7. Mark schemes for Paper 1: arithmetic

Qu.	Requirement	Mark	Additional guidance
1	697	**1m**	
2	6,594	**1m**	
3	2,808	**1m**	
4	8,413	**1m**	
5	240	**1m**	
6	960	**1m**	
7	14.753	**1m**	
8	2,754	**1m**	
9	50	**1m**	
10	520	**1m**	
11	400	**1m**	
12	6	**1m**	
13	900	**1m**	
14	$\frac{10}{63}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent, e.g. $0.\overline{158730}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
15	83	**1m**	
16	$\frac{13}{16}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent, e.g. 0.8125 **Do not** accept rounded or truncated decimals.
17	0.03	**1m**	

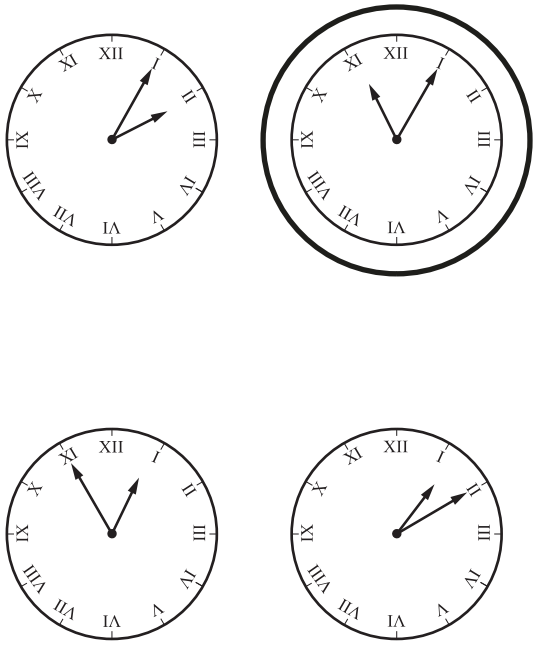
Qu.	Requirement	Mark	Additional guidance
18	$\frac{17}{18}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent, e.g. $0.9\dot{4}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
19	13.375	**1m**	
20	Award **TWO** marks for the correct answer of 37,592 If the answer is incorrect, award **ONE** mark for the formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 508 \\ \times \quad 74 \\ \hline 2032 \\ 35560 \\ \hline 37582 \end{array}$ *(error)* **OR** • $\begin{array}{r} 508 \\ \times \quad 74 \\ \hline 2032 \\ 35060 \\ \hline 37092 \end{array}$ *(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. $\begin{array}{r} 508 \\ \times \quad 74 \\ \hline 2032 \\ 3556 \\ \hline 5588 \end{array}$ *(place value error)*
21	$\frac{1}{24}$	**1m**	Accept equivalent fractions or the **exact** decimal equivalent, e.g. $0.041\dot{6}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
22	2	**1m**	Accept equivalent fractions. **Do not** accept answers such as $1\frac{7}{7}$
23	78	**1m**	
24	38.4	**1m**	

Qu.	Requirement	Mark	Additional guidance
25	Award **TWO** marks for the correct answer of 13 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. $\begin{array}{r} 15\text{ r}25 \\ 47\overline{)\,611} \\ -\ 470 \\ \hline 260 \quad \textit{(error)} \\ -\ 235 \\ \hline 25 \end{array}$ **OR** $\begin{array}{r} 18 \quad \textit{(error)} \\ 47\overline{)\,611} \\ -\ 470 \qquad 10 \times 47 \\ \hline 141 \\ -\ 141 \qquad 3 \times 47 \\ \hline 0 \end{array}$ • short division algorithm, e.g. $\begin{array}{r} 1\ \ 5\text{r}6 \quad \textit{(error)} \\ 47\overline{)\,61^{24}1} \end{array}$	**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.
26	1,149 r1 **OR** 1,149.2 **OR** $1{,}149\frac{1}{5}$	**1m**	Accept equivalent mixed numbers. **Do not** accept 1,149 r$\frac{1}{5}$
27	364	**1m**	**Do not** accept 364%
28	$\frac{1}{18}$	**1m**	Accept equivalent fractions or an exact decimal equivalent, e.g. $0.0\dot{5}$ **Do not** accept rounded or truncated decimals.

