7. Mark schemes for Paper 1: arithmetic

Qu.	Requirement	Mark	Additional guidance
1	1,040	1m	
2	2,525	1m	
3	$1\frac{1}{6}$ **OR** $\frac{7}{6}$	1m	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. $1.1\overline{6}$ (accept any unambiguous indication of the recurring digit). **Do not** accept rounded or truncated decimals.
4	505	1m	
5	285	1m	
6	5.714	1m	
7	5,100	1m	
8	264	1m	
9	8	1m	
10	668	1m	
11	4,088	1m	
12	$\frac{6}{25}$	1m	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $\frac{24}{100}$ or 0.24
13	1,159	1m	
14	56	1m	
15	$\frac{2}{5}$	1m	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $\frac{12}{30}$ or 0.4
16	1,200	1m	
17	83	1m	
18	0.004	1m	
19	2,345,000	1m	

Qu.	Requirement	Mark	Additional guidance
20	Award **TWO** marks for the correct answer of 42 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. 42 r2 17 | 714 – 680 (40 × 17) 36 *(error)* – 34 (2 × 17) 2 **OR** 43 *(error)* 17 | 714 – 680 (40 × 17) 34 – 34 (2 × 17) 0 • short division algorithm, e.g. 4 1 r7 17 | 71^{2}4 *(error in carrying digit)*	**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.
21	5.55	**1m**	

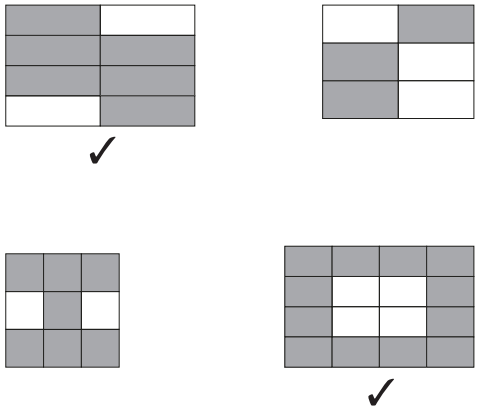
Qu.	Requirement	Mark	Additional guidance
22	Award **TWO** marks for the correct answer of 109,963 If the answer is incorrect, award **ONE** mark for a formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 4781 \\ \times \quad 23 \\ \hline 14343 \\ 95620 \\ \hline 209963 \end{array}$ *(error)* **OR** • $\begin{array}{r} 4781 \\ \times \quad 23 \\ \hline 14343 \\ 95630 \\ \hline 109973 \end{array}$ *(error)*	**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: $\begin{array}{r} 4781 \\ \times \quad 23 \\ \hline 14343 \\ 9562 \\ \hline 23905 \end{array}$ *(place value error)*
23	$\frac{3}{8}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.375
24	Award **TWO** marks for the correct answer of 19,228 If the answer is incorrect, award **ONE** mark for a formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 418 \\ \times \quad 46 \\ \hline 2508 \\ 16720 \\ \hline 18228 \end{array}$ *(error)* **OR** • $\begin{array}{r} 418 \\ \times \quad 46 \\ \hline 2508 \\ 16620 \\ \hline 19128 \end{array}$ *(error)*	**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: • $\begin{array}{r} 418 \\ \times \quad 46 \\ \hline 2508 \\ 1672 \\ \hline 4180 \end{array}$ *(place value error)*
25	23.129	**1m**	
26	$\frac{11}{20}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.55

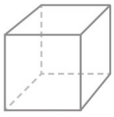
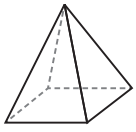
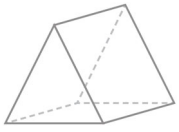
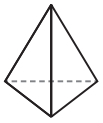
Qu.	Requirement	Mark	Additional guidance
27	$\frac{1}{5}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $\frac{4}{20}$ or 0.2
28	$\frac{5}{16}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.3125
29	207	**1m**	**Do not** accept 207%
30	$3\frac{1}{6}$ **OR** $\frac{19}{6}$	**1m**	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. $3.1\overline{6}$ (accept any unambiguous indication of the recurring digit). **Do not** accept rounded or truncated decimals. **Do not** accept $2\frac{7}{6}$
31	35	**1m**	**Do not** accept 35%
32	$\frac{5}{24}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $\frac{10}{48}$ or $0.208\overline{3}$ (accept any unambiguous indication of the recurring digit). **Do not** accept rounded or truncated decimals.
33	180	**1m**	
34	150	**1m**	**Do not** accept 150%
35	$85\frac{1}{2}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent e.g. $\frac{171}{2}$ or 85.5

