2016 national curriculum tests

Key stage 1

Mathematics test mark schemes

Paper 1: arithmetic
and Paper 2: reasoning

Standards & Testing Agency

Sourced from SATs-Papers.co.uk https://www.SATs-Papers.co.uk

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1. Introduction

The Standards and Testing Agency (STA) is responsible for the development and delivery of statutory tests and assessments. STA is an executive agency of the Department for Education.

The 2016 tests are the first assessment of the 2014 national curriculum. This test has been developed to meet the specification set out in the test framework for mathematics at key stage 1. The test frameworks are on the GOV.UK website at www.gov.uk/sta.

A new test and mark scheme will be developed each year.

The key stage 1 tests will be marked internally by teachers to inform teacher assessment.

Scaled score conversion tables are not included in this document. Conversion tables will be produced as part of the standard-setting process. Scaled score conversion tables for the 2016 tests will be published at www.gov.uk/sta in June 2016. The standard-setting process will take place in May 2016.

This mark scheme is provided for teachers to use when marking pupils' responses. The pupil examples are based on responses gathered from the test trialling process.

2. Structure of the key stage 1 mathematics test

The key stage 1 mathematics test materials comprise:

- Paper 1: arithmetic (25 marks)
- Paper 2: reasoning (35 marks)

The mathematics test is comprised of two components which are presented to pupils as two separate test papers. The first component is an arithmetic paper (Paper 1). The second component (Paper 2) presents a range of mathematical problems. The test is administered on paper. Each paper includes material drawn from the statutory section of the key stage 1 national curriculum (2014).

Sourced from SATs-Papers.co.uk

3. Content domain coverage

The 2016 test meets the specification set out in the test framework. Table 1 sets out the areas of the content domain that are assessed in the test papers 1 and 2.

The references below are taken from the test framework. A question assessing 2M1, for example, sets out to 'compare and order lengths, mass, volume / capacity and record the results using >, < and =' and is taken from the year 2 programme of study.

Table 1: Content domain coverage of the 2016 key stage 1 mathematics test

Paper 1: arithmetic	
Question	**Content domain reference**
1	2C1
2	2C1
3	1C4
4	2C2b
5	2C2b
6	2C6
7	2C6
8	2C3
9	2C3
10	2C1
11	2N1
12	2C6
13	2C2b
14	2C6
15	2C3
16	2C2b
17	2C8
18	2F1a
19	2C2b
20	2C6
21	2C6
22	2F1a
23	2C2b
24	2F1a
25	2F1a

Paper 2: reasoning	
Question	**Content domain reference**
1	2N3
2	2C4
3	2N1
4	2C2b
5	2C6
6	2M1
7	1C4
8	1M3
9	2N2a
10	2S1
11	2C4
12	2G2a
13a	2C1
13b	2C1
14	2F1a
15	2M9
16a	2N4
16b	2N4
17	2G2b
18	2C4/2C8
19	2C8
20	2C4
21	1G1a
22	2C4
23	2P2
24	2M2
25	2N6
26	2C7
27	2F1a
28	2C4
29	2N2b
30	2C4
31	2M4a

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4. Explanation of the mark schemes

The marking information for each question is set out in the form of tables (sections 7 and 8).

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

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

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 a correct method
- examples of some different types of correct answer.

The '**Additional guidance**' column indicates alternative acceptable answers, and provides details of specific types of answers which are unacceptable. Other guidance, such as the range of acceptable answers, is provided as necessary.

5. General marking guidance

5.1 Applying the mark schemes

To help you mark consistently, the most frequent procedural queries are listed along with the action you should take. Unless otherwise specified in the mark scheme, you should apply these guidelines in all cases.

Example responses are also included for the working mark question and one other question in Paper 2: reasoning. This should act as your guide when you are marking these questions.

Sourced from SATs-Papers.co.uk

5.2 General marking principles

Table 2: General marking principles

Possible issues when marking	
1. The pupil's answer does not match closely any of the examples in the mark scheme.	Teachers will use their judgement in deciding whether the answer corresponds with details in the 'Requirement' column of the mark scheme. Refer also to the 'Additional guidance' column and to the examples of responses (where appropriate).
2. The pupil has answered in a non-standard way.	Pupils may provide evidence in any form as long as its meaning can be understood. Diagrams, symbols or words are acceptable for indicating an answer.
3. There appears to be a misread of numbers affecting the working.	A misread occurs when a pupil misreads a number given in the question and consistently uses a different number that does not alter the original intention or difficulty of the question. For example, if '43' is misread as '48', both numbers may be regarded as comparable in difficulty. However, if '43' is misread as '40' or '45', the misread number may be regarded as making the question easier. The misread of a number will affect the award of marks. No marks are awarded if there is more than one misread in a question or if the mathematics is simplified by the misread. For **1-mark** questions: no mark is awarded for one or more misreads. For **2-mark** questions that have a method mark: 1 mark is awarded if the correct method is correctly implemented with the misread number, provided this does not simplify the mathematics.
4. No answer is given in the expected place, but the correct answer is given elsewhere.	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.
5. The pupil's answer is correct but the wrong working is shown.	Always award the mark for a final response that is correct.
6. The answer in the answer box is wrong, but the correct answer is shown in the working.	Give precedence to the response given in the answer box over any other workings. However, in a 2-mark question, one mark may still be awarded for evidence of a complete, correct method.

Sourced from SATs-Papers.co.uk https://www.SATs-Papers.co.uk

Possible issues when marking	
7. The pupil's answer correctly follows through from earlier incorrect work.	'Follow through' marks for an answer may only be awarded when specifically stated in the mark scheme.
8. The correct answer has been crossed (or rubbed) out and not replaced.	No marks will be awarded for crossed-out answers or working.
9. More than one answer is given.	If all answers given are correct (or a range of answers are given, all of which are correct), a mark will be awarded unless the mark scheme states otherwise. If both correct and incorrect responses are given, no mark will be awarded unless the mark scheme states otherwise.
10. The pupil reverses a digit in their answer.	A reversed digit is acceptable if it is clearly recognisable as the digit intended; for example, a reversed 2 must clearly show the characteristics of a 2 rather than a 5. As a further example, where the answer is '61' and the response 'ƃ1' is given, then this should be awarded the mark. You should take a decision based upon your knowledge of the child's writing.
11. The pupil transposes digits in their answer.	A pupil transposes digits by reversing their order e.g. '83' instead of '38'. An answer with transposed digits should not be awarded the mark; for example, a response of '16' or '1ƃ' when the answer is '61' should not be marked as correct.