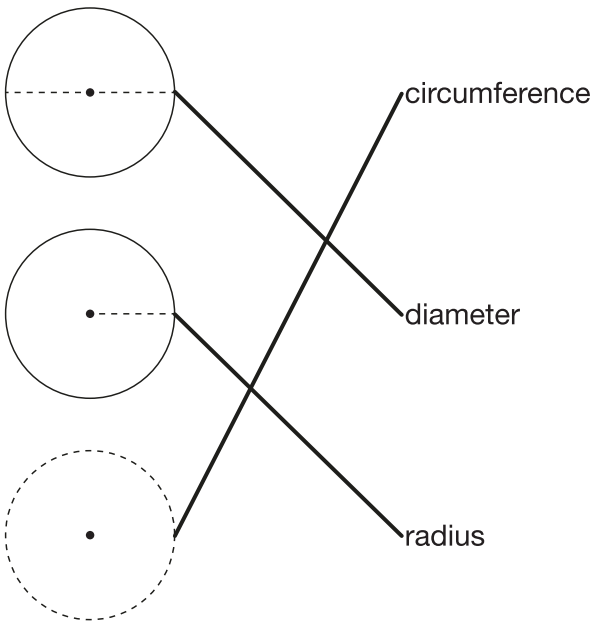
Qu.	Requirement	Mark	Additional guidance
29	Award **TWO** marks for the correct answer of 224,761 If the answer is incorrect, award **ONE** mark for the formal method of long multiplication with no more than **ONE** arithmetic error, e.g. • $\begin{array}{r} 5227 \\ \times \quad 43 \\ \hline 15681 \\ 209080 \\ \hline 214761 \end{array}$ *(error)* **OR** • $\begin{array}{r} 5227 \\ \times \quad 43 \\ \hline 10681 \\ 209080 \\ \hline 219761 \end{array}$ *(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: $\begin{array}{r} 5227 \\ \times \quad 43 \\ \hline 15681 \\ 20908 \\ \hline 36589 \end{array}$ *(place value error)*
30	171	**1m**	**Do not** accept 171%
31	14.8	**1m**	
32	$\frac{3}{10}$	**1m**	Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.3 **Do not** accept 30%

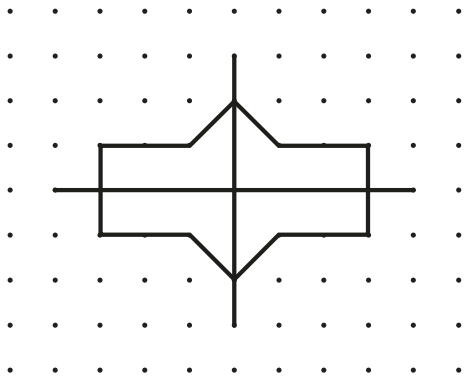
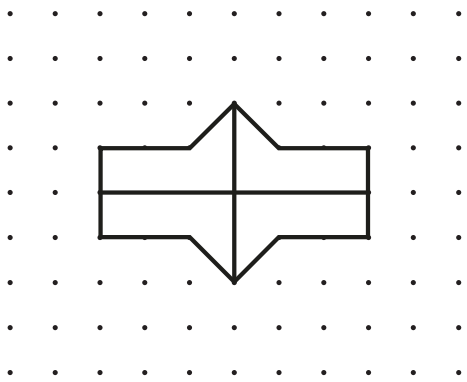
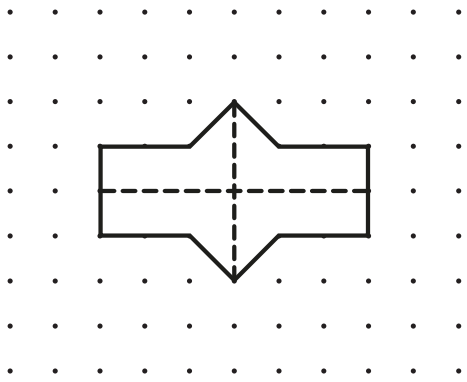
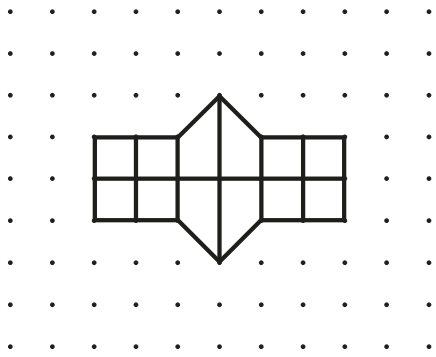
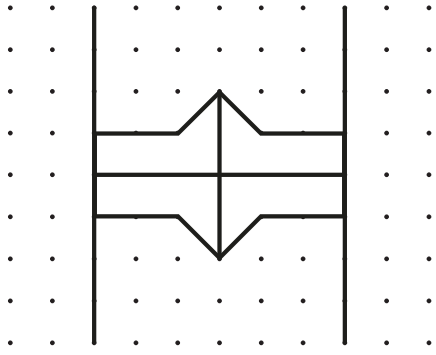
Qu.	Requirement	Mark	Additional guidance
33	Award **TWO** marks for the correct answer of 172 If the answer is incorrect, award **ONE** mark for the formal methods of division with no more than **ONE** arithmetic error, i.e. • long division algorithm, e.g. $$\begin{array}{r} 172\text{ r}10 \\ 26\overline{)\,4472} \\ -\ 2600 \\ \hline 1872 \\ -\ 1820 \\ \hline 52 \\ -\ 42 \quad \textit{(error)} \\ \hline 10 \end{array}$$ **OR** $$\begin{array}{rl} 162 & \textit{(error)} \\ 26\overline{)\,4472} & \\ -\ 2600 & 100 \times 26 \\ \hline 1872 & \\ -\ 1820 & 70 \times 26 \\ \hline 52 & \\ 52 & 2 \times 26 \end{array}$$ • short division algorithm, e.g. $$\begin{array}{r} 1\ \ 7\ \ 3 \quad \textit{(error)} \\ 26\overline{)\,44^{18}7^{5}2} \end{array}$$	**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 figures **must** be less than the divisor.
34	$2\frac{1}{12}$ **OR** $\frac{25}{12}$	**1m**	Accept equivalent mixed numbers, fractions or an **exact** decimal equivalent, e.g. $2.08\dot{3}$ (accept any unambiguous indication of the recurring digits). **Do not** accept rounded or truncated decimals.
35	285	**1m**	**Do not** accept 285%
36	600	**1m**	**Do not** accept $\frac{1800}{3}$

