7. Mark schemes for Paper 1: arithmetic

Qu.	Requirement	Mark	Additional guidance
1	7,305	1m	
2	0	1m	
3	292	1m	
4	1,200	1m	
5	415	1m	
6	15.08	1m	
7	30	1m	
8	168	1m	
9	5,459	1m	
10	10,100	1m	
11	80	1m	
12	660	1m	
13	120	1m	
14	495,000	1m	
15	4,172	1m	
16	0.212	1m	

Qu.	Requirement	Mark	Additional guidance
17	Award **TWO** marks for the correct answer of 32 If the answer is incorrect, award **ONE** mark for the formal method of division with no more than **ONE** arithmetic error, i.e. • long division algorithm, e.g. $\begin{array}{r} 32\ r3 \\ 21\overline{)\ 672} \\ -\ 630 \\ \hline 45 \\ -\ 42 \\ \hline 3 \end{array}$ *(error)* **OR** $\begin{array}{r} 52 \\ 21\overline{)\ 672} \\ -\ 630 \\ \hline 42 \\ -\ 42 \\ \hline 0 \end{array}$ *(error)* 30×21 2×21 • short division algorithm, e.g. $\begin{array}{r} 33 \\ 21\overline{)\ 67^{4}2} \end{array}$ *(error)*	**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.
18	$1\frac{1}{9}$ **OR** $\frac{10}{9}$	**1m**	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. $1.\dot{1}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.

Qu.	Requirement	Mark	Additional guidance
19	Award **TWO** marks for the correct answer of 50,381 If the answer is incorrect, award **ONE** mark for a formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 607 \\ \times\ 83 \\ \hline 1821 \\ 48560 \\ \hline 49381 \end{array}$ *(error)* **OR** • $\begin{array}{r} 607 \\ \times\ 83 \\ \hline 1822 \\ 48560 \\ \hline 50382 \end{array}$ *(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: $\begin{array}{r} 607 \\ \times\ 83 \\ \hline 1821 \\ 4856 \\ \hline 6677 \end{array}$ *(place value error)*
20	13,050	**1m**	
21	3	**1m**	Accept equivalent fractions. **Do not** accept answers such as $2\frac{3}{3}$
22	21	**1m**	
23	2.877	**1m**	
24	$\frac{1}{16}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.0625 **Do not** accept rounded or truncated decimals.
25	$\frac{5}{6}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $0.8\dot{3}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
26	23.988	**1m**	
27	480	**1m**	**Do not** accept 480%
28	60	**1m**	**Do not** accept 60%

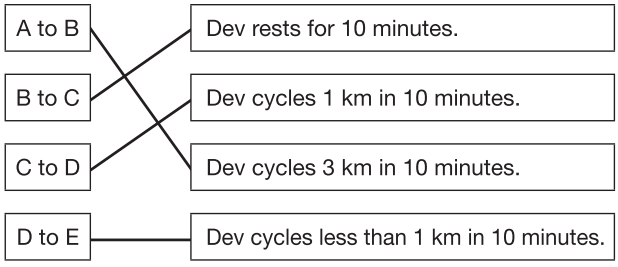
Qu.	Requirement	Mark	Additional guidance
29	Award **TWO** marks for the correct answer of 42 If the answer is incorrect, award **ONE** mark for the formal methods of division with no more than **ONE** arithmetic error, i.e. • long division algorithm, e.g. 41 r67 73 | 3066 – 2920 140 *(error)* – 73 67 **OR** 32 *(error)* 73 | 3066 – 730 10 × 73 2336 – 2190 30 × 73 146 146 2 × 73 0 • short division algorithm, e.g. 41 r71 *(error)* 73 | $306^{14}6$	**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.
30	92	**1m**	**Do not** accept 92%
31	$\frac{11}{63}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. $0.\overline{174603}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.