6. Internal moderation procedures

We recommend teachers involved in marking the key stage 1 tests undertake moderation activity to ensure marking is consistent across their school. Guidance is published on the GOV.UK website at www.gov.uk/sta.

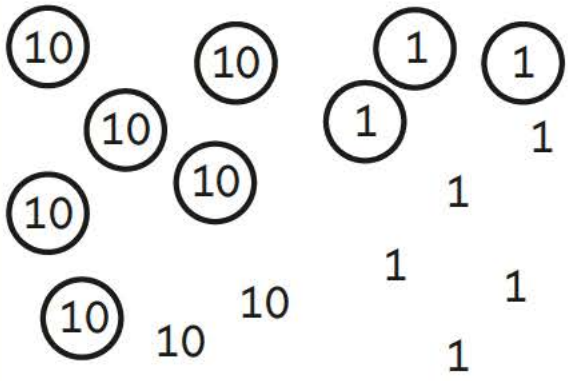
7. Mark schemes for Paper 1: arithmetic

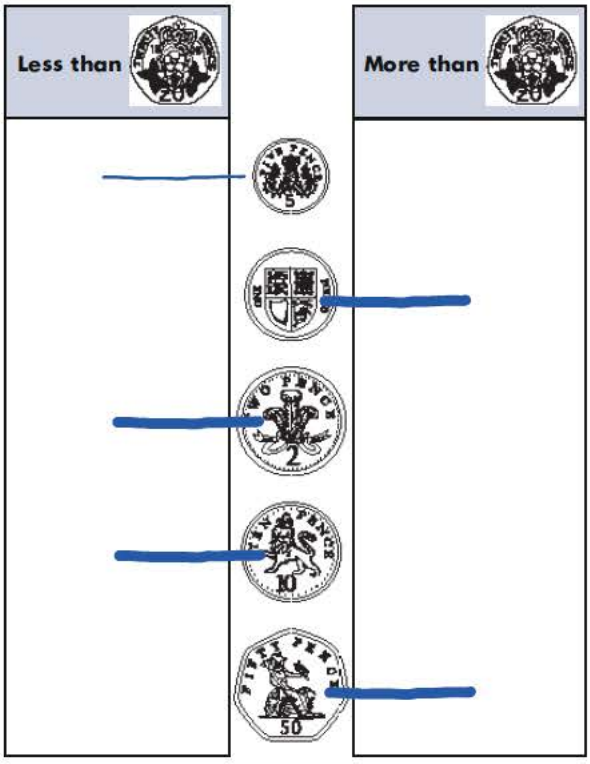
Equivalent answers are **not** acceptable e.g. 10 + 4 instead of 14

Qu.	Requirement	Mark	Additional guidance
P	4	none	Practice question
1	14	1m	
2	5	1m	
3	8	1m	
4	59	1m	
5	15	1m	
6	90	1m	
7	6	1m	
8	30	1m	
9	5	1m	
10	70	1m	
11	43	1m	
12	40	1m	
13	61	1m	
14	4	1m	
15	7	1m	
16	80	1m	
17	18	1m	
18	8	1m	
19	72	1m	
20	4	1m	
21	11	1m	
22	3	1m	
23	57	1m	
24	10	1m	
25	15	1m	

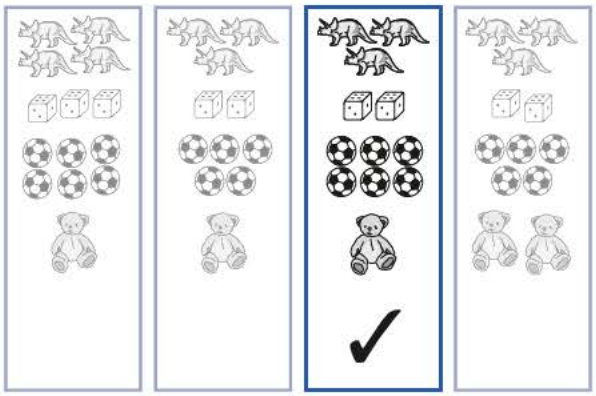
Sourced from SATs-Papers.co.uk https://www.SATs-Papers.co.uk

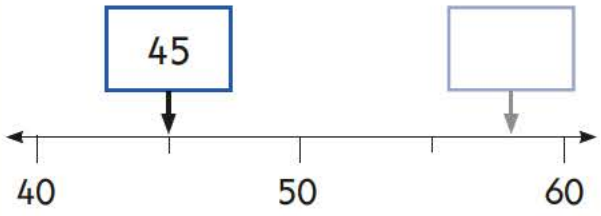
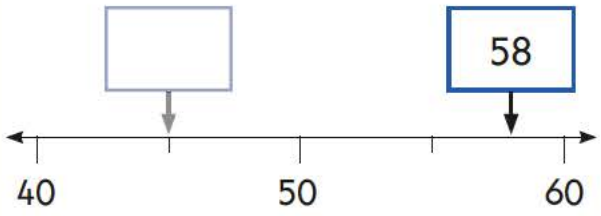
8. Mark schemes for Paper 2: reasoning

Qu.	Requirement	Mark	Additional guidance
	Aural questions		
P	7 (dots)	none	Practice question
1	6 tens and 3 ones circled, e.g.  	**1m**	Accept any other clear way of indicating the correct answer.
2	23 (children)	**1m**	
3	12 15	**1m**	Accept correct numbers in either order. Accept both answers given in one of the boxes. (Refer to general marking principles 4, 10 and 11 on pages 6 and 7)
4	10	**1m**	
5	21, 23, 25, 27, 29	**1m**	All five numbers must be correct for the award of the mark. Accept repeated correct numbers e.g. 21, 23, 23, 25, 27, 29 Numbers may be written in any order. **Do not** award the mark if additional incorrect numbers are written inside the answer box. (Use the examples of responses given on page 17 to help you determine if the mark can be awarded.)