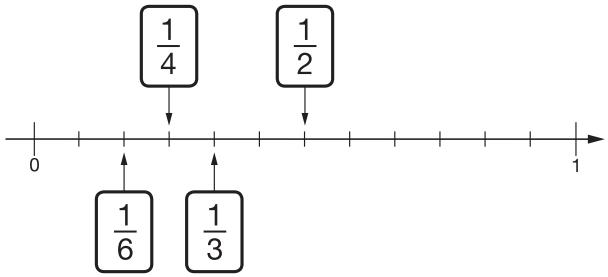
8. Mark schemes for Paper 2: reasoning

Qu.	Requirement	Mark	Additional guidance
1	Award **ONE** mark for the correct clock circled, as shown: 	1m	Accept alternative unambiguous positive indication of the correct answer.
2	Award **ONE** mark for the correct order as shown: **–10°C** **–4°C** **1°C** **3°C** **6°C** **Lowest**	1m	Misreads and transcription errors are **not** allowed. Accept temperatures in reverse order **AND** the label lowest changed to follow suit.
3	(**6** , **2**)	1m	
4	7	1m	

Qu.	Requirement	Mark	Additional guidance
5	Award **ONE** mark for a correct explanation that demonstrates why Stefan's total number of wheels is incorrect, e.g. Uses 5 cars and 3 motorbikes to show that the total number of wheels cannot be 28 because there are 26 wheels, e.g. • $5 \times 4 = 20$ $3 \times 2 = 6$ $20 + 6 = 26$ (not 28) • 20 and 6 - he is wrong because you need an extra pair of wheels. • because on 5 cars there are 20 wheels but on 3 motorbikes there are 6 wheels so he would need another motorbike to have 28 wheels. • 26 (not 28) **OR** Uses 3 motorbikes and the total of 28 wheels to show that the number of cars cannot be 5, e.g. • 3 motorbikes would have 6 wheels which leaves 22 wheels for the cars. But 22 divided by 4 is five and a half cars, so that can't be possible. **OR** Uses 5 cars and the total number of 28 wheels to show that the number of motorbikes cannot be 3, e.g. • There are 5 cars with 20 wheels. And there must be 4 motorbikes for him to have 28 wheels, so Stefan is wrong. **OR** Demonstrates that Stefan would have either two extra wheels or an extra motorbike, e.g. • He is wrong because he has counted 2 more wheels.	1m	**Do not** accept vague or incomplete explanations, e.g. • 20 and 6 • because 3 motorbikes is 6 wheels. • he is two off the answer. **Do not** accept responses that restate the question e.g. 3 motorbikes and 5 cars does not equal 28 **Do not** accept explanations which include incorrect mathematics or incorrect information relevant to the explanation.

