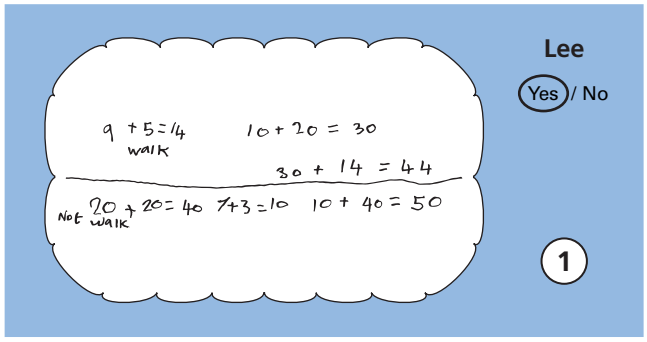
For the award of the mark, pupils may provide evidence in any form, including diagrams, symbols or words. If the incorrect option ('Yes' or 'No') is circled, the mark should still be awarded if a correct and unambiguous explanation is given.

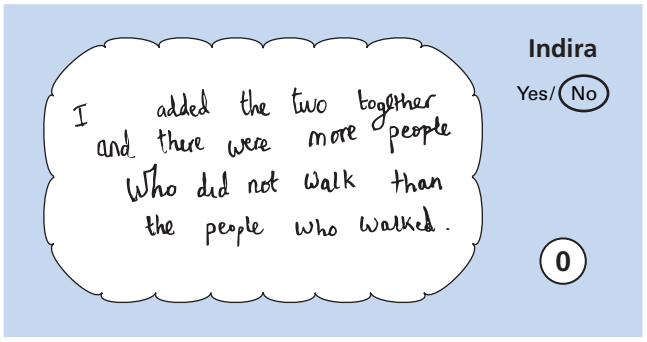
Examples of responses from Test 3b question 21

In this question, pupils are required to show that the number of children who did not walk to school is greater than the number of children who walked. They can demonstrate this either by recording the correct totals and/or calculations needed to compare the number of children that walked with those that did not walk, or by identifying the correct pairs of cells in the table that must be added and compared. Calculation errors are permitted in this question, provided that it is clear the correct pairs of numbers have been added together, as the focus is on pupils' communication and data handling skills rather than arithmetic skills.

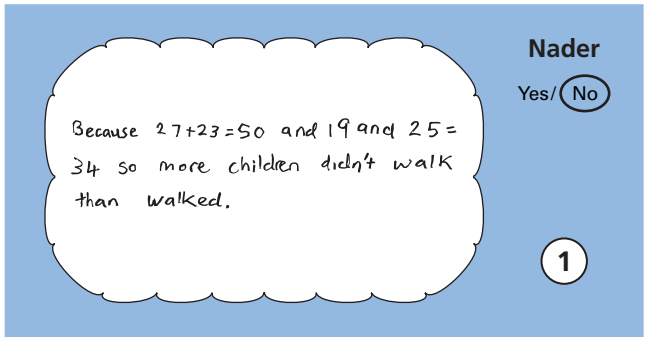
1 mark	0 marks

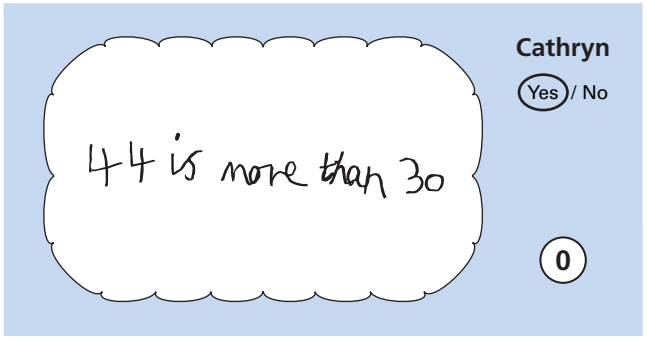
Lee explains in detail how he found the correct totals for children in the 'walked' region by adding 19 and 25 to make 44. He does the same for children in the 'did not walk' region by adding 27 and 23 to make 50. Although he has incorrectly circled the option 'Yes', his explanation clearly shows that the number who did not walk exceeded the number who walked, for which he can be awarded the mark. Indira's explanation lacks the detail of Lee's since she has given no numbers or totals to back up her explanation that more children did not walk than walked. Because Indira's explanation is vague, she cannot be awarded the mark.