Qu.	Requirement	Mark	Additional guidance
	Written questions		
6	Letters written in the correct order as shown: B D C A least full most full	1m	All letters must be in the correct order for the award of the mark. Accept any other clear way of indicating the correct answer e.g. matching each glass to the correct box. Accept the letters given in the reverse order, provided the labels have been swapped.
7	12 (shells)	1m	
8	Coins matched to the correct boxes as shown: 	1m	All four coins must be matched correctly for the award of the mark. Accept any other clear way of indicating the correct answer. **Do not** award the mark if a coin is matched to both boxes.

Sourced from SATs-Papers.co.uk https://www.SATs-Papers.co.uk

Qu.	Requirement	Mark	Additional guidance
9	Card indicated as shown: 	1m	Accept any other clear way of indicating the correct answer. **Do not** award the mark if other cards are indicated unless it is clear the correct card is the child's final choice.
10	Third box ticked as shown: 	1m	Accept any other clear way of indicating the correct box. **Do not** award the mark if other boxes are indicated unless it is clear that the correct box is the child's final choice.
11	13 (balloons)	1m	
12	Two sentences ticked as shown: A square has sides of equal length. ✓ A square has curved sides. A square has lines of symmetry. ✓ A square has five sides.	1m	Both correct sentences must be indicated for the award of the mark. Accept any other clear way of indicating the correct sentences. **Do not** award the mark if other sentences are indicated unless it is clear that the correct sentences are the child's final choice.

Qu.	Requirement	Mark	Additional guidance
13a	Two numbers written that total **19**, e.g. 10 + 9 = 19 16 + 3 = 19 19 + 0 = 19	1m	Accept **any** two numbers that total 19
13b	Three numbers written that total **19**, e.g. 10 + 4 + 5 = 19 5 + 5 + 9 = 19	1m	Accept **any** three numbers that total 19, including repeated numbers, e.g. 19 + 0 + 0
14	8 (toy cars)	1m	
15	93 (p)	1m	Accept the answer £0.93p **Do not** award the mark for 0.93p or £93p
16a	45 written in the first box as shown: 	1m	(Refer to general marking principles 4, 10 and 11 on pages 6 and 7)
16b	58 written in the second box as shown: 	1m	Accept any number **in the range 57–59 inclusive**. (Refer to general marking principles 4, 10 and 11 on pages 6 and 7)
17	D	1m	Accept any other clear way of indicating the correct shape.
18	35 (pencils)	1m	**Do not** accept the correct number of pencils indicated, unless the answer 35 is also seen.
19	6 (bags)	1m	

