

7. Mark schemes for Paper 1: arithmetic

Qu.	Requirement	Mark	Additional guidance
1	712	1m	
2	$\frac{5}{11}$	1m	Accept equivalent fractions or an exact decimal equivalent, e.g. $0.\overline{45}$ (accept any unambiguous indication of the recurring digits). Do not accept rounded or truncated decimals.
3	90	1m	
4	838	1m	
5	9	1m	
6	200	1m	
7	6,562	1m	
8	46	1m	
9	81.08	1m	
10	308	1m	
11	90	1m	
12	600	1m	
13	4	1m	
14	4,921	1m	
15	50,000	1m	
16	4.6	1m	
17	$\frac{6}{7}$	1m	Accept equivalent fractions or an exact decimal equivalent, e.g. $0.\overline{857142}$ (accept any unambiguous indication of the recurring digits). Do not accept rounded or truncated decimals.
18	0.001	1m	Accept equivalent fractions, e.g. $\frac{1}{1000}$

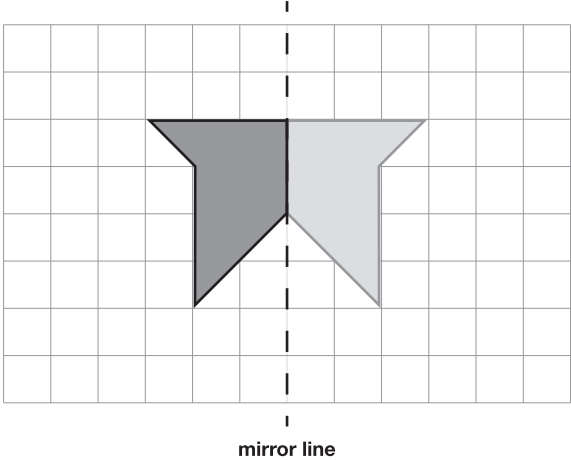
Qu.	Requirement	Mark	Additional guidance
19	750	1m	
20	Award TWO marks for the correct answer of 18,055 If the answer is incorrect, award ONE mark for a formal method of long multiplication with no more than ONE arithmetic error, e.g. $\begin{array}{r} 785 \\ \times 23 \\ \hline 2355 \\ 15700 \\ \hline 18155 \text{ (error)} \end{array}$ OR $\begin{array}{r} 785 \\ \times 23 \\ \hline 2345 \text{ (error)} \\ 15700 \\ \hline 18045 \end{array}$	Up to 2m	Working must be carried through to reach a final answer for the award of ONE mark. Do not award any marks if the error is in the place value, e.g. the omission of the zero when multiplying by tens: $\begin{array}{r} 785 \\ \times 23 \\ \hline 2355 \\ 1570 \text{ (place value error)} \\ \hline 3925 \end{array}$
21	240	1m	Do not accept 240%

Qu.	Requirement	Mark	Additional guidance
22	Award TWO marks for the correct answer of 15 If the answer is incorrect, award ONE mark for a formal method of division with no more than ONE arithmetic error, i.e. - long division algorithm, e.g. $ \begin{array}{r} 14 \quad (\text{error}) \\ 43 \overline{) 645} \\ \underline{- 430} \\ 215 \\ \underline{- 215} \\ 0 \end{array} $ OR $ \begin{array}{r} 15 \text{ r}28 \\ 43 \overline{) 645} \\ \underline{- 430} \qquad 10 \times 43 \\ 215 \\ \underline{- 129} \qquad 3 \times 43 \\ 114 \quad (\text{error}) \\ \underline{- 86} \qquad 2 \times 43 \\ 28 \end{array} $ - short division algorithm, e.g. $ \begin{array}{r} 1 \ 5 \text{ r}3 \quad (\text{error}) \\ 43 \overline{) 64^{21}5} \end{array} $	Up to 2m	Working must be carried through to reach a final answer for the award of ONE mark. Short division methods must be supported by evidence of appropriate carrying figures to indicate the use of a division algorithm, and be a complete method. The carrying figure must be less than the divisor.
23	14	1m	
24	$\frac{7}{10}$	1m	Accept equivalent fractions or the exact decimal equivalent, e.g. 0.7
25	$2\frac{1}{2}$	1m	Accept equivalent mixed numbers, fractions or the exact decimal equivalent, e.g. 2.5
26	0.262	1m	
27	117	1m	