Nader has explained how he correctly interpreted the sorting diagram by adding 27 and 23 to find the number of children who walked, and by adding 19 and 25 to find the number who did not walk. He made an error in his second addition resulting in an answer of 34 rather than 44. However, he can be awarded the mark because he extracted the correct data from the diagram and his explanation shows evidence of appropriate working. Cathryn chose the option 'Yes', which supports her brief explanation. She appears to have added 19 and 25 correctly to calculate the number of children who walked to school. However, it is not possible to tell how she arrived at the number 30. Her explanation is too vague to be awarded the mark. Cathryn could, however, have been awarded the mark if she had explained that the numbers 44 and 30 were the totals from the two relevant rows.

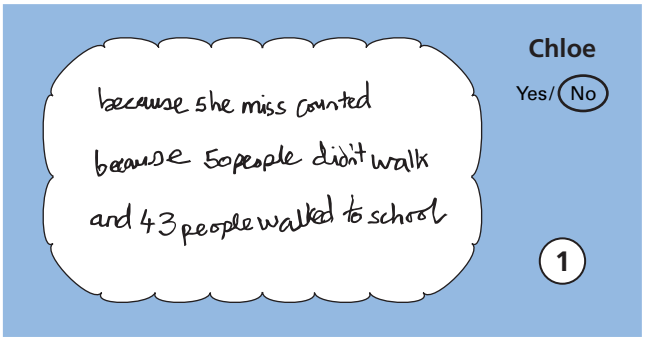


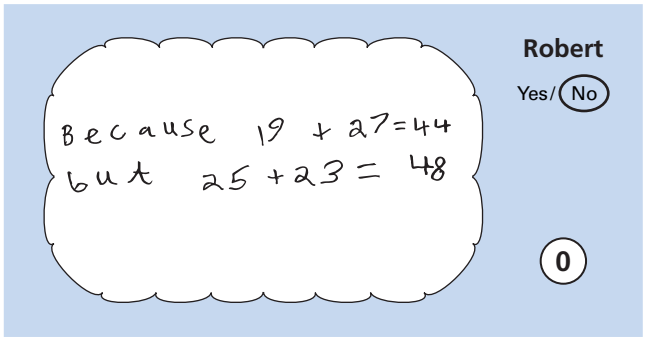


Examples of responses from Test 3b question 21 – continued

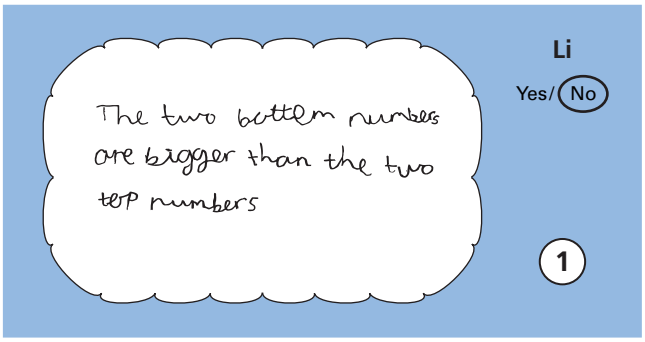
1 mark	0 marks

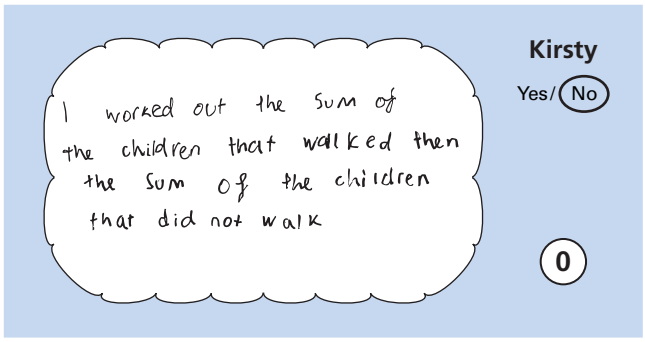
Both Chloe and Robert have correctly indicated 'No' as the answer to the question but made errors in their calculations. Chloe correctly explains that 50 children did not walk to school but that only 43 walked. She can be awarded the mark even though the latter number should be 44, since her interpretation of the sorting diagram and her explanation are correct. In Robert's case, the fact that he has also made an error in one calculation is irrelevant. He cannot be awarded the mark because his interpretation of the sorting diagram is incorrect. Unlike Chloe, he has attempted to add the numbers in each column rather than in each row, which would give the total number of boys and girls only.