Qu.	Requirement	Mark	Additional guidance
32	$1\frac{5}{6}$ **OR** $\frac{11}{6}$	**1m**	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. $1.8\dot{3}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
33	Award **TWO** marks for the correct answer of 273,226 If the answer is incorrect, award **ONE** mark for a formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 4078 \\ \times \quad 67 \\ \hline 28546 \\ 244680 \\ \hline 273126 \end{array}$ *(error)* **OR** • $\begin{array}{r} 4078 \\ \times \quad 67 \\ \hline 28544 \\ 244680 \\ \hline 273224 \end{array}$ *(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: $\begin{array}{r} 4078 \\ \times \quad 67 \\ \hline 28546 \\ 24468 \\ \hline 53014 \end{array}$ *(place value error)*
34	$7\frac{3}{4}$ **OR** $\frac{31}{4}$	**1m**	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. 7.75 **Do not** accept rounded or truncated decimals.
35	8	**1m**	
36	320	**1m**	**Do not** accept $\frac{1600}{5}$

8. Mark schemes for Paper 2: reasoning

Qu.	Requirement	Mark	Additional guidance
1	Correct response circled, as shown: 9,206,499 **(9,215,300)** 9,206,504 9,215,298 9,206,909	1m	Accept alternative unambiguous positive indication of the correct answer.
2	5	1m	
3	30,000	1m	
4a	Emma	1m	Accept unambiguous abbreviations, e.g. E, or recognisable misspellings. Accept 1,400 for the award of the mark.
4b	Olivia	1m	Accept unambiguous abbreviations, e.g. O, or recognisable misspellings. Accept 1,220 for the award of the mark.
5	2,300	1m	
6	2.25	1m	Refer to section 6.3 on page 16 for additional guidance on marking answers involving measures.
7	$\frac{6}{10}$	1m	Accept equivalent fractions and decimals, e.g. $\frac{3}{5}$ and 0.6 **Do not** accept 60%
8	Correct answer circled, as shown: $\frac{5}{8}$ $\frac{14}{8}$ **($\frac{19}{8}$)** $\frac{23}{8}$ $\frac{26}{8}$	1m	Accept alternative unambiguous positive indication of the correct answer.
9	52	1m	

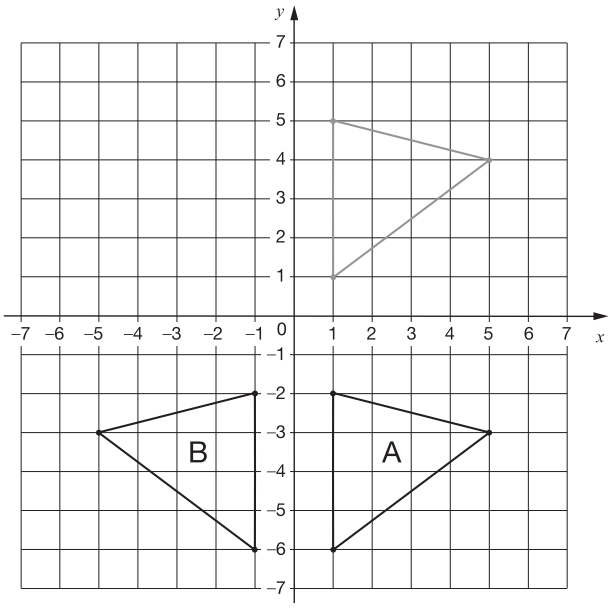
Qu.	Requirement	Mark	Additional guidance
10	Award **TWO** marks for the correct answer of (£)2.85 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 190 ÷ 2 = 85 *(error)* 190 + 85 **OR** • 1.90 × 1.5	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Accept for **ONE** mark an answer of (£)285 **OR** £285p as evidence of an appropriate method. Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
11	Award **ONE** mark for both numbers correct, as shown: $\frac{3}{10} = \frac{\boxed{6}}{20}$ $\frac{12}{15} = \frac{4}{\boxed{5}}$	**1m**	
12	Masses in correct order, as shown: **2 kg** **1500 g** **1.4 kg** **300 g** **heaviest** **OR** Accept correct conversions, e.g. 2000g 1500g 1400g 300g **OR** 2000 1500 1.4 300	**1m**	Misreads and transcription errors are **not** allowed. Accept with correct units or without units. Accept masses written in reverse order **AND** the label heaviest changed to follow suit.