Qu.	Requirement	Mark	Additional guidance
28	$\frac{2}{3}$	1m	Accept equivalent fractions or an exact decimal equivalent, e.g. $0.\overline{6}$ (accept any unambiguous indication of the recurring digits). Do not accept rounded or truncated decimals.
29	Award TWO marks for the correct answer of 465,518 If the answer is incorrect, award ONE mark for the formal method of long multiplication with no more than ONE arithmetic error, e.g. $\begin{array}{r} 5413 \\ \times \quad 86 \\ \hline 32478 \\ 433040 \\ \hline 465438 \text{ (error)} \end{array}$ OR $\begin{array}{r} 5413 \\ \times \quad 86 \\ \hline 32478 \\ 423040 \text{ (error)} \\ \hline 455518 \end{array}$	Up to 2m	Working must be carried through to reach a final answer for the award of ONE mark. Do not award any marks if the error is in the place value, e.g. the omission of the zero when multiplying by tens: $\begin{array}{r} 5413 \\ \times \quad 86 \\ \hline 32478 \\ 43304 \text{ (place value error)} \\ \hline 75782 \end{array}$
30	198	1m	Do not accept 198%
31	$\frac{1}{8}$	1m	Accept equivalent fractions or an exact decimal equivalent, e.g. 0.125
32	77	1m	
33	60	1m	Do not accept unsimplified equivalent fractions unless accompanied by 60 or $\frac{60}{1}$
34	182	1m	Do not accept 182%
35	$2\frac{17}{21}$ OR $\frac{59}{21}$	1m	Accept equivalent mixed numbers, fractions or the exact decimal equivalent, e.g. 2.809523 (accept any unambiguous indication of the recurring digits). Do not accept rounded or truncated decimals.

Qu.	Requirement	Mark	Additional guidance
36	Award TWO marks for the correct answer of 91 If the answer is incorrect, award ONE mark for the formal methods of division with no more than ONE arithmetic error, i.e. - long division algorithm, e.g. $ \begin{array}{r} 81 \text{ (error)} \\ 97 \overline{) 8827} \\ \underline{- 8730} \\ 97 \\ \underline{- 97} \\ 0 \end{array} $ OR $ \begin{array}{r} 91 \text{ r}2 \\ 97 \overline{) 8827} \\ \underline{- 7760} \quad 80 \times 97 \\ 1069 \text{ (error)} \\ \underline{- 970} \quad 10 \times 97 \\ 99 \\ \underline{- 97} \quad 1 \times 97 \\ 2 \end{array} $ - short division algorithm, e.g. $ \begin{array}{r} 7 \ 1 \text{ (error)} \\ 97 \overline{) 882} 7 \end{array} $	Up to 2m	Working must be carried through to reach a final answer for the award of ONE mark. Sometimes an error in calculation leads to a remainder which equals the truncated decimal equivalent. In such cases when the remainder is expressed as a decimal, evidence of working leading to the decimal must be seen in order to condone the possible notation error. (See General Marking Principle 13, page 8.) Short division methods must be supported by evidence of appropriate carrying figures to indicate the use of a division algorithm, and be a complete method. The carrying figure must be less than the divisor.

8. Mark schemes for Paper 2: reasoning

Qu.	Requirement	Mark	Additional guidance
1	Diagram completed, as shown: 	1m	Accept slight inaccuracies in drawing (see page 12 for guidance). Shape need not be shaded for the award of ONE mark.
2	Correct addition calculation, as shown: $\begin{array}{r} \boxed{28} \\ + \boxed{67} \\ \hline \boxed{95} \end{array}$ OR $\begin{array}{r} \boxed{67} \\ + \boxed{28} \\ \hline \boxed{95} \end{array}$	1m	All 6 digit cards must be completed correctly for the award of ONE mark.
3	A point on the line in the range 6.6 cm to 6.8 cm inclusive from A.	1m	
4	Both values correct, as shown: $\frac{3}{4} = \frac{9}{\boxed{12}} = \frac{\boxed{18}}{24}$	1m	Both values must be correct for the award of ONE mark.