Li has given a minimal explanation indicating that he compared the two numbers on the bottom row with those on the top row. Although he has not indicated the actual numbers, his explanation shows that he interpreted the diagram correctly and extracted the relevant data. His response contains just enough detail for him to be awarded the mark. Unlike Li, Kirsty has not indicated which numbers she added to support her explanation. Since her explanation is too vague, she cannot be awarded the mark.





Applying the mark scheme for the mental mathematics test

Please note that pupils should not be penalised if they record any information given in the question or show their working. Ignore any annotation, even if in the answer space, and mark only the answer. Accept an unambiguous answer written in the stimulus box or elsewhere on the answer sheet.

Full mark scheme information is given on page 43. In addition, a 'quick reference' mark scheme is provided on page 44. This is presented in a similar format to the pupil answer sheet.

General guidance for marking the mental mathematics test

The general guidance for the marking of the written tests also applies to the mental mathematics test. In addition, please apply the principles below.

1. Unless otherwise stated in the mark scheme, accept answers written in words, or a combination of words and figures.
2. Where units are specified, they are given on the answer sheet. Do not penalise pupils for writing the units again.
3. Where answers need to be ringed and an incorrect response is indicated in addition to the correct response(s), the mark should not be awarded.

Mark scheme for the mental mathematics test

Questions 1–15

Question	Requirement	Mark	Additional guidance
Practice	7	***None***	
1	8	***1m***	
2	3	***1m***	
3	8	***1m***	
4	7	***1m***	
5	180	***1m***	
6	45	***1m***	
7	£9 **OR** £9.00	***1m***	*Accept £9.00p **OR** £9.00 pence **OR** £9-00 **OR** £9:00 **OR** £9 00* ***Do not** accept £900p OR £900*
8	33	***1m***	
9	16	***1m***	
10	20	***1m***	
11	30	***1m***	
12	Three answers circled as shown: 18 **(23)** **(31)** **(45)**	***1m***	***All three** answers must be correct for the award of the mark.* *Accept any other clear way of indicating the correct answers, such as ticking or underlining.*
13	80	***1m***	
14	2000	***1m***	
15	9	***1m***	
Maximum 15 marks			

Year 3 mental mathematics quick reference mark scheme

Practice question

	7

Time: 5 seconds

1	8
2	3
3	8
4	7 days
5	180
6	45

Time: 5 seconds continued

7	£ 9	Accept £9.00 or £9 00 or £9.00p
8	33	
9	16	
10	20	

Time: 10 seconds

11	30
12	18 (23) (31) (45)
13	80
14	2000 g
15	9

Using the outcomes of the tests

Finding the level

Test 3a provides level outcomes ranging from level 2B to level 3B.
Test 3b provides level outcomes ranging from level 3C to level 4C.

The level is calculated by adding up the marks gained from the mental mathematics test and the relevant written test, and reading across to a level in the usual way.

Test 3a and mental mathematics test

Number of marks from Test 3a plus mental mathematics test	0–10	11–18	19–29	30–37	38–50
level	below level 2B	level 2B	level 2A	level 3C	level 3B

Test 3b and mental mathematics test

Number of marks from Test 3b plus mental mathematics test	0–21	22–29	30–35	36–40	41–50
level	below level 3C	level 3C	level 3B	level 3A	level 4C

Grids for test analysis

The questions in the mathematics tests are aimed at a variety of aspects of the Programme of Study for key stage 2, including Using and applying mathematics, and complement the National Numeracy Strategy Framework for teaching mathematics.

An analysis of incorrect answers and the ways in which pupils attempted these different types of question could give useful diagnostic information about the pupils' understanding of and ability to cope with the required mathematics. This information can help you plan future learning for the class, for groups and for individuals. The *Grids for test analysis*, included in the Teacher pack, give national curriculum references for each question, which will facilitate the analysis.

Age standardised scores

This section explains how to work out age standardised scores for mathematics.