Qu.	Requirement	Mark	Additional guidance
13	Award **ONE** mark for each part of Dev's journey matched with the correct sentence, as shown:  	**1m**	Lines need not touch the boxes, provided the intention is clear. **Do not** accept any part of the journey which has been matched to more than one sentence.
14	50	**1m**	
15	Award **TWO** marks for all four signs correct, as shown: $1 \times 2 \times 3 \boxed{=} 1 + 2 + 3$ $2 \times 2 \times 2 \boxed{>} 2 + 2 + 2$ $1 \times 10 \times 10 \boxed{>} 1 + 10 + 10$ $0 \times 10 \times 10 \boxed{<} 0 + 10 + 10$ If the answer is incorrect, award **ONE** mark for three signs placed correctly.	**Up to 2m**	Accept unambiguous drawings of the correct signs.
16	Award **ONE** mark for two boxes ticked correctly, as shown: 28.07 ☐ 28.65 ☑ 28.71 ☑ 28.75 ☐ 28.97 ☐	**1m**	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.

Qu.	Requirement	Mark	Additional guidance
17	9 **OR** 12 **OR** 18 **OR** 36	**1m**	Award **ONE** mark for more than one correct answer given and no incorrect answers.
18	Award **TWO** marks for the correct answer of 821 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 800 × 2 = 1600 511 + 268 = 779 1600 – 779 **OR** • 800 – 511 = 289 800 – 268 = 542 *(error)* 542 + 289 **OR** • 800 – 511 – 268 = 23 *(error)* 800 + 23	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
19	15	**1m**	Refer to section 6.3 on page 16 for additional guidance on marking answers involving measures.
20	Award **TWO** marks for the correct answer of 12 If the answer is incorrect, award **ONE** mark for evidence of an appropriate complete method with no more than one arithmetic error, e.g. • 16 × 15 = 210 *(error)* 10 × 18 = 180 210 + 180 = 390 432 – 390 = 42 **OR** Award **ONE** mark for sight of 420 (as evidence of the sum of the two correct products).	**Up to 2m**	Misreads are **not** allowed.

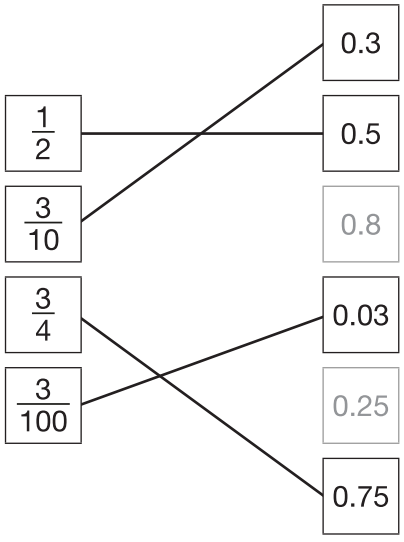
Qu.	Requirement	Mark	Additional guidance
21a	16	**1m**	
21b	30	**1m**	If the answer to part b is incorrect, award **ONE** mark for an answer of: • (200 – 5n) ÷ 4 Where n represents the answer to part a of the question, the value of n **must** be between 12 and 18 (inclusive). Any follow-through fraction or decimal answer must be expressed as an exact value.
22	Award **TWO** marks for the correct answer of 4,200 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 750 ÷ 250 = 3 1,150 + 250 = 1,400 1,400 × 3 **OR** • 750 ÷ 250 = 3 1,150 × 3 = 3,350 *(error)* 3,350 + 750 Award **ONE** mark for sight of 3450, 3.45 **OR** 3.450 (as evidence of correctly calculating how much yellow paint is required).	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.