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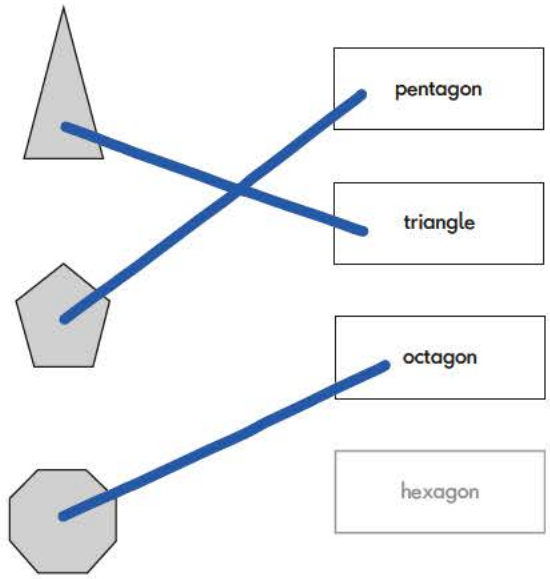
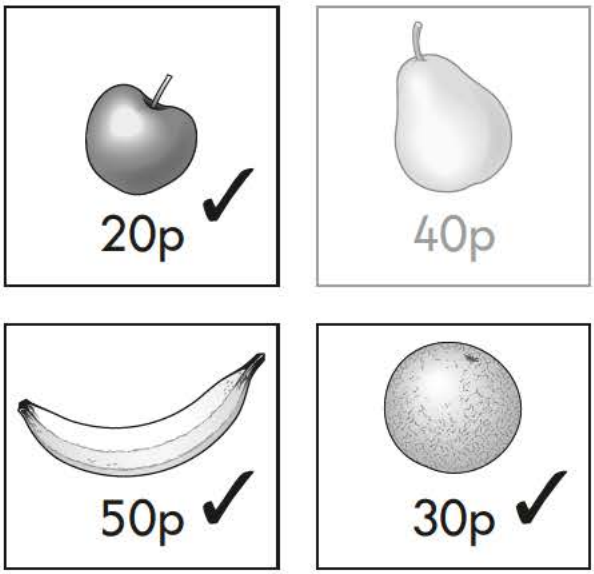
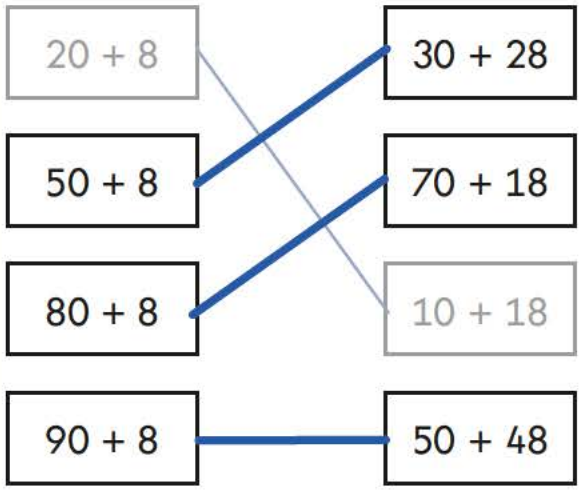
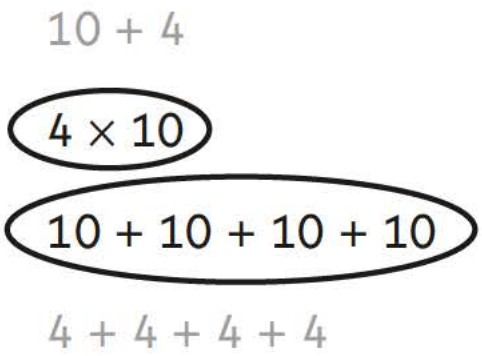
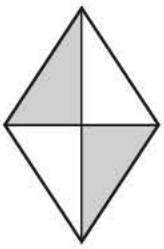
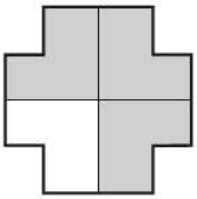
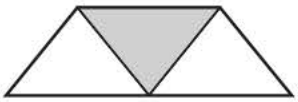
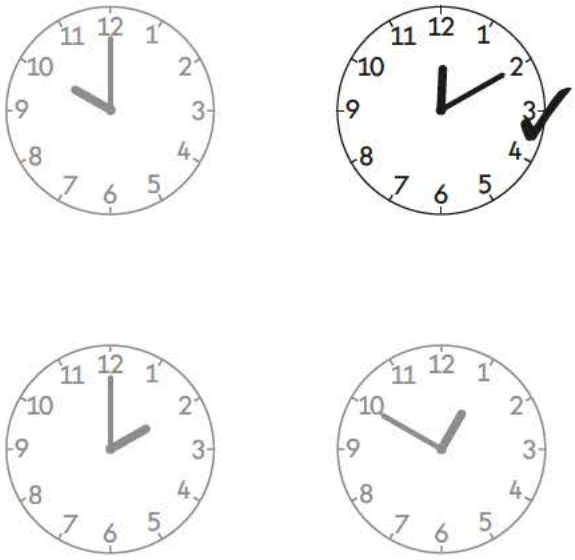
Qu.	Requirement	Mark	Additional guidance
20	7 (counters)	1m	**Do not** accept seven counters drawn unless the answer 7 is also seen. (Refer to general marking principle 4 on page 6)
21		1m	All shapes must be correctly matched for the award of the mark. **Do not** award the mark if a shape is matched to more than one name. Ignore any additional shapes drawn.
22	Three correct fruits ticked as shown: 	1m	Accept any other clear way of indicating the correct fruits shown on the page e.g. 50p + 20p + 30p = 100p or £1 (Refer to general marking principle 4 on page 6)
23	Correct answer circled as shown: 	1m	Accept any other clear way of indicating the correct rotation. **Do not** award the mark if other rotations are indicated unless it is clear that the correct answer is the child's final choice.
24	150 (g)	1m	

Qu.	Requirement	Mark	Additional guidance
25		1m	All three pairs must be correctly matched for the award of the mark. **Do not** award the mark if a sum is matched to more than one sum. Ignore any extra lines drawn from 20 + 8
26	Both calculations circled as shown: 	1m	Both correct calculations must be indicated for the award of the mark. Accept any other clear way of indicating the correct calculations, including evaluating **only** the correct two calculations, i.e. writing 40 alongside each of the two correct calculations. **Do not** award the mark if other calculations have been evaluated, and the correct two have not been indicated. **Do not** award the mark if more than two calculations are circled unless it is clear that the correct calculations are the child's final choice.

Sourced from SATs-Papers.co.uk https://www.SATs-Papers.co.uk

Qu.	Requirement	Mark	Additional guidance
27	Award **TWO** marks for all shapes correctly shaded e.g. Shade $\frac{1}{2}$  Shade $\frac{3}{4}$  Shade $\frac{1}{3}$  Award **ONE** mark for any **two** shapes correctly shaded.	**2m** **or** **1m**	Accept any other clear way of indicating the correct fractions; e.g. marking the appropriate number of sections.
28	Award **TWO** marks for the correct answer of 13 (crayons) If the answer is incorrect or missing, award **ONE** mark for evidence of a complete, correct method, e.g. • 40 – 17 – 10 = (incorrect **or** no answer) • 17 + 10 = 26 (*error*) 40 – 26 =	**2m** **or** **1m**	(Use the examples of responses given on pages 18-21 to help you determine how many marks can be awarded.)
29	Both signs written correctly as shown: $10 + 5$ **<** 10×5 2×6 **=** $6 + 6$	**1m**	Both signs must be correct for the award of the mark. Accept slight inaccuracies in the drawing of the signs, as long as the intention is clear.
30	47 (cherries)	**1m**	

Qu.	Requirement	Mark	Additional guidance
31	Clock face ticked as shown: 	1m	Accept any other clear way of indicating the correct clock face. **Do not** award the mark if other clock faces are indicated unless it is clear that the correct clock face is the child's final answer.

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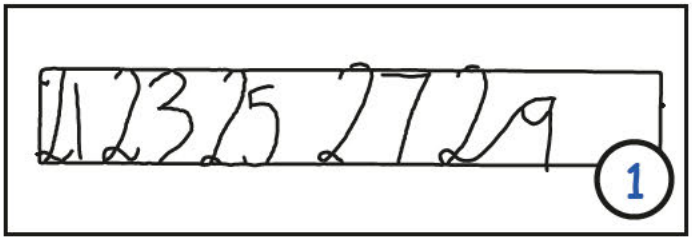
9. Example responses

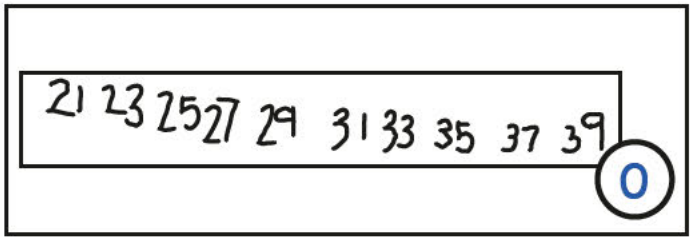
9.1 Examples of responses from question 5

Children must show all of the numbers **21**, **23**, **25**, **27** and **29** for the award of the mark. No other numbers must be given as part of the child's final answer.

