7. Mark schemes for Paper 1: arithmetic

Qu.	Requirement	Mark	Additional guidance
1	1,087	1m	
2	350	1m	
3	326	1m	
4	459	1m	
5	1,221	1m	
6	19	1m	
7	97,637	1m	
8	405	1m	
9	24	1m	
10	2,637	1m	
11	568	1m	
12	3,500	1m	
13	41,200	1m	
14	9.125	1m	
15	162	1m	
16	42.294	1m	
17	53.18	1m	
18	110,457	1m	
19	19	1m	
20	0.09	1m	
21	2.85	1m	
22	110	1m	

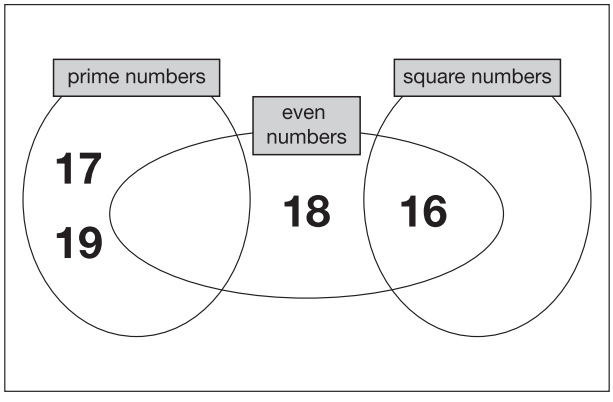
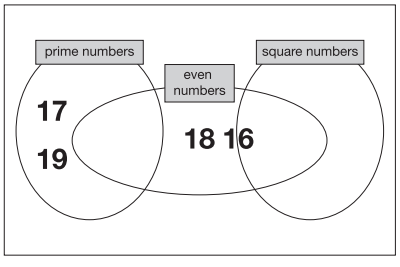
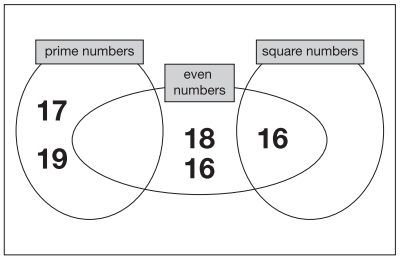
Qu.	Requirement	Mark	Additional guidance
23	Award **TWO** marks for the correct answer of 3,266 If the answer is incorrect, award **ONE** mark for the formal method of long multiplication with no more than **ONE** arithmetical error, e.g. • $\begin{array}{r} 71 \\ \times\ 46 \\ \hline 426 \\ 2840 \\ \hline 3260 \end{array}$ *(error)* **OR** • $\begin{array}{r} 71 \\ \times\ 46 \\ \hline 426 \\ 2440 \\ \hline 2866 \end{array}$ *(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: $\begin{array}{r} 71 \\ \times\ 46 \\ \hline 426 \\ 284 \\ \hline 710 \end{array}$ *(place value error)*
24	$1\frac{2}{7}$ **OR** $\frac{9}{7}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent, e.g. $1.\overline{285714}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
25	360	**1m**	**Do not** accept 360%
26	91.5	**1m**	
27	$\frac{1}{4}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.25

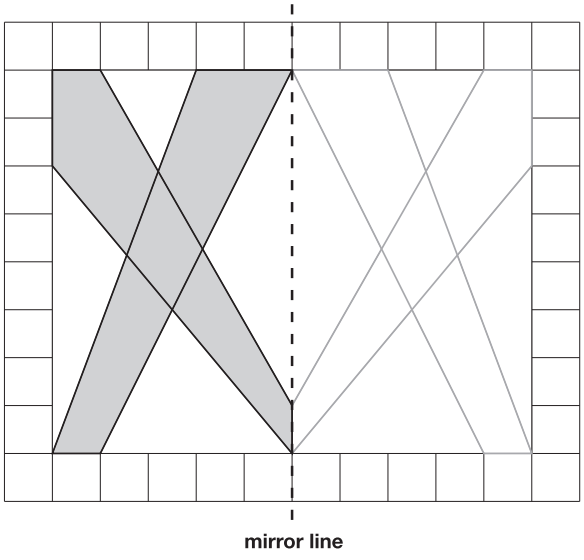
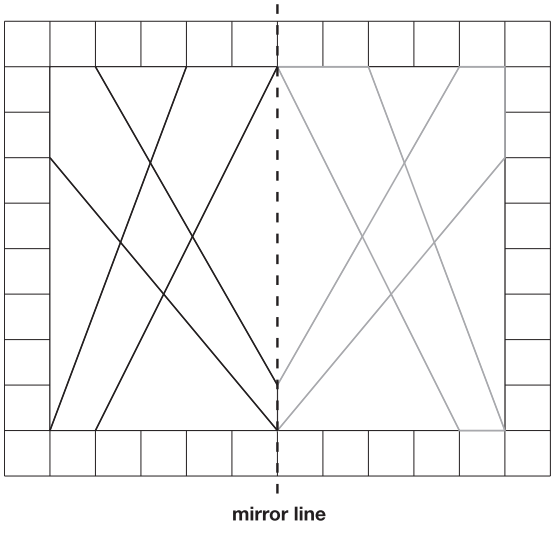
Qu.	Requirement	Mark	Additional guidance
28	Award **TWO** marks for the correct answer of 25 If the answer is incorrect, award **ONE** mark for the formal methods of division with no more than **ONE** arithmetical error, i.e. • long division algorithm, e.g. 25r2 29 ⟌ 725 – 580 (20 × 29) 145 – 116 (4 × 29) 31 (*error*) – 29 (1 × 29) 2 **OR** 24 (*error*) 29 ⟌ 725 – 58 (2 × 29) 145 – 145 (5 × 29) 0 • short division algorithm, e.g. 2 6 (*error*) 29 ⟌ $72^{14}5$	**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.
29	66	**1m**	**Do not** accept 66%