Qu.	Requirement	Mark	Additional guidance
23	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. • 1.25kg – 1.1kg = 0.05kg *(error)* 1100g – 920g = 180g 180 – 50 = 130g **OR** Award **ONE** mark for the correct weight of the banana and the orange, e.g. 0.15(kg) **AND** 180(g)	**Up to 2m**	Accept for **TWO** marks 0.03kg for final answer in working and the answer box blank **OR** 0.03 in the answer box where the grams has been replaced with kilograms. Accept for **ONE** mark 0.03 (g) in the answer box **OR** as the final answer in working and answer box blank. Answer need not be obtained for the award of **ONE** mark. Any conversion of units must be correct. **Do not** award the mark for a method that contains an incorrect conversion, e.g. 1.25 – 1.1 = 0.16 *(error)* 1100 – 920 = 180 180 – 16 *(conversion error)*
24	Award **TWO** marks for the correct answer of $x = 75$ **AND** $y = 15$ If the answer is incorrect, award **ONE** mark for evidence of an appropriate method calculating both angles, e.g. • 180 – 30 = 150 150 ÷ 2 = 70 *(error)* 90 – 70 **OR** Award **ONE** mark for either correct x **OR** y.	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. If there is no evidence of an appropriate method and the values for x **AND** y are incorrect, accept for **ONE** mark $x + y = 90$, unless x is between 65–69 (inclusive) **AND** y is between 21–25 (inclusive).

Qu.	Requirement	Mark	Additional guidance
25	Award **TWO** marks for both triangles correctly drawn, as shown:  Award **ONE** mark for either: • correct triangle A **OR** • correct triangle B **OR** • a correct reflection of an incorrectly translated triangle (maintaining congruency of the original triangle).	**Up to 2m**	Accept slight inaccuracies in drawing provided the intention is clear. (See page 13 for guidance.) Ignore any triangles drawn in the 2nd quadrant, unless it is a correct follow-through of triangle A.

9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance
1	8	1m	
2	Award **ONE** mark for all multiplications completed correctly with the given cards, as shown: 24 = 3 × 8 28 = 4 × 7 30 = 5 × 6	1m	Accept for each multiplication the numbers given in either order, e.g. 8 × 3 7 × 4 6 × 5
3	Award **TWO** marks for the correct answer of 15(p) If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 30p + 45p + 60p = 135p 50p × 3 – 135p **OR** • 50 – 30 = 20 50 – 45 = 5 20 + 5 + 50 = 75 75 – 60 **OR** • 150 – 45 = 95 *(error)* 95 – 60 = 35 35 – 30	Up to 2m	Answer need not be obtained for the award of **ONE** mark. Accept for **ONE** mark an answer of 0.15(p) **OR** £15(p) as evidence of an appropriate method. Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.

Qu.	Requirement	Mark	Additional guidance
4	Award **TWO** marks for all four fractions matched to the correct decimal as shown:  Award **ONE** mark for three fractions and decimals matched correctly.	**Up to 2m**	Lines need not touch the boxes, provided the intention is clear. **Do not** accept any fraction that has been matched to more than one decimal number.
5	Award **TWO** marks for the correct answer of 123 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 87 + 154 + 38 = 279 402 – 279 **OR** • 87 + 154 + 38 = 269 *(error)* 402 – 269	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
6a	–7	**1m**	**Do not** accept 7–
6b	8	**1m**	**Do not** accept –8

Qu.	Requirement	Mark	Additional guidance
7	Award **TWO** marks for the correct answer of 81,572 Award **ONE** mark for evidence of an appropriate method, e.g. • $\begin{array}{r} 80{,}978 \\ +\ 72{,}319 \\ \hline 153{,}297 \end{array}$ 234,869 – 153,297 **OR** • $\begin{array}{r} 234{,}869 \\ -\ 80{,}978 \\ \hline 153{,}891 \end{array}$ 153,891 – 72,319 **OR** • $\begin{array}{r} 234{,}869 \\ -\ 72{,}319 \\ \hline 162{,}550 \end{array}$ 162,550 – 80,978 **OR** Award **ONE** mark for sight of 153,297 **OR** 153,891 **OR** 162,550	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
8	Award **TWO** marks for the correct three numbers, as shown: to the nearest 1,000 **8,000** to the nearest 100 **7,500** to the nearest 10 **7,550** If the answer is incorrect, award **ONE** mark for **any two** of the numbers rounded correctly.	**Up to 2m**	**Do not** accept 500 or 50 for the second and third entries.