Ling: 1 mark

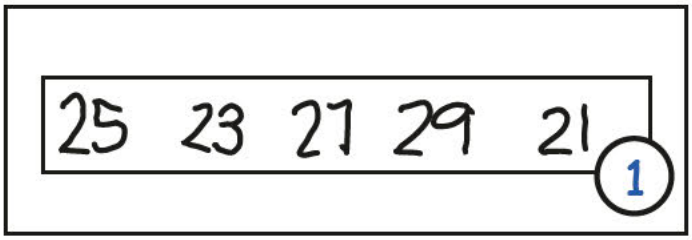


Aaron: 0 marks

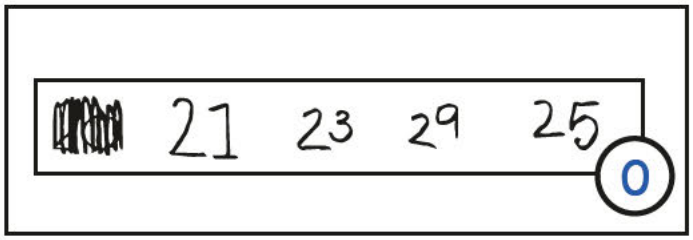


Ling and **Aaron** have both written the correct five numbers in the answer space. **Ling** has not offered any other numbers so **one mark** can be awarded. **Aaron** has written other numbers so his answer is not correct and **no mark** can be awarded.

Kalila: 1 mark

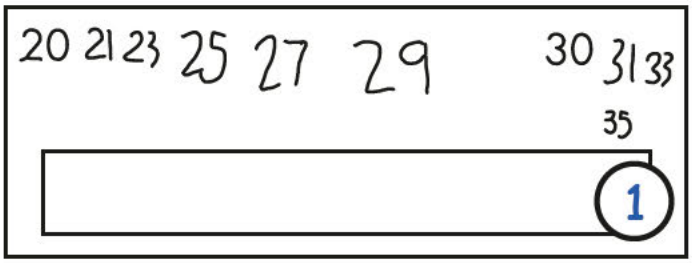


Umed: 0 marks

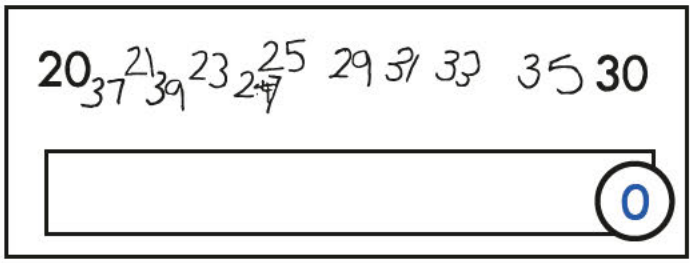


Kalila and **Umed** have both written correct numbers in the answer space. **Kalila** has written the correct five numbers in a random order and has not offered any other numbers so **one mark** can be awarded. **Umed** has only written four of the five numbers, so his answer is not fully correct and **no mark** can be awarded.

Liam: 1 mark



Narinder: 0 marks

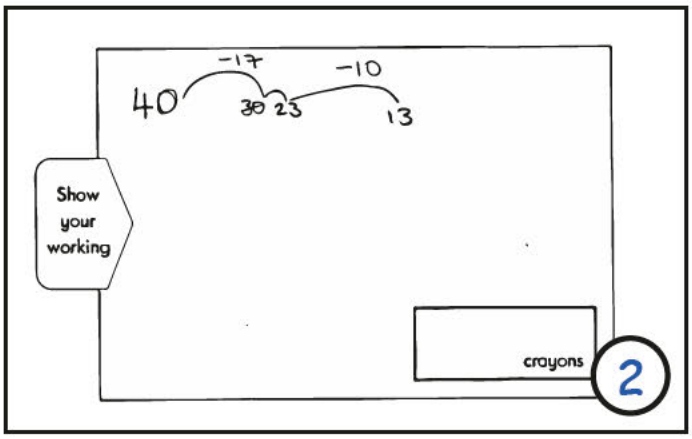


Liam and **Narinder** have both left the answer box blank, but offered their responses elsewhere on the page. **Liam** shows the correct five numbers clearly. Although additional numbers are seen, they are not between the 20 and 30 and can be ignored. **One mark** can be awarded. Although **Narinder** shows the correct five numbers, she has also written other numbers between the 20 and 30 making her final answer incorrect, so **no mark** can be awarded.

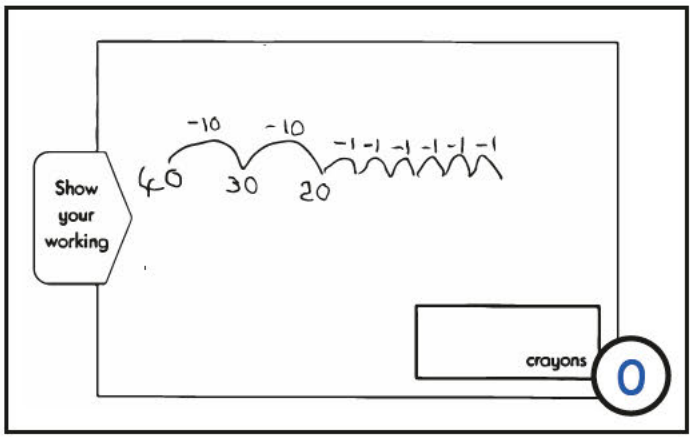
9.2 Examples of responses from question 28

Children must show a complete, correct method for the award of the method mark. The working may contain one or more arithmetic errors.