Age standardised scores take into account the pupil's age in years and months, so you have an indication of how each pupil is performing relative to other pupils of the same age. It also means that the tests can be administered at different points in the school year (including, in the case of year 3 tests, in the first half of the autumn term in year 4) and comparative information still be obtained.
The standardised scores in this booklet cover the age range 7 years 5 months to 9 years 4 months. If you have decided to give the tests to pupils outside this range, you will not be able to use the tables. You will still be able to calculate national curriculum levels.

Calculating age standardised scores

To convert a pupil's total mark into an age standardised score:

- find the pupil's age in years and completed months at the time of testing
- locate his or her age in years and months along the top of the table
- locate the pupil's total mark down the left side of the table
- read off the standardised score from where the row and column meet.

Statistically, the average standardised score is 100. A higher score is above average and a score below 100 is below average. About two-thirds of pupils will have standardised scores between 85 and 115. Almost all pupils will fall within the range 70 to 130, so scores outside this range can be regarded as exceptional. Very low and very high standardised scores are printed in the table as ***.
This means that they would be below the lowest score in the table or above the highest, but cannot be calculated with the necessary degree of statistical reliability. If an exact score is needed, 69 or 121 should be used as appropriate for pupils taking Test 3a and 84 and 140 should be used for pupils taking Test 3b.

National comparisons – using the shaded bands

The tables of standardised scores are divided into five shaded bands. These bands indicate how the scores relate to the national population. The band nearest the top of the table contains the scores that correspond to the lowest fifth of the population; the next band, the next fifth; and so on. If a pupil has a score in the final band, you know that his or her score is in the top 20 per cent nationally, once age has been taken into account.

Making use of age standardised scores

If you choose to work out age standardised scores, you may use this additional information about the pupils' performance in various ways, for example:

- age standardised scores could be averaged across a group, for example a class or a year group. In the average school, year group or class, the mean score should be close to 100; if it is much above or below this, the performance of your class or school varies from the national average
- you may include it as part of the information to parents, for example an age standardised score of 112 shows that test performance was above average for his or her age
- you may be able to identify patterns or results which indicate teaching and learning issues to be addressed, eg the difference in older/younger pupils' performance
- similarly, age standardised scores can be used to consider differences in performance between boys and girls, or between pupils who have English as an additional language and those who do not. In order to provide useful information, these groups need to be reasonably large; small groups will not provide reliable information
- the progress made by an individual, a class or a school can be monitored from one year to the next. Age standardised scores can be calculated and reported for individual pupils. However, because of the nature of the scores and the fact that they are a statistical estimate (see 'Confidence bands' below) the scores are much more reliable when calculated for groups of pupils. In addition, if reported to parents, the fact that a pupil who is making typical progress from year to year will remain on a similar age standardised score will need to be explained.

Confidence bands

As the standardised scores in the tables are derived from only one short test, some margin of error is inevitable, as is the case for all standardised tests. A margin of error does not mean pupils have been assessed incorrectly. It is simply a statistical estimate, based on the fact that tests sample only the particular areas of learning which they assess. To indicate how wide this margin of error is likely to be, a '90 per cent confidence band' has been calculated. This means that you can have 90 per cent certainty that the pupil's true score lies within the confidence band. In this case, the 90 per cent confidence band is 7. So, for example, if a pupil has a standardised score of 105 in mathematics, you can be 90 per cent certain that the true score is between 98 and 112.

