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. $\frac{1}{1000}$

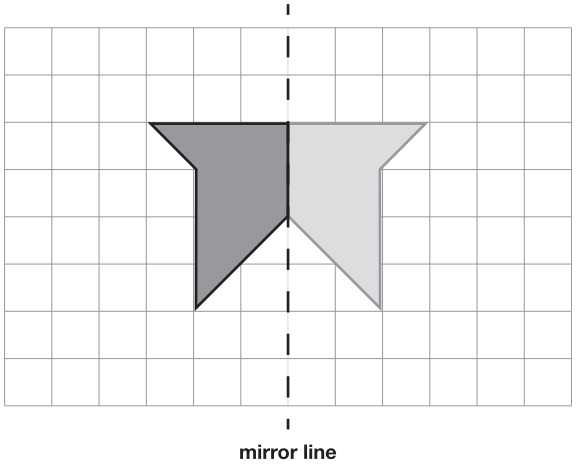
Qu.	Requirement	Mark	Additional guidance
19	750	**1m**	
20	Award **TWO** marks for the correct answer of 18,055 If the answer is incorrect, award **ONE** mark for a formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • 785 × 23 = 2355 + 15700 = 18155 *(error)* **OR** • 785 × 23 = 2345 *(error)* + 15700 = 18045	**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: 785 × 23 = 2355 + 1570 *(place value error)* = 3925
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. 14 *(error)* 43 | 645 – 430 215 – 215 0 **OR** 15 r28 43 | 645 – 430 10×43 215 – 129 3×43 114 *(error)* – 86 2×43 28 • short division algorithm, e.g. 1 5 r3 *(error)* 43 | 64^{21}5	**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. • 5413 × 86 = 32478 + 433040 = 465438 *(error)* **OR** • 5413 × 86 = 32478 + 423040 *(error)* = 455518	**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: • 5413 × 86 = 32478 + 43304 *(place value error)* = 75782
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. $2.\overline{809523}$ (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. 81 *(error)* 97 | 8827 − 8730 97 − 97 0 **OR** 91 r2 97 | 8827 − 7760 80 × 97 1069 *(error)* − 970 10 × 97 99 − 97 1 × 97 2 • short division algorithm, e.g. 7 1 *(error)* 97 | 882 9 7	**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: $\begin{array}{r} 28 \\ +\ 67 \\ \hline 95 \end{array}$ **OR** $\begin{array}{r} 67 \\ +\ 28 \\ \hline 95 \end{array}$	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**. 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.
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 × 3 = 144 24 × 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.

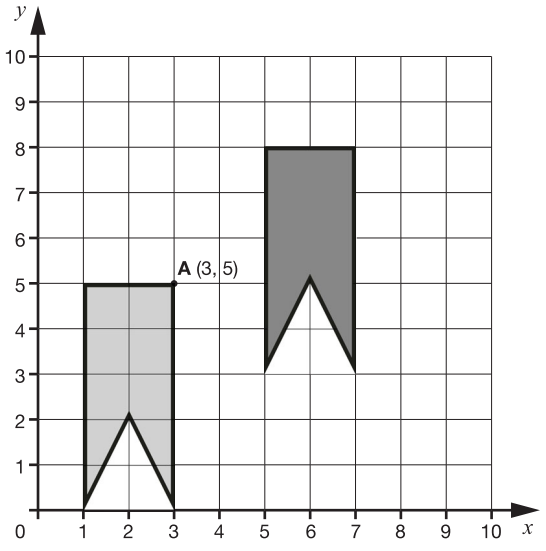
<table>
<tr><th>Qu.</th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>9</td><td>Explanation that recognises that the sequence does not always increase by four, with clear reference to the data, e.g.
The difference between 1996 and 1999 is three years, not four so it is not 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.</td><td>1m</td><td>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</td></tr>
<tr><td>10</td><td>Award TWO marks for all symbols correct, as shown:

11 × 12 | < | 15 × 10
90 ÷ 30 | = | 60 ÷ 20
120 ÷ 4 | > | 160 ÷ 8
30 × 8 | < | 100 × 10

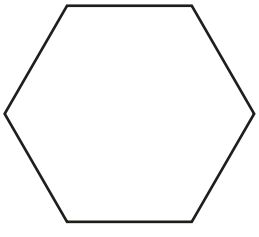
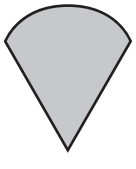
Award ONE mark for any three symbols correct.</td><td>Up to 2m</td><td></td></tr>
<tr><td>11</td><td>Award TWO marks for the table completed, as shown:

<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.</td><td>Up to 2m</td><td></td></tr>
</table>

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: $\frac{67}{8}$ $\frac{48}{8}$ $\frac{62}{8}$ $\frac{55}{8}$ $\frac{76}{8}$	**1m**	Accept alternative unambiguous positive indication of the correct answer, e.g. fraction ticked.
14	Fractions written in the correct order, as shown: $\frac{3}{5}$ $\frac{3}{4}$ $\frac{6}{5}$	**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 × 15 = 500 *(error)* 500 × 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 × 3 = 45 45 × 40 = **OR** • 40 × 15 = 600 600 × 3 = **OR** • 40 × 3 = 120 120 × 15 =	**Up to 2m**	**Do not** accept sight of a correct multiplication, e.g. 40 × 15 × 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 × 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 × 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 ÷ 4 **OR** • evidence of appropriate method, e.g. • 3 tickets cost 3 × £5 = £15 1 ticket costs £7 £15 + £7 = £22 £22 ÷ 2 ÷ 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**	
21b	 = **25**	**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.
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. • $24 \times 58\frac{2}{3}$ = answer • $24 \times 58 = 1{,}394$ *(error)* $\frac{2}{3}$ of 24 = 16 1,394 + 16 = answer • $24 \times \frac{176}{3}$ = answer • 24×58.67 = 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.

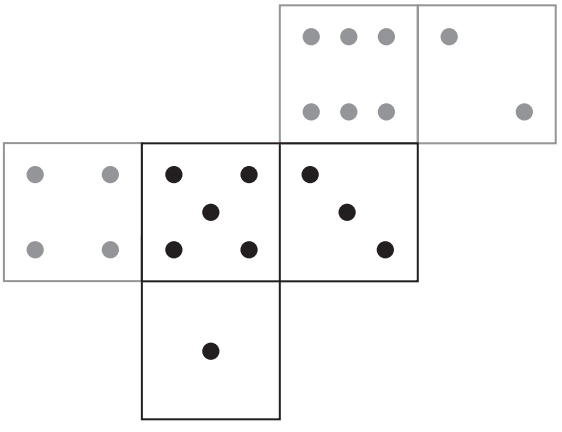
9. Mark schemes for Paper 3: reasoning

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 *(error)* =	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Accept a reading in the range 170 to 180 ml 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 × 1,000 = 2,600 2,600 ÷ 65 = • 2.6 ÷ 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 ÷ 65 = • 2.6 kg ÷ 65 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. *(No reference to angles)* • An equilateral triangle has equal angles. *(Does not say all.)* **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 ÷ 60p = 6.25 7 colours *(rounded incorrectly)* **OR** • £5 – £1.25 = £4.75 *(error)* 475 ÷ 60 = **OR** • 6 × 60 = 360 £3.60 + £1.25 = £4.85 7 colours *(rounded incorrectly)*	**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 × 9.5 = **3,363** 3,540 × 95 = **336,300** 3,363 ÷ 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 × 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**	