Qu.	Requirement	Mark	Additional guidance
16	Award **TWO** marks for three boxes ticked correctly, as shown: $\frac{1}{4}$ ☐ $\frac{2}{5}$ ☑ $\frac{4}{10}$ ☑ $\frac{6}{10}$ ☐ $\frac{40}{100}$ ☑ If the answer is incorrect, award **ONE** mark for: • only two boxes ticked correctly and no incorrect boxes ticked. **OR** • three boxes ticked correctly and one incorrect box ticked.	**Up to 2m**	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.
17	Award **TWO** marks for the correct answer of 108 If the answer is incorrect, award **ONE** mark for an appropriate method, e.g. • 7.5 × 4 = 30 11 × 4 = 44 8.5 × 4 = 34 30 + 44 + 34 **OR** • 7.5 + 11 + 8.5 = 27 27 × 4 **OR** • 7.5 + 7.5 + 7.5 + 7.5 + 11 + 11 + 11 + 11 + 8.5 + 8.5 + 8.5 + 8.5	**Up to 2m**	Misreads are **not** allowed. Answer need not be obtained for the award of **ONE** mark.

Qu.	Requirement	Mark	Additional guidance
18	Award **TWO** marks for the correct answer of (£)10.50 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 70 × 15 ÷ 100 **OR** • 10 × 15 ÷ 100 = £1.50 3 × £1.50 = £4.50 £15 – £4.50 **OR** Award **ONE** mark for sight of (£)4.50	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Award **ONE** mark for a final answer of (£)10.5 **OR** (£)105 **OR** (£)1050 as evidence of an appropriate method. Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
19	Award **ONE** mark for a correct explanation, e.g. • It has 3 factors – the prime number, 1 and the square of the prime number. • The prime number has 2 factors; the squared prime number will be divisible by one, itself and the prime number. • All prime numbers squared have 3 factors. **OR** A correct explanation that gives a counter example, e.g. • 5 is prime $5^2 = 25$ 25 has 3 factors: 1, 5 and 25, not two • 7^2 has more than 2 factors – 1, 7 and 49 • 121 = 1 × 121 = 11 × 11 • $3^2 = 9$ 9 – 1, 9, 3 • $5^2 = 25$ Factors of 25 = 1, 5, 25 All squared primes have 3 factors.	**1m**	**Do not** accept vague or incomplete explanations, e.g. • A square number doesn't have 2 factors (repeat of the question) • $2^2 = 4$ (incomplete) • Prime numbers have 2 factors only (incomplete) • Prime numbers squared have more than 2 factors (vague) **Do not** accept explanations which include incorrect mathematics or incorrect information relevant to the explanation, e.g. • 49 = 1, 7, 49 • 5 squared is 25 1, 5, 5, 25 25 has four factors • All prime numbers squared have more than 3 factors

Qu.	Requirement	Mark	Additional guidance
20	Award **THREE** marks for the correct answer of 207,300 If the answer is incorrect, award **TWO** marks for: • evidence of an appropriate complete method which contains no more than one error, e.g. 24,863 170,932 282,420 + 350,824 828,939 *(error)* 828,939 ÷ 4 = 207,234 r3 Rounded to the nearest hundred = 207,200 **OR** • sight of 207,259 r3 **OR** 207,259 $\frac{3}{4}$ **OR** 207,259.75 Award **ONE** mark for: • evidence of an appropriate method with more than one error.	**Up to 3m**	Answer need not be obtained or rounded 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 method with the misread number is followed through correctly. **ONE** mark will be awarded for evidence of an appropriate method with the misread number followed through correctly with no more than one error.
21	Award **ONE** mark for x and y coordinates written correctly: (**6** , **3**)	**1m**	