Age standardised scores for pupils taking Test 3a

Total mark	Age in years and (completed) months											
	7.05	7.06	7.07	7.08	7.09	7.10	7.11	8.00	8.01	8.02	8.03	8.04
0	***	***	***	***	***	***	***	***	***	***	***	***
1	***	***	***	***	***	***	***	***	***	***	***	***
2	71	70	70	70	70	70	***	***	***	***	***	***
3	73	73	72	72	72	71	71	71	70	70	70	70
4	76	75	75	74	74	73	73	72	72	72	71	71
5	78	78	77	77	76	75	75	74	74	73	73	73
6	81	80	80	79	78	78	77	76	76	75	75	74
7	84	83	82	81	80	80	79	78	78	77	76	76
8	86	85	84	83	83	82	81	80	80	79	78	78
9	88	87	86	85	85	84	83	82	82	81	80	79
10	89	89	88	87	86	86	85	84	83	83	82	81
11	91	90	90	89	88	87	87	86	85	84	83	83
12	92	91	91	90	90	89	88	87	87	86	85	84
13	93	93	92	91	91	90	89	89	88	87	87	86
14	94	94	93	93	92	91	91	90	89	89	88	87
15	95	94	94	93	93	92	92	91	91	90	89	88
16	95	95	95	94	94	93	93	92	92	91	90	90
17	96	96	95	95	94	94	94	93	93	92	91	91
18	97	96	96	95	95	95	94	94	93	93	92	92
19	97	97	96	96	96	95	95	95	94	94	93	93
20	98	97	97	97	96	96	96	95	95	94	94	93
21	98	98	97	97	97	96	96	96	95	95	95	94
22	99	98	98	98	97	97	97	96	96	95	95	95
23	99	99	98	98	98	97	97	97	96	96	96	95
24	100	100	99	99	98	98	98	97	97	97	96	96
25	101	100	100	99	99	98	98	98	97	97	97	96
26	102	101	101	100	100	99	99	98	98	97	97	97
27	103	102	101	101	100	100	99	99	98	98	98	97
28	104	103	102	102	101	100	100	99	99	99	98	98
29	105	104	103	103	102	101	101	100	100	99	99	98
30	106	105	104	104	103	102	102	101	100	100	99	99
31	107	106	105	105	104	103	103	102	101	101	100	100
32	108	107	106	106	105	104	104	103	102	102	101	101
33	109	108	108	107	106	105	105	104	103	103	102	101
34	110	110	109	108	107	107	106	105	104	104	103	102
35	111	111	110	109	109	108	107	106	106	105	104	104
36	113	112	111	111	110	109	108	108	107	106	105	105
37	114	113	113	112	111	110	110	109	108	108	107	106
38	115	114	114	113	113	112	111	110	110	109	108	108
39	116	115	115	114	114	113	113	112	111	110	110	109
40	117	116	116	116	115	114	114	113	113	112	111	111
41	118	117	117	117	116	116	115	115	114	114	113	112
42	119	118	118	118	117	117	116	116	116	115	114	114
43	119	119	119	119	118	118	118	117	117	116	116	115
44	120	120	119	119	119	119	119	118	118	118	117	117
45	***	***	120	120	120	120	119	119	119	119	119	118
46	***	***	***	***	***	***	120	120	120	120	119	119
47	***	***	***	***	***	***	***	***	***	***	120	120
48	***	***	***	***	***	***	***	***	***	***	***	***
49	***	***	***	***	***	***	***	***	***	***	***	***
50	***	***	***	***	***	***	***	***	***	***	***	***