Peter: 2 marks

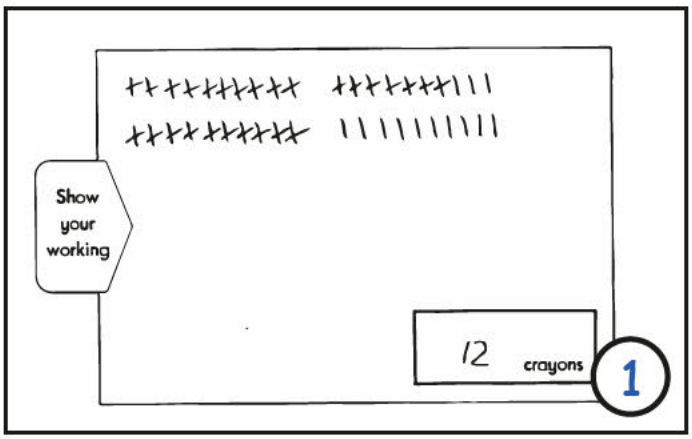


Alia: 0 marks

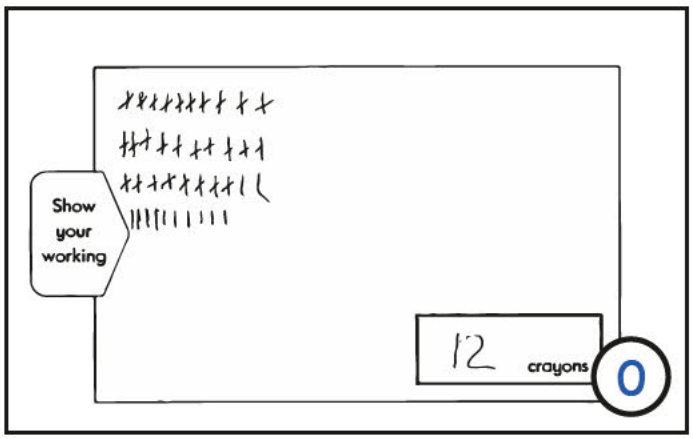


Both **Peter** and **Alia** have used a number line to solve the problem. **Peter** has been awarded **two marks** because he has shown the correct final answer of 13 even though it is not within the answer box. **Alia** has recorded an incorrect method. She has used a number line, but after subtracting two tens she has only subtracted 6 instead of 7, so **no mark** can be awarded.

Esne: 1 mark



Nicky: 0 marks



Esne and **Nicky** have used pictorial methods and both have shown the incorrect answer '12'. **Esne** has recorded a correct pictorial method, showing 40 tallies and crossing off 27, i.e. 40 – 17 – 10, but has made an error in counting the remaining tallies. Because her method is correct, **Esne** can be awarded **one mark**. **Nicky** has also recorded a pictorial method. She has shown 40 tallies, but has crossed off 28 so her method is not correct and **no mark** can be awarded.

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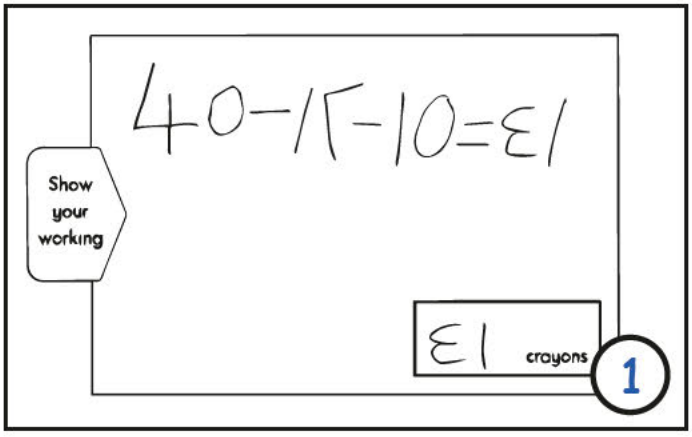
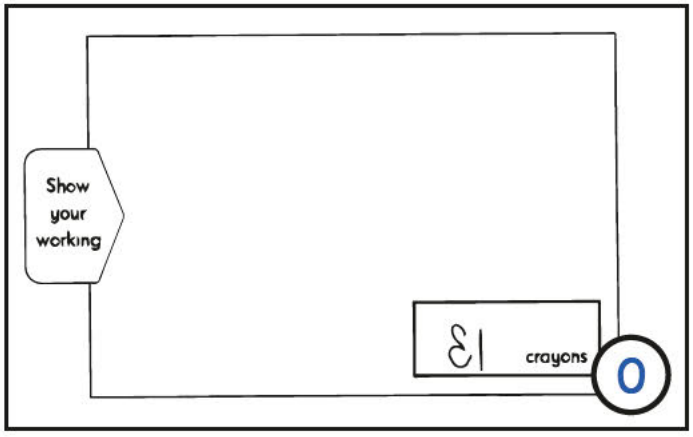
Examples of responses from question 28 continued