Qu.	Requirement	Mark	Additional guidance
6	£3.61	**1m**	Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
7	Award **ONE** mark for the correct order, as shown: 75 50 25 **0** **–25**	**1m**	**Do not** accept 25–
8	24,400	**1m**	**Do not** accept 400
9	Award **ONE** mark for all three diagrams matched correctly, as shown:  	**1m**	Lines need not touch the diagrams and names, provided the intention is clear. **Do not** accept a diagram matched to more than one name.
10	216	**1m**	
11a	20,039	**1m**	
11b	18,939	**1m**	

Qu.	Requirement	Mark	Additional guidance
12	Both lines of symmetry drawn correctly, as shown:  **OR**  **OR** 	**1m**	Accept slight inaccuracies in drawing lines provided the intention is clear. Within the shape, both lines of symmetry must be within 2mm of the correct end points for the award of a mark. (See page 13 for guidance.) **Do not** award the mark if additional lines are given, e.g.  **OR** 
13	110	**1m**	
14	Award **ONE** mark for an answer in the range of 128 to 132 inclusive.	**1m**	

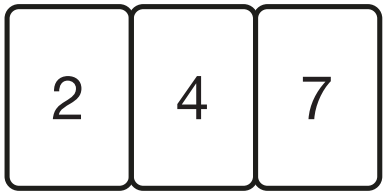
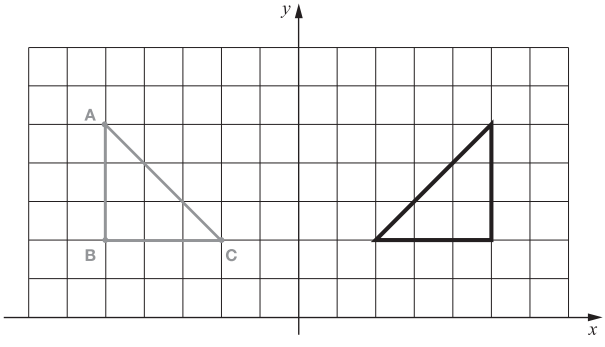
Qu.	Requirement	Mark	Additional guidance
15	All four fractions correctly placed on the number line, as shown:  	**1m**	Misreads are **not** allowed. Accept equivalent fractions.
16	5	**1m**	Refer to section 6.3 on page 16 for additional guidance on marking answers involving measures.
17	Award **TWO** marks for the correct answer of 33 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • $4 \times 50 = 200$ $200 \div 6 = 30$ (*error*) **OR** • $50 \div 6 = 8\text{ r }2$ $(8\text{ r }2) \times 4 = 32\text{ r }8$ **OR** Award **ONE** mark for sight of: • $33\frac{1}{3}$ **OR** $33.\dot{3}$ **OR** 33.33r **OR** 33.3 **OR** $33\text{r}2$ (as evidence of completing $200 \div 6$ correctly without interpreting the remainder in context)	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. If the pupil reaches an answer with a remainder and subsequently rounds to the nearest integer value either side, then the method remains appropriate for the award of **ONE** mark, e.g. • $200 \div 6 = 31\text{ r }8$ Acceptable rounded answers would be 31 **OR** 32 For the 'sight of' mark, accept equivalent fractions. Award **ONE** mark for an answer of 34.