Age standardised scores for pupils taking Test 3a – continued

Total mark	Age in years and (completed) months											
	8.05	8.06	8.07	8.08	8.09	8.10	8.11	9.00	9.01	9.02	9.03	9.04
0	***	***	***	***	***	***	***	***	***	***	***	***
1	***	***	***	***	***	***	***	***	***	***	***	***
2	***	***	***	***	***	***	***	***	***	***	***	***
3	70	70	***	***	***	***	***	***	***	***	***	***
4	71	71	70	70	70	70	70	***	***	***	***	***
5	72	72	72	71	71	71	70	70	70	70	70	70
6	74	73	73	73	72	72	71	71	71	71	70	70
7	75	75	74	74	73	73	73	72	72	72	71	71
8	77	76	76	75	75	74	74	73	73	73	72	72
9	79	78	77	77	76	76	75	75	74	74	73	73
10	80	80	79	78	78	77	76	76	75	75	74	74
11	82	81	80	80	79	78	78	77	76	76	75	75
12	83	83	82	81	80	80	79	78	78	77	76	76
13	85	84	83	83	82	81	80	80	79	78	78	77
14	86	86	85	84	83	83	82	81	80	80	79	78
15	88	87	86	85	85	84	83	82	82	81	80	79
16	89	88	88	87	86	85	84	84	83	82	81	81
17	90	89	89	88	87	86	86	85	84	83	83	82
18	91	91	90	89	88	88	87	86	85	85	84	83
19	92	91	91	90	90	89	88	87	87	86	85	84
20	93	92	92	91	91	90	89	88	88	87	86	85
21	94	93	93	92	92	91	90	90	89	88	87	87
22	94	94	93	93	92	92	91	91	90	89	88	88
23	95	95	94	94	93	93	92	91	91	90	90	89
24	95	95	95	94	94	93	93	92	92	91	90	90
25	96	96	95	95	94	94	94	93	93	92	91	91
26	96	96	96	95	95	95	94	94	93	93	92	92
27	97	97	96	96	96	95	95	94	94	94	93	93
28	97	97	97	96	96	96	95	95	95	94	94	93
29	98	98	97	97	97	96	96	96	95	95	94	94
30	99	98	98	97	97	97	96	96	96	95	95	95
31	99	99	98	98	98	97	97	97	96	96	96	95
32	100	100	99	99	98	98	97	97	97	96	96	96
33	101	100	100	99	99	98	98	98	97	97	97	96
34	102	101	101	100	100	99	99	98	98	98	97	97
35	103	102	102	101	100	100	99	99	99	98	98	97
36	104	103	103	102	101	101	100	100	99	99	98	98
37	105	105	104	103	103	102	101	101	100	100	99	99
38	107	106	105	105	104	103	103	102	101	101	100	100
39	108	108	107	106	105	105	104	103	103	102	101	101
40	110	109	108	108	107	106	105	105	104	103	103	102
41	112	111	110	109	109	108	107	106	106	105	104	104
42	113	113	112	111	111	110	109	108	108	107	106	105
43	115	114	114	113	112	112	111	110	110	109	108	107
44	116	116	116	115	114	114	113	113	112	111	111	110
45	118	118	117	117	116	116	115	115	114	114	113	112
46	119	119	119	118	118	118	117	117	117	116	116	115
47	120	120	120	120	119	119	119	119	119	118	118	118
48	***	***	***	***	120	120	120	120	120	120	120	120
49	***	***	***	***	***	***	***	***	***	***	***	***
50	***	***	***	***	***	***	***	***	***	***	***	***

Age standardised scores for pupils taking Test 3b

Total mark	Age in years and (completed) months											
	7.05	7.06	7.07	7.08	7.09	7.10	7.11	8.00	8.01	8.02	8.03	8.04
0	***	***	***	***	***	***	***	***	***	***	***	***
1	***	***	***	***	***	***	***	***	***	***	***	***
2	***	***	***	***	***	***	***	***	***	***	***	***
3	***	***	***	***	***	***	***	***	***	***	***	***
4	85	85	85	85	***	***	***	***	***	***	***	***
5	87	87	86	86	86	85	85	85	85	***	***	***
6	88	88	88	87	87	87	86	86	86	85	85	85
7	89	89	89	88	88	88	87	87	87	86	86	86
8	90	90	90	89	89	89	88	88	88	87	87	87
9	92	91	91	90	90	90	89	89	89	88	88	88
10	93	92	92	91	91	91	90	90	89	89	89	88
11	94	93	93	92	92	92	91	91	90	90	90	89
12	95	94	94	93	93	92	92	92	91	91	90	90
13	96	96	95	94	94	93	93	92	92	92	91	91
14	97	97	96	96	95	94	94	93	93	92	92	92
15	99	98	97	97	96	95	95	94	94	93	93	92
16	100	99	99	98	97	97	96	95	95	94	94	93
17	101	100	100	99	98	98	97	96	96	95	95	94
18	103	102	101	100	100	99	98	97	97	96	96	95
19	104	103	102	101	101	100	99	99	98	97	97	96
20	105	104	104	103	102	101	100	100	99	98	98	97
21	106	106	105	104	103	102	102	101	100	99	99	98
22	108	107	106	105	104	104	103	102	101	101	100	99
23	109	108	107	107	106	105	104	103	102	102	101	100
24	110	109	109	108	107	106	105	105	104	103	102	101
25	112	111	110	109	108	107	107	106	105	104	103	103
26	113	112	111	110	110	109	108	107	106	105	105	104
27	114	113	112	112	111	110	109	108	107	107	106	105
28	115	114	114	113	112	111	110	110	109	108	107	106
29	116	116	115	114	113	112	112	111	110	109	108	108
30	117	117	116	115	114	114	113	112	111	111	110	109
31	118	118	117	116	116	115	114	113	113	112	111	110
32	120	119	118	118	117	116	115	115	114	113	112	112
33	121	120	119	119	118	117	117	116	115	114	114	113
34	122	121	120	120	119	119	118	117	116	116	115	114
35	123	122	122	121	120	120	119	118	118	117	116	116
36	124	123	123	122	121	121	120	120	119	118	118	117
37	125	124	124	123	123	122	121	121	120	120	119	118
38	126	125	125	124	124	123	123	122	121	121	120	120
39	127	126	126	125	125	124	124	123	123	122	122	121
40	128	128	127	127	126	126	125	125	124	124	123	122
41	129	129	128	128	127	127	126	126	125	125	124	124
42	130	130	129	129	128	128	128	127	127	126	126	125
43	131	131	131	130	130	129	129	129	128	128	127	127
44	132	132	132	131	131	131	130	130	130	129	129	128
45	134	133	133	133	132	132	132	131	131	131	130	130
46	135	135	134	134	134	133	133	133	133	132	132	132
47	136	136	136	135	135	135	135	135	134	134	134	133
48	137	137	137	137	137	137	136	136	136	136	136	135
49	139	139	139	138	138	138	138	138	138	138	138	138
50	***	***	***	***	***	***	***	***	***	***	***	***