Shay: 1 mark

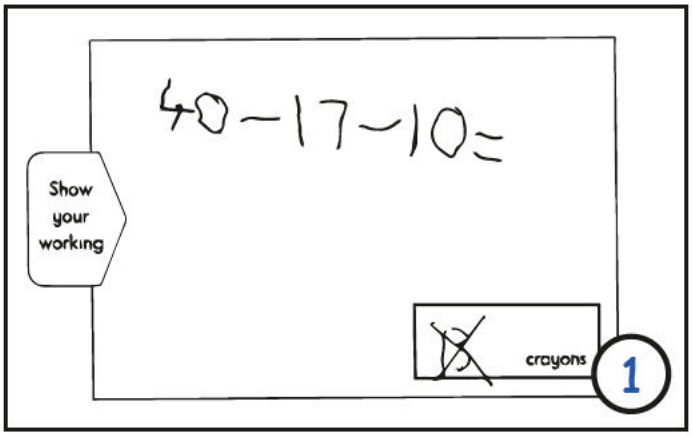


Charlie: 0 marks

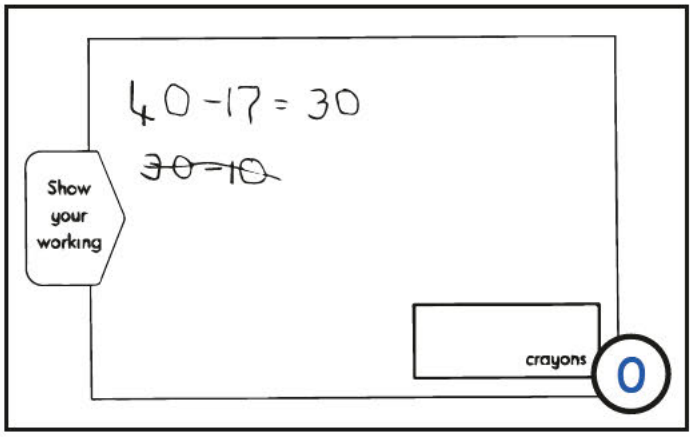


Shay and **Charlie** have both transposed digits in the final answer so two marks cannot be awarded. In **Shay's** working, 17 can be considered a reversal of a digit because the 17 is clearly seen in the question. Consequently her method (40 – 17 – 10 =) is complete and correct and can be awarded **one mark**. In his answer box, **Charlie** may be trying to write 13, but transposed digits are not acceptable. Since he has not shown any working, **no mark** can be awarded.

Alex: 1 mark



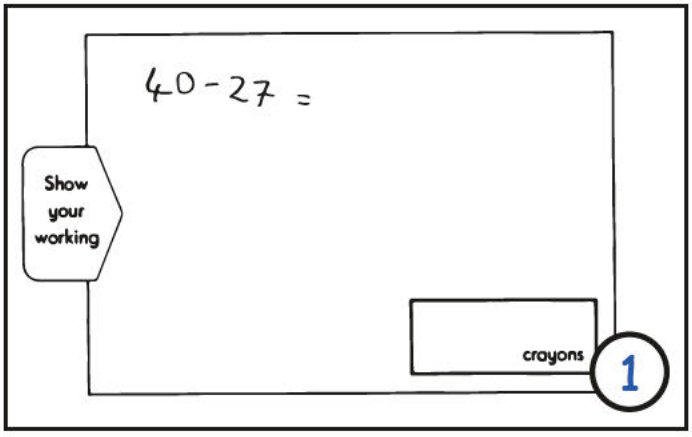
Erin: 0 marks



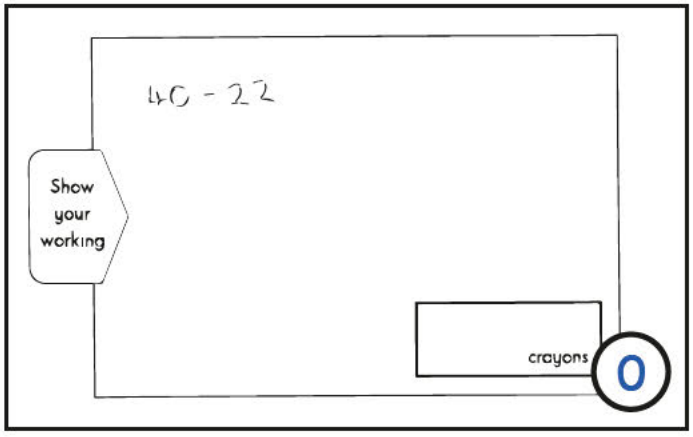
Alex and **Erin** have both crossed out some of their work. **Alex** has written the correct answer but has crossed it out and has not replaced it. However, he can be awarded **one mark** for a complete, correct method. In comparison, **Erin** had a complete method (albeit with an arithmetic error and no final answer) but she crossed out the second part (30 – 10) resulting in an incomplete method so **no mark** can be awarded.

Examples of responses from question 28 continued

Arnav: 1 mark

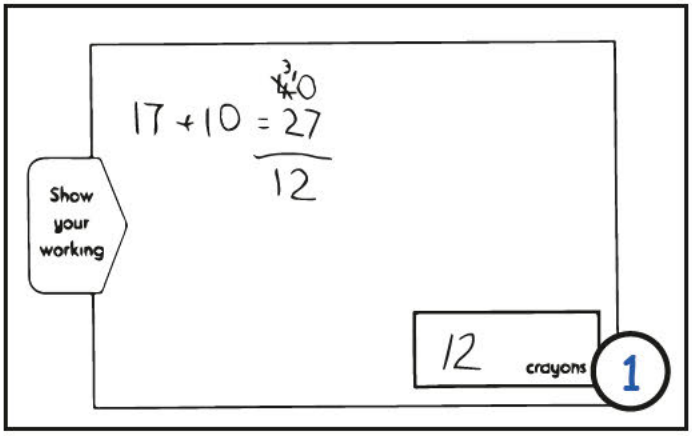


Oliwa: 0 marks

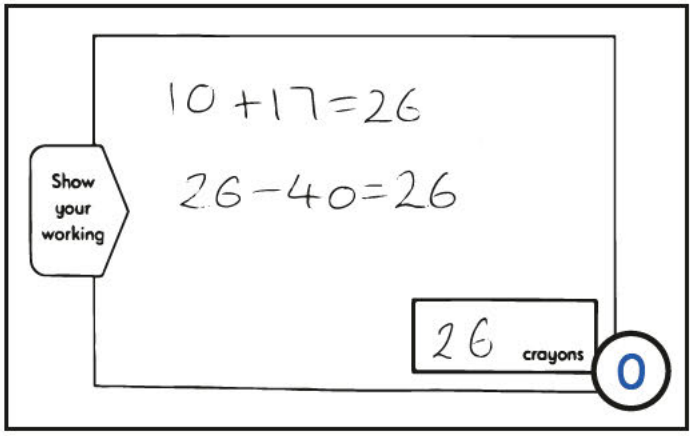


Arnav and **Oliwia** both recorded a calculation but did not complete it. Even though the first part of **Arnav's** method is not visible, we can assume that he has added 17 and 10 as he shows the total 27 being subtracted from 40 in the written part of his method. **One mark** can be awarded for a complete, correct method, despite the omission of a final answer. **Oliwia** has not shown the addition of 17 and 10, so it is not clear where her '22' has come from. We are not able to assume that she has a correct method so **no mark** can be awarded.