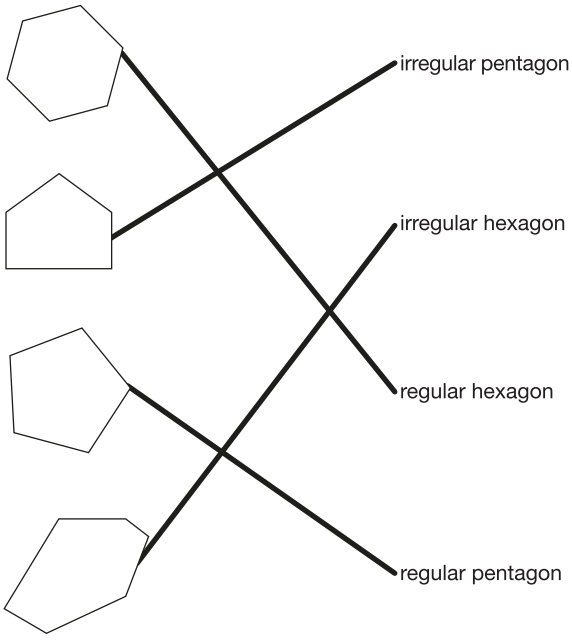
Qu.	Requirement	Mark	Additional guidance
18	Award **TWO** marks for the correct answer of $\frac{7}{20}$ If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • $\frac{3}{5} \underset{(5\times4)}{\overset{(3\times4)}{=}} \frac{12}{20}$ $\frac{1}{20} + \frac{12}{20} = \frac{13}{20}$ $1 - \frac{13}{20}$ • $\frac{1}{20} + \frac{3}{5} = \frac{13}{20}$ $1 - \frac{13}{20}$ **OR** • Award **ONE** mark for sight of $\frac{13}{20}$ (as evidence of correctly totalling price A and price B tickets).	**Up to 2m**	Accept for **TWO** marks for an equivalent fraction of $\frac{7}{20}$ e.g. $\frac{35}{100}$ Answer need not be obtained for the award of **ONE** mark. Also accept for **ONE** mark equivalent fractions for $\frac{13}{20}$ e.g. $\frac{65}{100}$
19	200	**1m**	
20	Award **TWO** marks for boxes completed correctly, as shown: $\begin{array}{r} \boxed{3}235 \\ \times \quad \boxed{5}3 \\ \hline 9705 \\ 161750 \\ \hline 171455 \end{array}$ If the answer is incorrect, award **ONE** mark for either box completed correctly.	**Up to 2m**	

Qu.	Requirement	Mark	Additional guidance
21	Award **TWO** marks for 267.5 **OR** $267\frac{1}{2}$ (cm) If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 30 × 8 = 210 (*error*) 2.5 × 11 = 27.5 210 + 27.5 **OR** • 30 ÷ 2.5 = 12 8 × 12 + 11 = 106 (*error*) 106 × 2.5 **OR** • 12 inches = 1 ft 1 ft + 8 ft = 9 ft 30 × 9 = 270 270 – 2.5	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.
22	$\frac{3}{12}$	**1m**	Also accept equivalent fractions, e.g. $\frac{1}{4}$
23	Award **TWO** marks for the correct answer of 19 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 650 ÷ 10 = 65 65 × 2 = 130 650 + 130 = 780 780 ÷ 40 • 20% of 650 = 130 130 + 650 = 770 (*error*) 770 ÷ 40 **OR** Award **ONE** mark for sight of: • 19.5 **OR** $19\frac{1}{2}$ **OR** 19 r20 **OR** 19 r2 (as evidence of a complete method before rounding down)	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. If a pupil's method uses repeated addition or subtraction appropriately, only one step error is allowed, otherwise the method is not appropriate. If the pupil reaches an answer with a remainder and subsequently rounds to the nearest integer value either side, then the method remains appropriate for the award of **ONE** mark, e.g. 780 ÷ 40 = 14 r2 (*error*) Acceptable rounded answers would be 14 **OR** 15 Award **ONE** mark for an answer of 20.