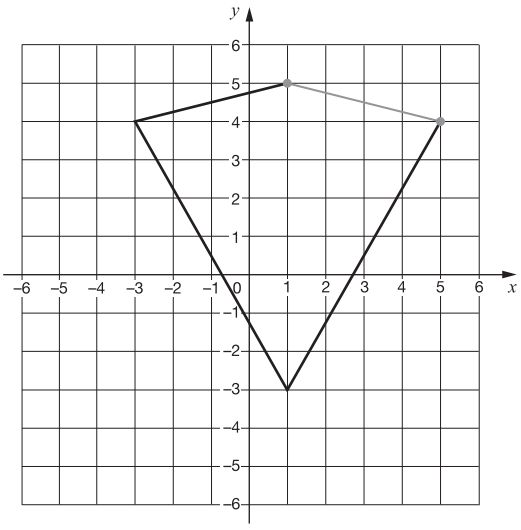
Qu.	Requirement	Mark	Additional guidance
36	Award **TWO** marks for the correct answer of 38 If the answer is incorrect, award **ONE** mark for a formal method of division with no more than **ONE** arithmetic error, i.e. • long division algorithm, e.g. 38 r2 59 | 2242 – 1770 (30 × 59) 474 *(error)* – 472 (8 × 59) 2 **OR** 35 *(error)* 59 | 2242 – 1770 (30 × 59) 472 – 472 (8 × 59) 0 • short division algorithm, e.g. 3 7 r48 *(error)* 59 | 224^{47}2	**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.

8. Mark schemes for Paper 2: reasoning

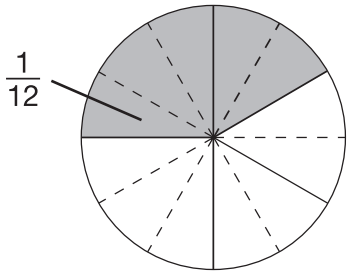
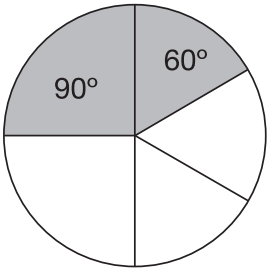
Qu.	Requirement	Mark	Additional guidance
1a	200	1m	
1b	50	1m	
2	The correct number circled as shown: 9,700 907 9,007 970 (9,070)	1m	Accept alternative unambiguous positive indications, e.g. number ticked.
3	Three boxes completed correctly as shown: × | 7 | 6 9 | 63 | 54 8 | 56 | 48	1m	
4	Award **TWO** marks for the correct answer of 1,609 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 5,895 + 1,344 = 7,239 8,848 – 7,239	Up to 2m	Answer need not be obtained for the award of **ONE** mark.
5	Award **TWO** marks for three boxes completed correctly as shown: Number | 1,000 more 3,500 | 4,500 85 | 1,085 8,099 | 9,099 14,250 | 15,250 If the answer is incorrect, award **ONE** mark for two boxes completed correctly.	Up to 2m	
6	Numbers in order as shown: 0.328 0.96 1.253 1.9	1m	

Qu.	Requirement	Mark	Additional guidance
7	Award **TWO** marks for three boxes completed correctly as shown: 60 months = [5] years 72 hours = [3] days 84 days = [12] weeks If the answer is incorrect, award **ONE** mark for two boxes completed correctly.	**Up to 2m**	
8	Award **TWO** marks for the correct answer of 1,048 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 1,793 + 8,728 = 10,521 10,521 – 9,473 **OR** • 9,473 – 8,728 = 745 1,793 – 745	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
9	Both shapes ticked as shown: 	**1m**	Accept alternative unambiguous positive indications, e.g. shapes circled.