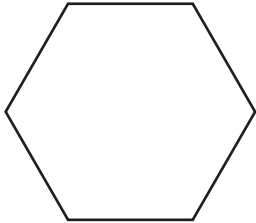
Qu.	Requirement	Mark	Additional guidance										
5a	7	1m	Do not accept –7 or 7–										
5b	Oslo	1m	Accept unambiguous abbreviations or recognisable misspellings.										
6	299,604	1m											
7	Both boxes ticked, as shown: Tick two. <table><tr><td>0.25</td><td>☒</td></tr><tr><td>0.75</td><td>☐</td></tr><tr><td>$\frac{25}{100}$</td><td>☒</td></tr><tr><td>0.5</td><td>☐</td></tr><tr><td>$\frac{2}{5}$</td><td>☐</td></tr></table>	0.25	☒	0.75	☐	$\frac{25}{100}$	☒	0.5	☐	$\frac{2}{5}$	☐	1m	As pupils are told to select two boxes, alternative unambiguous positive indications, e.g. Y, of the correct answer are accepted. Both correct boxes must be ticked for the award of the mark. No additional boxes must be ticked.
0.25	☒												
0.75	☐												
$\frac{25}{100}$	☒												
0.5	☐												
$\frac{2}{5}$	☐												
8	Award TWO marks for the correct answer of 192 If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g. • $48 \times 3 = 144$ $24 \times 2 = 48$ $144 + 48 =$ OR • $48 + 48 + 48 = 144$ $24 + 24 = 48$ $144 + 48 =$ OR • 4×48 OR • 8×24	Up to 2m	Answer need not be obtained for the award of ONE mark.										

Qu.	Requirement	Mark	Additional guidance												
9	Explanation that recognises that the sequence does not always increase by four, with clear reference to the data, e.g. - The difference between 1996 and 1999 is three years, not four so it is not always every four years - It would be 2000 if it was every 4 years - It should have ended in 2016 OR Explanation that demonstrates that the sequence does not always increase by 4, but does not reference specific years from the data, e.g. - The cricket world cup was sometimes 3 years apart instead of 4 years apart - Not all of the years have 4 years difference between.	1m	Do not accept vague or incomplete explanations, e.g. - It does not always increase by four - It should be 2000 - The difference can be 3, 4 or 5 years at different times. Do not accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation, e.g. $1992 + 4 = 1996 + 3 = 1999$												
10	Award TWO marks for all symbols correct, as shown: <table><tr><td>11×12</td><td>$<$</td><td>15×10</td></tr><tr><td>$90 \div 30$</td><td>$=$</td><td>$60 \div 20$</td></tr><tr><td>$120 \div 4$</td><td>$>$</td><td>$160 \div 8$</td></tr><tr><td>30×8</td><td>$<$</td><td>100×10</td></tr></table> Award ONE mark for any three symbols correct.	11×12	$<$	15×10	$90 \div 30$	$=$	$60 \div 20$	$120 \div 4$	$>$	$160 \div 8$	30×8	$<$	100×10	Up to 2m	
11×12	$<$	15×10													
$90 \div 30$	$=$	$60 \div 20$													
$120 \div 4$	$>$	$160 \div 8$													
30×8	$<$	100×10													
11	Award TWO marks for the table completed, as shown: <table><tr><th>Number of faces</th><th>Number of vertices</th><th>Number of edges</th></tr><tr><td>6</td><td>8</td><td>12</td></tr></table> Award ONE mark for two correct numbers, correctly placed.	Number of faces	Number of vertices	Number of edges	6	8	12	Up to 2m							
Number of faces	Number of vertices	Number of edges													
6	8	12													