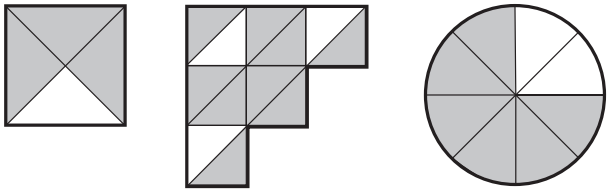
Qu.	Requirement	Mark	Additional guidance
30	Award **TWO** marks for the correct answer of 203,794 If the answer is incorrect, award **ONE** mark for the formal method of long multiplication with no more than **ONE** arithmetical error, e.g. • $\begin{array}{r} 6574 \\ \times \quad 31 \\ \hline 6574 \\ 143790 \\ \hline 150364 \end{array}$ *(error)* **OR** • $\begin{array}{r} 6574 \\ \times \quad 31 \\ \hline 6574 \\ 197220 \\ \hline 193794 \end{array}$ *(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: $\begin{array}{r} 6574 \\ \times \quad 31 \\ \hline 6574 \\ 19722 \\ \hline 26296 \end{array}$ *(place value error)*
31	$2\frac{1}{10}$ **OR** $\frac{21}{10}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 2.1 **Do not** accept $1\frac{11}{10}$

Qu.	Requirement	Mark	Additional guidance
32	Award **TWO** marks for the correct answer of 26 If the answer is incorrect, award **ONE** mark for the formal methods of division with no more than **ONE** arithmetical error, i.e. • long division algorithm, e.g. 28r14 43 | 1118 – 645 (15 x 43) 573 *(error)* – 430 (10 x 43) 143 – 129 (3 x 43) 14 **OR** 25r23 43 | 1118 – 88 *(error)* (2 x 43) 238 – 215 (5 x 43) 23 • short division algorithm, e.g. 2 5 *(error)* 43 | 111^{25}8	**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.
33	$\frac{1}{5}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.2
34	56	**1m**	
35	$\frac{11}{12}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent e.g. $0.91\overline{6}$ (accept any unambiguous indication of the recurring digit). **Do not** accept rounded or truncated decimals.
36	53	**1m**	

8. Mark schemes for Paper 2: reasoning

Qu.	Requirement	Mark	Additional guidance
1a	499	**1m**	
1b	555	**1m**	
2	Award **ONE** mark for the correct answer as shown: • **E** B **C** **D** **A**	**1m**	Accept: • £91,500 **B** £130,500 £131,500 £135,300
3	Award **TWO** marks for: 1 5 **1** + 4 **6** 4 **6** 1 5 If the answer is incorrect, award **ONE** mark for two digits correct.	**Up to 2m**	
4a	191,118	**1m**	
4b	48,361	**1m**	
5	Award **TWO** marks for all four numbers placed correctly as shown:  If the answer is incorrect, award **ONE** mark for three numbers placed correctly.	**Up to 2m**	Accept alternative unambiguous indications, e.g. lines drawn from the numbers to the appropriate regions of the diagram. **Do not** accept numbers written in more than one region, e.g.  **OR** 