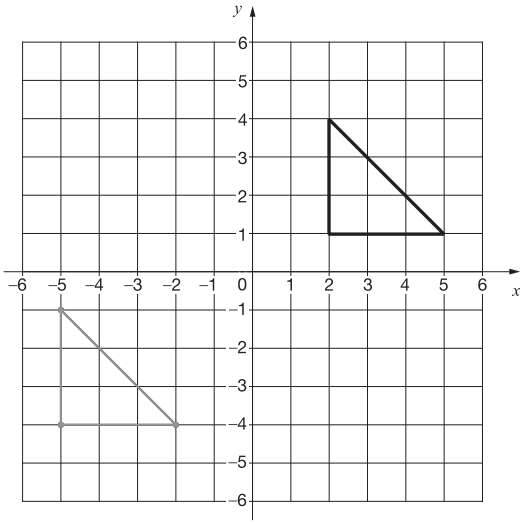
Qu.	Requirement	Mark	Additional guidance
10	Award **TWO** marks for three boxes completed correctly as shown: to the nearest 10: 84,520 to the nearest 100: 84,500 to the nearest 1,000: 85,000 If the answer is incorrect, award **ONE** mark for two boxes completed correctly.	**Up to 2m**	
11a	140	**1m**	The answer is a time interval (see page 14 for guidance).
11b	2	**1m**	
12	Award **TWO** marks for both pyramids ticked as shown:  Cube ☐  Square-based pyramid ☑  Triangular prism ☐  Triangular-based pyramid ☑ If the answer is incorrect, award **ONE** mark for: • the two pyramids and not more than one incorrect shape ticked **OR** • only one correct shape ticked and no incorrect shape ticked.	**Up to 2m**	Accept alternative unambiguous positive indications, e.g. Y.

Qu.	Requirement	Mark	Additional guidance
13	Award **TWO** marks for the correct answer of £1.39 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 12 × 99p = £11.88 £11.88 – £10.49	**Up to 2m**	Accept for **ONE** mark an answer of £139 **OR** £139p as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.
14	18	**1m**	Accept 18:12 **OR** 12:18
15	2006	**1m**	**Do not** accept 'two thousand and six' in words.
16	540	**1m**	
17	Quadrilateral completed as shown:  	**1m**	Accept slight inaccuracies in drawing (see page 12 for guidance).
18	75	**1m**	
19	Award **TWO** marks for the correct answer of £1.68 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 20 – 14.96 = 5.04 5.04 ÷ 3	**Up to 2m**	Accept for **ONE** mark an answer of £168 **OR** £168p as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.

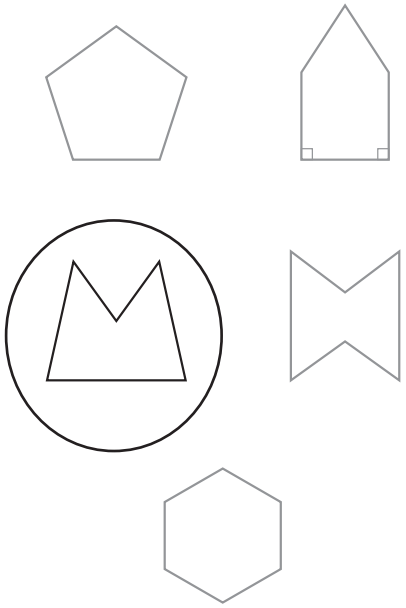
Qu.	Requirement	Mark	Additional guidance
20	An explanation showing that 0.25 is less than $\frac{2}{5}$, e.g. • $\frac{2}{5}$ is 0.4 > 0.25 • 0.25 is $\frac{5}{20} < \frac{8}{20}$ • 0.25 is 25% and $\frac{2}{5}$ is 40% and 25% is smaller than 40% • 0.25 is a quarter. You need 8 quarters to make 2, but only 5 lots of $\frac{2}{5}$ to make 2 • $\frac{2}{5} = 0.4$ • $\frac{1}{4}$ is $\frac{1}{4}$ smaller than a half, but $\frac{2}{5}$ is only $\frac{1}{10}$ smaller, so $\frac{1}{4}$ is smaller than $\frac{2}{5}$	**1m**	**Do not** accept vague, incomplete or incorrect explanations, e.g. • Because $\frac{1}{4}$ is bigger than $\frac{2}{5}$ • Because $\frac{1}{4}$ comes first on a number line • Because 0.25 is $\frac{1}{4}$ Accept $\frac{2.5}{10}$ as an equivalent to $\frac{1}{4}$ in an explanation when comparing to $\frac{4}{10}$
21	Award **TWO** marks for the correct answer of 12.5 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 250 ÷ 20 **OR** • 20 km is 1 cm 100 km is 5 cm 50 km is 2.5 cm 5 cm + 5 cm + 2.5 cm	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. **Do not** accept incorrect proportions in any step without evidence of the calculation performed.
22	1:4	**1m**	Accept other equivalent ratios, e.g. 2:8 or 0.5:2 **Do not** accept reversed ratios, e.g. 4:1 or 8:2