Qu.	Requirement	Mark	Additional guidance
12	Shape located correctly, as shown:	1m	Accept slight inaccuracies in drawing (see page 12 for guidance). Shape need not be shaded for the award of ONE mark.
13	Correct number circled, as shown: $\frac{67}{8} \quad \frac{48}{8} \quad \frac{62}{8} \quad \left(\frac{55}{8} \right) \quad \frac{76}{8}$	1m	Accept alternative unambiguous positive indication of the correct answer, e.g. fraction ticked.
14	Fractions written in the correct order, as shown: $\frac{3}{5} \quad \frac{3}{4} \quad \frac{6}{5}$	1m	Accept the fraction joined to the correct box, rather than written in it. Do not accept transcription errors or misreads for this question.

Qu.	Requirement	Mark	Additional guidance
15	Award TWO marks for the correct answer of 1800 If the answer is incorrect, award ONE mark for evidence of appropriate complete method with no more than one arithmetic error, e.g. $40 \times 15 = 500$ (<i>error</i>) $500 \times 3 = 1500$ If no answer is given, the first part of the calculation must be evaluated correctly for the award of ONE mark, e.g. $15 \times 3 = 45$ $45 \times 40 =$ OR $40 \times 15 = 600$ $600 \times 3 =$ OR $40 \times 3 = 120$ $120 \times 15 =$	Up to 2m	Do not accept sight of a correct multiplication, e.g. $40 \times 15 \times 3$, for ONE mark unless part of the calculation is evaluated correctly. Misreads are not allowed.
16	Award TWO marks for two boxes ticked correctly, as shown: add 3 then subtract 90 ☐ subtract 100 then add 3 ☒ subtract 7 then subtract 90 ☒ subtract 3 then subtract 100 ☐ If the answer is incorrect, award ONE mark for: - only one box ticked correctly and no incorrect boxes ticked OR - two boxes ticked correctly and one incorrect box ticked.	Up to 2m	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.

Qu.	Requirement	Mark	Additional guidance
17	Award THREE marks for the correct answer of 1.7 (litres) or 1,700 (ml). If the answer is incorrect, award TWO marks for: - sight of 6,300 OR 6.3 as evidence of the multiplication completed correctly OR - evidence of an appropriate complete method with no more than one error, e.g. $28 \times 225 = 6,300$ 8 litres = 8,000 ml $8,000 - 6,300 = 2,700$ (error) Award ONE mark for evidence of an appropriate method, e.g. $8,000 - 28 \times 225 =$	Up to 3m	Unit need not be given for the award of THREE marks. An incorrect unit is treated as one error. A misread may affect the award of marks. No marks are awarded if there is more than one misread or if the mathematics is simplified. TWO marks will be awarded for an appropriate complete method with the misread number followed through correctly. ONE mark will be awarded for evidence of an appropriate complete method with the misread number followed through correctly with one arithmetic error. If the answer reached in the first part of the calculation gives an answer greater than 8(L) or 8000(ml) and the smaller value is then subtracted from it, ONE mark may still be available. Answer need not be obtained for the award of ONE mark.
18	Award TWO marks for the correct answer of £5.50 If the answer is incorrect, award ONE mark for: - sight of $22 \div 4$ OR - evidence of appropriate method, e.g. 3 tickets cost $3 \times £5 = £15$ 1 ticket costs £7 $£15 + £7 = £22$ $£22 \div 2 \div 2$	Up to 2m	For ONE mark, accept an answer of £550, £550p or £5.5 as evidence of appropriate method. Answer need not be obtained for the award of ONE mark.