Qu.	Requirement	Mark	Additional guidance
6	Diagram completed correctly as shown:  	1m	Accept inaccurate drawing, provided the intention is clear. Diagram need not be shaded. Diagram need not include edges drawn along the gridlines, e.g. 
7a 7b	$\frac{\boxed{2}}{3} = \frac{8}{12} = \frac{4}{\boxed{6}}$	1m 1m	
8	Numbers circled as shown: (0.05) 0.23 (0.2) 0.5	1m	Accept alternative unambiguous positive indications, e.g. numbers ticked or underlined.
9	Award **TWO** marks for the correct answer of 25p If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 168 ÷ 2 = 84 109 – 84 **OR** • 168 ÷ 6 = 28 3 × 28 = 84 109 – 84	Up to 2m	Accept for **TWO** marks, an answer given in the acceptable notation (see page 10 for guidance). Answer need not be obtained for the award of **ONE** mark. Accept for **ONE** mark an answer of 0.25p **OR** £25p **OR** £25 as evidence of an appropriate method.

Qu.	Requirement	Mark	Additional guidance
10	Award **TWO** marks for all three diagrams completed to show three-quarters shaded, e.g.  If the answer is incorrect, award **ONE** mark for two diagrams correct.	**Up to 2m**	Accept alternative unambiguous indications of parts shaded.
11	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. • 1.5 kg = 1,500 g 1,500 ÷ 50	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Units must be converted correctly for the award of **ONE** mark.
12a **12b**	53 48	**1m** **1m**	
13	Award **TWO** marks for the correct answer of 119 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 140 ÷ 20 = 7 3 × 7 = 21 140 – 21 **OR** • 140 ÷ 20 = 7 20 – 3 = 17 17 × 7	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.

Qu.	Requirement	Mark	Additional guidance
14	24 **AND** 48 only	**1m**	Numbers may be given in either order.
15	Award **TWO** marks for the correct answer of 77 °F If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 86 – 68 = 18 18 ÷ 2 = 9 9 + 68 **OR** • 86 – 68 = 18 18 ÷ 2 = 9 86 – 9 **OR** • 86 + 68 = 154 154 ÷ 2	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
16a **16b**	9,999,995 5,900,000	**1m** **1m**	
17a **17b**	160 20	**1m** **1m**	If the answers to a and b are incorrect, award **ONE** mark if $a + b = 180°$ unless b is between 33° and 37° inclusive, or 90°
18	20	**1m**	

Qu.	Requirement	Mark	Additional guidance
19	Award **THREE** marks for the correct answer of £111.70 If the answer is incorrect, award **TWO** marks for: • sight of £90 **AND** £7.90 **AND** £13.80 as all multiplication steps completed correctly **OR** • evidence of an appropriate complete method with no more than one arithmetic error, e.g. $\begin{array}{r} 7.50 \\ \times \quad 12 \\ \hline 88.80 \end{array}$ *(error)* $\quad \begin{array}{r} 79 \\ \times \quad 10 \\ \hline 790 \end{array} \quad \begin{array}{r} 6.90 \\ \times \quad 2 \\ \hline 13.80 \end{array}$ 88.80 + 7.90 + 13.80 = 110.50 Award **ONE** mark for evidence of an appropriate complete method.	**Up to 3m**	Accept for **TWO** marks, sight of 9,000p **AND** 790p **AND** 1,380p as all multiplication steps completed correctly. 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 if an appropriate complete method with the misread number is followed through correctly. **ONE** mark will be awarded for: • all multiplication steps completed correctly with the misread number **OR** • evidence of an appropriate complete method with the misread number followed through correctly with no more than one arithmetic error.
20	(–10, –40)	1m	

9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance
1	Award **TWO** marks for numbers in order as shown: **68** 82 96 **110** 124 138 **152** If the answer is incorrect, award **ONE** mark for two numbers correct.	**Up to 2m**	
2a	9	**1m**	**Do not** accept –9 or 9–
2b	–6	**1m**	**Do not** accept 6–
3	Both clocks ticked, as shown: 03:45 ✓ 02:45 09:45 21:45 14:45 ✓	**1m**	Accept alternative unambiguous positive indications, e.g. clocks circled or underlined.
4a	△ = 32	**1m**	
4b	○ = 18	**1m**	If the answers to ○ and △ are incorrect, award **ONE** mark if △ + ○ = 50 unless ○ = 25
5	Numbers in order, as shown: 0.098 0.607 0.78 4.003 5.6	**1m**	