Age standardised scores for pupils taking Test 3b – continued

Total mark	Age in years and (completed) months											
	8.05	8.06	8.07	8.08	8.09	8.10	8.11	9.00	9.01	9.02	9.03	9.04
0	***	***	***	***	***	***	***	***	***	***	***	***
1	***	***	***	***	***	***	***	***	***	***	***	***
2	***	***	***	***	***	***	***	***	***	***	***	***
3	***	***	***	***	***	***	***	***	***	***	***	***
4	***	***	***	***	***	***	***	***	***	***	***	***
5	***	***	***	***	***	***	***	***	***	***	***	***
6	85	***	***	***	***	***	***	***	***	***	***	***
7	85	85	85	85	***	***	***	***	***	***	***	***
8	86	86	86	85	85	85	85	***	***	***	***	***
9	87	87	87	86	86	86	85	85	85	85	***	***
10	88	88	87	87	87	86	86	86	86	85	85	85
11	89	89	88	88	88	87	87	87	86	86	86	85
12	90	89	89	89	88	88	88	87	87	87	86	86
13	90	90	90	89	89	89	88	88	88	87	87	87
14	91	91	90	90	90	89	89	89	88	88	88	87
15	92	92	91	91	90	90	90	89	89	89	88	88
16	93	92	92	91	91	91	90	90	90	89	89	88
17	94	93	93	92	92	91	91	91	90	90	89	89
18	95	94	93	93	93	92	92	91	91	90	90	90
19	95	95	94	94	93	93	92	92	91	91	91	90
20	96	96	95	95	94	94	93	93	92	92	91	91
21	97	97	96	96	95	94	94	93	93	92	92	92
22	98	98	97	96	96	95	95	94	94	93	93	92
23	99	99	98	97	97	96	96	95	94	94	93	93
24	101	100	99	98	98	97	97	96	95	95	94	94
25	102	101	100	100	99	98	98	97	96	96	95	95
26	103	102	101	101	100	99	99	98	97	97	96	95
27	104	103	103	102	101	100	100	99	98	98	97	96
28	105	105	104	103	102	102	101	100	99	99	98	97
29	107	106	105	104	104	103	102	101	100	100	99	98
30	108	107	106	106	105	104	103	102	102	101	100	99
31	109	109	108	107	106	105	104	104	103	102	101	101
32	111	110	109	108	107	107	106	105	104	103	103	102
33	112	111	110	110	109	108	107	106	106	105	104	103
34	113	113	112	111	110	109	109	108	107	106	105	105
35	115	114	113	113	112	111	110	109	108	108	107	106
36	116	115	115	114	113	112	112	111	110	109	108	108
37	118	117	116	115	115	114	113	112	112	111	110	109
38	119	118	118	117	116	115	115	114	113	112	112	111
39	120	120	119	118	118	117	116	116	115	114	113	113
40	122	121	121	120	119	119	118	117	117	116	115	114
41	123	123	122	121	121	120	120	119	118	118	117	116
42	125	124	124	123	123	122	121	121	120	119	119	118
43	126	126	125	125	124	124	123	123	122	121	121	120
44	128	127	127	126	126	125	125	124	124	123	123	122
45	129	129	129	128	128	127	127	126	126	125	125	124
46	131	131	131	130	130	129	129	129	128	128	127	127
47	133	133	133	132	132	132	131	131	131	130	130	129
48	135	135	135	135	134	134	134	134	133	133	133	132
49	138	137	137	137	137	137	137	137	136	136	136	136
50	***	***	139	138	138	138	138	138	138	138	138	138