Qu.	Requirement	Mark	Additional guidance
19	Third box only ticked correctly, as shown: 3 – 2 + 2 ☐ 4 – 2 + 1 ☐ 4 – 2 + 2 ☒ 3 – 2 + 1 ☐	1m	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.
20	Award TWO marks for the correct answer of 30 If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g. 17.5 × 12 = 210 15 × 12 = 180 210 – 180 = OR 2.5 × 12 =	Up to 2m	Answer need not be obtained for the award of ONE mark.
21a	 = 36	1m	Award ONE mark for an answer of (147 – 2 × answer for box 1) ÷ 3 OR (111 – answer for box 1) ÷ 3 Any follow-through fraction or decimal answer must be expressed as an exact value.
21b	 = 25	1m	
22	125	1m	

Qu.	Requirement	Mark	Additional guidance
23	Award TWO marks for the correct answer of 1,408 OR for an answer in the range of 1,406 to 1,409 inclusive. If the answer is incorrect, award ONE mark for: - sight of 1,392 OR - evidence of an appropriate method, e.g. $24 \times 58 \frac{2}{3} = \text{answer}$ $24 \times 58 = 1,394$ (<i>error</i>) $\frac{2}{3}$ of 24 = 16 $1,394 + 16 = \text{answer}$ $24 \times \frac{176}{3} = \text{answer}$ $24 \times 58.67 = \text{answer.}$	Up to 2m	A final answer is required for the award of ONE mark. Within an appropriate method, if a decimal equivalent for $\frac{2}{3}$ is given, it must be rounded or truncated to at least 2 decimal places.

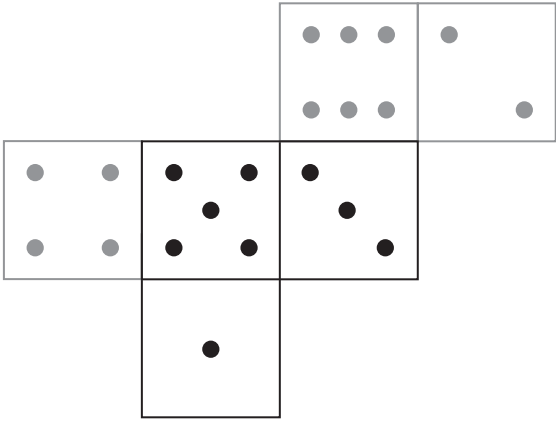
9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance
1	Award TWO marks for three correct numbers, as shown: 35 42 49 56 63 70 Award ONE mark for two numbers correctly placed.	Up to 2m	
2	Two combinations, as shown: blue and red OR red and blue AND white and red OR red and white.	1m	
3	Digits in correct order, as shown: 2 7 4 3	1m	All digits must be in the correct order for the award of ONE mark.
4	Award TWO marks for numbers completed, as shown: 5 3 2 4 9 + 7 4 2 7 6 0 6 7 6 Award ONE mark for any two numbers completed correctly.	Up to 2m	

Qu.	Requirement	Mark	Additional guidance
5	Award TWO marks for only three correct boxes ticked, as shown: 2 ☒ 3 ☒ 6 ☒ 9 ☐ 12 ☐ Award ONE mark for: - only two correct boxes ticked and no incorrect boxes ticked OR - three correct boxes ticked and one incorrect box ticked.	Up to 2m	Accept alternative unambiguous positive indications, e.g. Y.
6	Award TWO marks for only two correct boxes ticked, as shown: There are more cheetahs than jaguars. ☒ The total number of lions and tigers is 10 ☐ One-quarter of the big cats are cheetahs. ☒ There are more than 5 jaguars. ☐ Award ONE mark for: - only one correct box ticked and no incorrect boxes ticked OR - two correct boxes ticked and one incorrect box ticked.	Up to 2m	Accept alternative unambiguous positive indications, e.g. Y.

Qu.	Requirement	Mark	Additional guidance
7a	163	1m	
7b	2	1m	
8	£140	1m	Do not accept 140%
9	108	1m	
10	(-3,1)	1m	Do not accept (3-, 1)
11	Award TWO marks for a correct answer of 275 OR an answer in the range from 270 to 280 inclusive. If the answer is incorrect, award ONE mark for evidence of appropriate method, e.g. $150 + 175 = 325$ $600 - 325 =$ OR $600 - 150 - 165$ (<i>error</i>) =	Up to 2m	Answer need not be obtained for the award of ONE mark. Accept a reading in the range 170 to 180ml inclusive for the second jug. At least one of the measurements must be correct for the award of ONE mark.
12	24	1m	
13	Award TWO marks for the correct answer of 40 If the answer is incorrect, award ONE mark for evidence of appropriate method, e.g. $2.6 \times 1,000 = 2,600$ $2,600 \div 65 =$ $2.6 \div 0.065 =$	Up to 2m	Answer need not be obtained for the award of ONE mark. Do not accept an incorrect conversion or no conversion of units, e.g. $260 \div 65 =$ $2.6 \text{ kg} \div 65 \text{ g}$