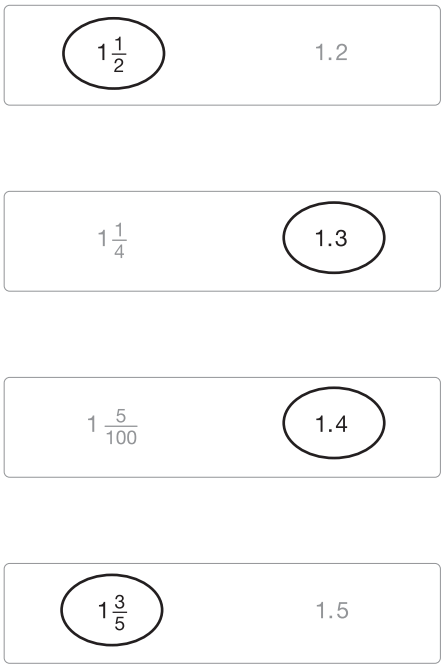
Qu.	Requirement	Mark	Additional guidance
23	Award **TWO** marks for the correct answer of $\frac{7}{12}$ If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • $\frac{1}{4}+\frac{1}{6}=$ $\frac{3}{12}+\frac{2}{12}=\frac{5}{12}$ $1-\frac{5}{12}$ **OR** • $\frac{1}{4}+\frac{1}{6}+\frac{1}{6}$ **OR** • $1-\frac{1}{4}-\frac{1}{6}$ **OR** •  $\frac{3}{12}+\frac{4}{12}$ **OR** •  $90°+60°=150°$ $1-\frac{150}{360}$	**Up to 2m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $0.58\overline{3}$ Accept for **ONE** mark an answer between 0.58 and 0.59 inclusive. Answer need not be obtained for the award of **ONE** mark.

9. Mark schemes for Paper 3: reasoning

<table>
<tr><th>Qu.</th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>1</td><td>10</td><td>1m</td><td></td></tr>
<tr><td>2</td><td>5</td><td>1m</td><td></td></tr>
<tr><td>3</td><td>95 × 6 OR 96 × 5</td><td>1m</td><td></td></tr>
<tr><td>4a
4b</td><td>7
–2</td><td>1m
1m</td><td>Do not accept –7 or 7–
Do not accept 2–</td></tr>
<tr><td>5</td><td>£302.27</td><td>1m</td><td></td></tr>
<tr><td>6</td><td>The correct time circled as shown:
<table><tr><th>Leaves London</th><th>Arrives Paris</th></tr><tr><td>12:01</td><td>15:22</td></tr><tr><td>12:25</td><td>15:56</td></tr><tr><td>13:31</td><td>16:53</td></tr><tr><td>14:01</td><td>17:26</td></tr><tr><td>14:31</td><td>17:53</td></tr><tr><td>15:31</td><td>18:53</td></tr><tr><td>16:01</td><td>19:20</td></tr></table></td><td>1m</td><td>Accept alternative unambiguous positive indications, e.g. 14:01 ticked or underlined.
Accept 17:26 circled in addition to 14:01, provided no other time is circled.
Do not accept only the arrival time 17:26 circled.</td></tr>
<tr><td>7</td><td>Triangle with vertices at (2,1) AND (2,4) AND (5,1) drawn on the grid as shown:
  </td><td>1m</td><td>Accept slight inaccuracies in drawing (see page 12 for guidance).</td></tr>
</table>