Guidance for teaching assistants

This guidance is for teaching assistants or other adults assisting in the administration of the year 3 optional mathematics tests. If a teaching assistant is to administer any part of the tests independently to a group of pupils, they will need to follow the administration instructions found in the main part of the ***Teacher's guide****.*

Please read this guidance carefully as it gives information about the different tests and specifies what help may or may not be given to pupils taking the tests. **If pupils are given too much help, the test results may be invalid.**

Each pupil will sit two tests: a written mathematics test and a mental mathematics test.

The written tests

A choice of two written tests is available: Test 3a (a levels 2–3 test awarding levels 2B to 3B), and Test 3b (a levels 3–4 test awarding levels 3C to 4C). **Pupils should sit only one written test** since some questions are common to both. The class teacher should decide which paper is appropriate for each pupil.

Each written test contains 35 marks and has a recommended time limit of 45 minutes. They contain the same practice question. This means that it should be possible for you to administer both tests at the same time.

Guidance for assisting pupils

You may:

- read the names of the three children on page 2 of the test booklet and explain that they will feature in some of the questions
- read through with them the section 'Getting started' on page 3
- help them read and answer the practice question on page 3 of the booklet
- give help with reading words or sentences in the test questions
- give help with reading calculations, including numerals and symbols within them
- explain or rephrase general instruction words in the test, such as *complete* in question 7 in Test 3a
- explain or rephrase words used in everyday contexts, such as *cherries* in question 24 in Test 3a and question 8 in Test 3b

- encourage pupils not to give up at the first difficult question because there may be easier questions further on
- indicate any omitted questions when pupils have finished that they should go back and try to answer.

You should not:

- give any help with the mathematics as this will invalidate the assessment
- suggest to the pupils the mathematical operation to use
- gives clues as to the meaning of mathematical terms, such as *angles* in question 26 in Test 3a and question 10 in Test 3b
- rephrase the wording of the questions (except as indicated on page 52)
- prompt the pupils to confirm or change answers by pointing, frowning, smiling, head shaking or nodding, offering rubbers, or asking leading questions.

The mental mathematics test

The mental mathematics test is a recorded test consisting of a practice question and 15 timed questions. The test should be administered using the CD, although a transcript is provided on pages 17–19 in case of an equipment malfunction on the day of the test.

The test should be taken by all pupils. It has an administration time of approximately 20 minutes.

The test starts with instructions to the pupils followed by the questions. There will be two opportunities for you to pause the recording. These will be indicated by a bleep. The first pause comes near the beginning of the recording, once the instructions have been given. This will allow clarification of any of the instructions not understood by the pupils. The second pause is after the practice question. After this second pause, the recording should be allowed to play without interruption.

You may:

- answer any questions pupils have after the first and second pause of the recording.

You should not:

- stop the recording after it has been restarted following the practice question.

Photocopiable pupil answer sheet

Year 3 mental mathematics test

Name ..... Class .....

School .....

Total marks

Practice question

Time: 5 seconds

1 ____ 1

2 ____ 30 2

3 ____ 16 3

4 ____ days 4

5 ____ 176 5

6 ____ 9 5 6

Time: 5 seconds continued

7 £ ____ 7

8 ____ 8

9 ____ 50 9

10 ____ 5 10

Time: 10 seconds

11 ____ 15 11

12 18 23 31 45 12

13 ____ 76 84 13

14 ____ g 14

15 ____ $\frac{3}{4}$ 15

Curriculum and Standards

Audience	Year 3 teachers
Circulation lists	
Type	Assessment materials
Description	
Cross ref	Key stage 1 ARA QCA/05/1636 Key stage 2 ARA QCA/05/1637
Action required	Teachers of year 3 should read before using optional tests to assess pupils
Timing	
Contact	
For school use	

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