Qu.	Requirement	Mark	Additional guidance
6	Award **TWO** marks for the correct answer of 1.07 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 1.28 + 1.65 = 2.93 4 – 2.93 **OR** • 4 – 1.28 = 2.72 2.72 – 1.65 **OR** • 4 – 1.65 = 2.35 2.35 – 1.28	**Up to 2m**	Accept for **ONE** mark an answer of 107 metres as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.
7a	*c* **AND** *e*	**1m**	Letters may be given in either order.
7b	*a* **AND** *d*	**1m**	Letters may be given in either order.
8	Award **TWO** marks for the correct answer of 35p **OR** £0.35 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 50p + 20p + 10p + 10p + 5p = 95p £2.00 – 95p = £1.05 £1.05 ÷ 3	**Up to 2m**	Accept for **ONE** mark an answer of £35 **OR** £35p **OR** 0.35p as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.
9a	46	**1m**	The answer is a time interval (see page 10 for guidance).
9b	10:44	**1m**	The answer is a specific time (see page 11 for guidance).
10	C	**1m**	Accept 18
11	Award **TWO** marks for the correct answer of 2,970 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method with no more than one arithmetic error, e.g. • 11 × 6 = 66 66 × 45	**Up to 2m**	**Do not** accept sight of a correct multiplication only, e.g. 11 × 6 × 45, for **ONE** mark. Misreads are **not** allowed.

<table>
<tr><th>Qu.</th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>12</td><td>The triangle has moved [6] squares to the right
and [5] squares down.</td><td>1m</td><td></td></tr>
<tr><td>13</td><td>Award TWO marks for the correct answer of 15

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.
• 4.5 × 3 = 13.5
13.5 – 6 = 7.5
7.5 × 2</td><td>Up to 2m</td><td>Answer need not be obtained for the award of ONE mark.

Misreads are not allowed.</td></tr>
<tr><td>14a

14b</td><td>3,600

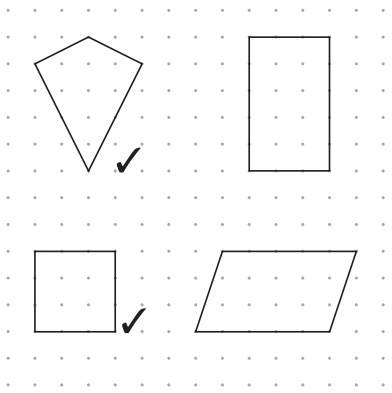
1,440</td><td>1m

1m</td><td>Misreads and transcription errors are not allowed.</td></tr>
<tr><td>15</td><td>Award TWO marks for three boxes completed correctly as shown:

<table><tr><th></th><th>Rounded to nearest hundred</th></tr><tr><td>20,906</td><td>20,900</td></tr><tr><td>2,090.6</td><td>2,100</td></tr><tr><td>209.06</td><td>200</td></tr></table>
If the answer is incorrect, award ONE mark for two boxes correct.</td><td>Up to 2m</td><td></td></tr>
<tr><td>16</td><td>Award TWO marks for the correct answer of 3

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.
• 2.5 × 6 = 15
15 ÷ 5</td><td>Up to 2m</td><td>Answer need not be obtained for the award of ONE mark.

Misreads are not allowed.</td></tr>
<tr><td>17</td><td>A</td><td>1m</td><td>Accept alternative unambiguous positive indications of the correct triangle, e.g. $2\frac{1}{2}$ or 2.5</td></tr>
</table>

Qu.	Requirement	Mark	Additional guidance
18	Award **TWO** marks for both kite **AND** square ticked as shown.  If the answer is incorrect, award **ONE** mark for: • kite **AND** square and not more than one incorrect shape ticked **OR** • one correct shape only ticked.	**Up to 2m**	Accept alternative unambiguous positive indications, e.g. shapes circled.
19	Numbers circled as shown: **200** 2,000 **5,000** 50,000	**1m**	Accept alternative unambiguous positive indications, e.g. numbers ticked or underlined.
20	Award **TWO** marks for the correct answer of £11.40 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • £1.25 + £1.60 = £2.85 £2.85 × 4	**Up to 2m**	Accept for **ONE** mark an answer of £1,140 **OR** £1,140p **OR** £11.4 as evidence of an appropriate method. Answer need not be obtained for the award of **ONE** mark.
21	An explanation that shows that 5,868 can be made by adding 326 to 17 × 326, e.g. • '5542 + 326 = 18 × 326' • '18 × 326 is 326 more than 5,542' • 'Because this is the same as 17 × 326 = 5542 so add one more 326 to get the answer' • 'You add 326 to 5,542 and your answer will be correct' • 'Because you can add 326 to the answer of 17 × 326' • '5542 + 326'.	**1m**	**Do not** accept an explanation that simply calculates 326 × 18 = 5,868 **Do not** accept vague or incomplete, or incorrect explanations, e.g. • 'You could add another 326' • 'The difference between 17 and 18 is 1 so you add 326 and that is one more' • 'Because if you turn the question around you would see that 17 × 326 = 5542 so all you need to do is times the number one more time' • '5,542 + 326 because it is one more'. • 5868 – 326 = 5542