Harry: 1 mark



Lucia: 0 marks



Harry and **Lucia** both added 10 and 17 and then attempted a subtraction. **Harry** has subtracted 27 from 40 so **one mark** can be awarded for a complete, correct method. **Lucia** made an arithmetic error when adding 10 and 17 to reach 26. This arithmetic error need not affect the method mark, but **Lucia** went on to subtract 40 from 26 which is an incorrect method. Consequently **no mark** can be awarded. (If **Lucia** had reached the answer of 14, we would assume that she intended to subtract 26 from 40, and **one mark** would be awarded for a complete, correct method.)

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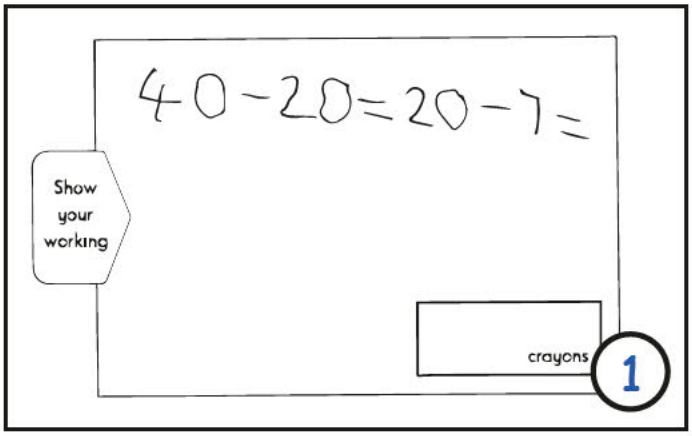
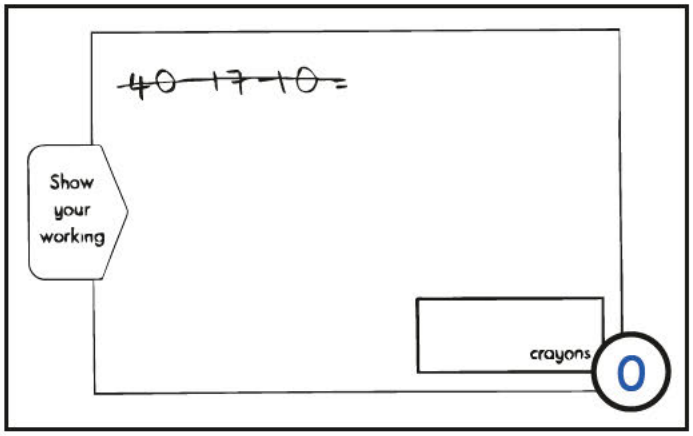
Examples of responses from question 28 continued

Anna: 1 mark

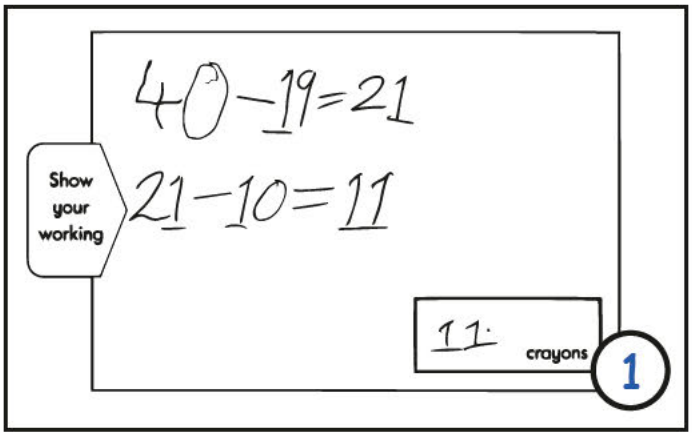


Leroy: 0 marks

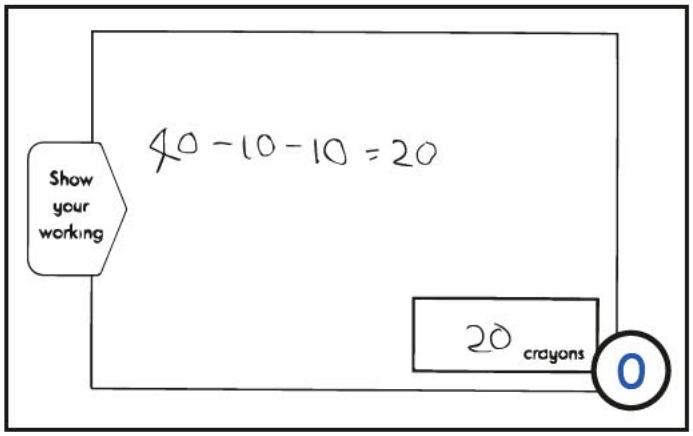


Anna and **Leroy** both recorded a calculation with no final answer. **Anna** shows a complete, correct method of 40 – 27 so **one mark** can be awarded. **Leroy** also recorded a complete, correct method of 40 – 17 – 10, but has crossed it out so **no mark** can be awarded.

Tom: 1 mark



Fleur: 0 marks



Tom and **Fleur** have both misread numbers in the question. **Tom** has misread 17 as 19. As all the arithmetic is correct and the question has not been made easier, **one mark** can be awarded for the method. **Fleur** has misread 17 as 10 and subtracted 10 twice. As her misread makes the question easier, **no mark** can be awarded.

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