Qu.	Requirement	Mark	Additional guidance
8	Award **TWO** marks for any three of the following numbers written in any order: • 2 • 6 • 10 • 30 If the answer is incorrect, award **ONE** mark for two numbers correct.	**Up to 2m**	
9	5	**1m**	**Do not** accept 300 (minutes).
10	68 (ml) **OR** 0.068 (l)	**1m**	**Do not** accept incorrect units, e.g. 68 l **OR** 0.068 ml.
11	32	**1m**	
12	An explanation that shows Adam has four times as many balloons as Chen, e.g. • 24×6 is 4 times as many as 12×3 • 144 is four times 36 • $144 \div 4 = 36$ • $144 \div 36 = 4$ • $36 \times 4 = 144$ • Adam buys twice as many bags of twice as many balloons, so it's doubled twice • 24 is double 12 and 6 is double 3, so it's doubled twice • Chen buys half the amount of bags and each bag has half the number of balloons, so he has $\frac{1}{4}$ of the amount.	**1m**	**Do not** accept vague or incomplete explanations, e.g. • Adam buys more bags and there are more balloons in each bag • Adam buys twice as many bags of twice as many balloons • 24 is double 12 and 6 is double 3.

Qu.	Requirement	Mark	Additional guidance
13	The correct shape circled as shown: 	**1m**	Accept alternative unambiguous positive indications, e.g. shape ticked.
14	Award **TWO** marks for the correct answer of £0.90 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • £1.35 × 2 = £2.70 £2.70 ÷ 3	**Up to 2m**	Accept for **ONE** mark an answer of £90p **OR** £0.9 as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.
15	The correct letter circled as shown: 	**1m**	Accept alternative unambiguous positive indications, e.g. letter ticked.
16	Award **TWO** marks for the correct answer of 750 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 450 × 2 = 900 2,400 – 900 = 1,500 1,500 ÷ 2	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.

Qu.	Requirement	Mark	Additional guidance
17	Award **TWO** marks for all four rows completed correctly as shown:  If the answer is incorrect, award **ONE** mark for three rows completed correctly.	**Up to 2m**	Accept alternative unambiguous positive indications of the correct numbers, e.g numbers ticked.
18	Both numbers correct as shown: 9 (square number) + 13 (prime number) = 22	**1m**	Numbers must be in the correct order. **Do not** accept: 3^2 (square number) + 13 (prime number) = 22
19	Award **TWO** marks for 12 **AND** 13 If the answer is incorrect, award **ONE** mark for: • only one correct number and no incorrect number **OR** • 12 **AND** 13 **AND** not more than one incorrect number.	**Up to 2m**	Accept for **ONE** mark an answer of 48 **AND** 52 **AND** no more than one incorrect number.

Qu.	Requirement	Mark	Additional guidance
20	Award **THREE** marks for the correct answer of 14 If the answer is incorrect, award **TWO** marks for: • sight of 414 as evidence of 23 × 18 completed correctly **OR** • evidence of an appropriate method with no more than one arithmetic error, e.g. 20 × 20 = 400 $\begin{array}{r} 23 \\ \times\ 18 \\ \hline 230 \\ 184 \\ \hline 314 \end{array}$ *(error)* 400 – 314 = 86 Award **ONE** mark for evidence of an appropriate method.	**Up to 3m**	Answer need not be obtained for the award of **ONE** mark. A misread of a number 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 method using the misread number followed through correctly to a final answer. **ONE** mark will be awarded for evidence of an appropriate method using the misread number followed through correctly with no more than one arithmetic error.

Qu.	Requirement	Mark	Additional guidance
21a	$\frac{3}{8}$ written in the first box	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.375
21b	$2\frac{7}{8}$ **OR** $\frac{23}{8}$ written in the last box	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 2.875
22	Award **TWO** marks for the correct answer of 7 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 18 + 9 + 2 widths = 34 + 1 width 27 + 2 widths = 34 + 1 width 27 + 1 width = 34 34 – 27 **OR** • 34 – (18 + 9)	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Award **ONE** mark for a method which uses algebraic representation correctly, e.g. • 34 + w = 18 + w + 9 + w 34 + w = 27 + w + w
23	Both numbers correct as shown: $b = \boxed{10} \times a - \boxed{1}$	**1m**	
24	Award **TWO** marks for the correct answer of 9 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 6 × 6 × 6 = 216 216 ÷ 6 = 36 36 ÷ 4 **OR** • 216 ÷ 24	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.