Qu.	Requirement	Mark	Additional guidance
14	An explanation showing an understanding: - that this specific triangle has angles 70, 70 and 40 OR - of the properties of an equilateral triangle – all angles are equal (60°) and therefore that this triangle cannot be equilateral, e.g. - The angles aren't 60° - There is not a 60° angle - It has two different angles (70° and 40°) so it can't be equilateral - The angles aren't the same - An equilateral triangle has 60° + 60° + 60° - All the angles are the same in an equilateral triangle - It's an isosceles triangle. (In the context of this question, the term isosceles triangle is treated as not including equilateral triangles as a special type, as the national curriculum does not specify this at key stage 2.)	1m	Do not accept vague or incomplete explanations, e.g. - The other angle is 70° - They aren't (all) the same. <i>(No reference to angles)</i> - An equilateral triangle has equal angles. <i>(Does not say all.)</i> Do not accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation, e.g. $40 + 70 = 110 + 70 = 180$
15a	£3.05	1m	Refer to page 13 for additional guidance on marking answers involving money.
15b	Award TWO marks for the correct answer of 6 If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g. $£5 - £1.25 = £3.75$ $£3.75 \div 60p = 6.25$ 7 colours <i>(rounded incorrectly)</i> OR $£5 - £1.25 = £4.75$ <i>(error)</i> $475 \div 60 =$ OR $6 \times 60 = 360$ $£3.60 + £1.25 = £4.85$ 7 colours <i>(rounded incorrectly)</i>	Up to 2m	Answer need not be obtained for the award of ONE mark.

Qu.	Requirement	Mark	Additional guidance
16	Award TWO marks for the correct answer of 184 If the answer is incorrect, award ONE mark for: - sight of 92 OR - evidence of appropriate method, e.g. $\frac{1}{3} \times 276 = 92$ $92 \times 2 =$ $276 \div 3 = 92$ $276 - 92 =$	Up to 2m	Answer need not be obtained for the award of ONE mark.
17	Net completed, as shown: 	1m	Accept unconventional arrangements of the dots, provided the intended number is clear and correct. Accept numbers instead of dots.

Qu.	Requirement	Mark	Additional guidance
18	Award TWO marks for the correct answer of $\frac{1}{12}$ or an equivalent fraction. If the answer is incorrect, award ONE mark for: - sight of $\frac{11}{12}$ OR - evidence of appropriate method, e.g. $\frac{2}{3} + \frac{1}{4}$ $\frac{8}{12} + \frac{3}{12} = \frac{10}{12}$ (error) $1 - \frac{10}{12} =$ $1 - \frac{2}{3} - \frac{1}{4} =$	Up to 2m	Answer need not be obtained for the award of ONE mark.
19	Award TWO marks for numbers completed, as shown: $354 \times 9.5 =$ 3,363 $3,540 \times 95 =$ 336,300 $3,363 \div 95 =$ 35.4 Award ONE mark for any two numbers completed correctly.	Up to 2m	Do not accept transcription errors or misreads for this question.
20	Award TWO marks for the correct answer of 101 If the answer is incorrect, award ONE mark for: - sight of 44 OR - evidence of appropriate method, e.g. $31 - 20 = 11$ $11 \times 4 + 57 =$	Up to 2m	Answer need not be obtained for the award of ONE mark.

Qu.	Requirement	Mark	Additional guidance
21a	57 min 15 sec	1m	The answer is a time interval (see page 14 for guidance).
21b	44 min 40 sec	1m	