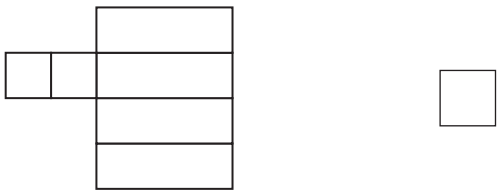
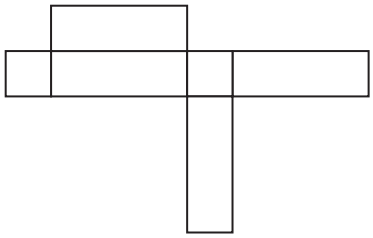
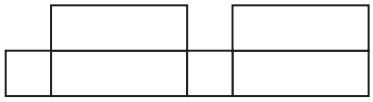
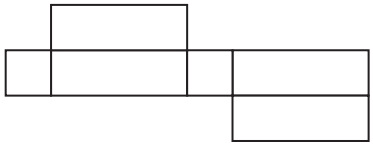
Qu.	Requirement	Mark	Additional guidance
24	564	**1m**	
25a	20	**1m**	
25b	Award **TWO** marks for the correct answer of 4.8 (g) If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 2.4 × 1000 = 240 (*error*) 240 ÷ 500 • 2.4 ÷ 500 = 0.0048 0.0048 × 1000	**Up to 2m**	Accept for **TWO** marks 0.0048 kg for final answer in working and the answer box blank **OR** 0.0048 in answer box where the grams has been replaced with kilograms (kg). Accept for **ONE** mark 0.0048g in the answer box **OR** as the final answer in the working and answer box blank. Answer need not be obtained for award of **ONE** mark.
26a	18	**1m**	
26b	3	**1m**	

9. Mark schemes for Paper 3: reasoning

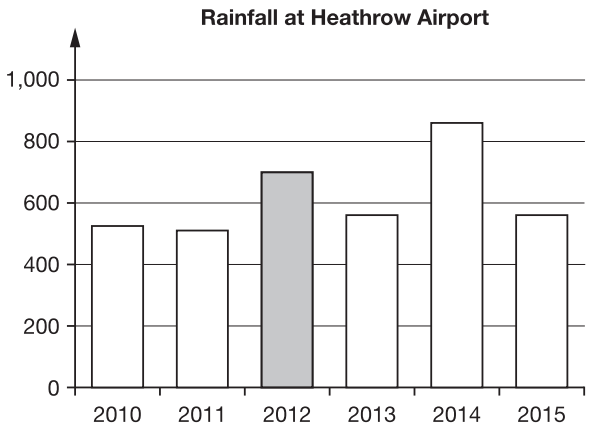
Qu.	Requirement	Mark	Additional guidance
1	Award **ONE** mark for digits placed correctly, as shown: 	1m	
2	Award **ONE** mark for the third box ticked correctly, as shown: 8,306 ☐ 80,036 ☐ 80,306 ✓ 800,306 ☐ 80,300,006 ☐	1m	Accept alternative unambiguous positive indication of the correct answer.
3	Diagram completed, as shown: 	1m	Ignore any attempt to label the reflected triangle. Accept slight inaccuracies in drawing, provided the intention is clear. See page 13 for guidance.
4	Award **ONE** mark for the correct order, as shown: 1,780 1,880 1,980 **2,080** **2,180**	1m	

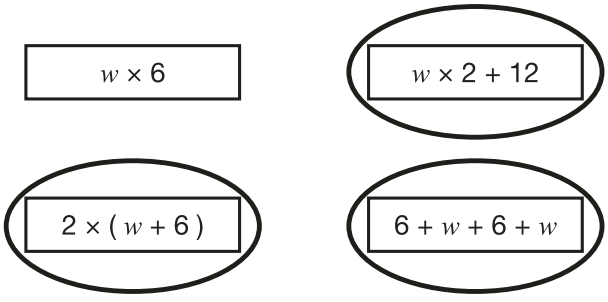
Qu.	Requirement	Mark	Additional guidance
5	Correct decimals circled, as shown: 13.2 14.7 **(15.9)** **(16.3)** 17.6	1m	Accept alternative unambiguous positive indication of the correct answer.
6	300,000	1m	
7	$10\frac{1}{2}$	1m	Also accept equivalent decimal answers, e.g. 10.5 **OR** 10.50
8	Award **ONE** mark for the four shapes matched correctly, as shown:  	1m	Lines need not touch the shapes and names, provided the intention is clear. **Do not** accept any shape that has been matched to more than one name.
9	Award **ONE** mark for an explanation that recognises that 32 is not a multiple of 3, e.g. • 32 is not in the 3× table • 32 ÷ 3 = 10 r2 or 10.66 (which are not whole numbers) • if you count in multiples of 3 from 0, you won't get 32 • 3 + 2 = 5, 5 is not a multiple of 3 so he is wrong. **OR** For a description that includes one or both of the multiples of 3 either side of 32, e.g. • if you do 10 × 3 = 30 and 11 × 3 = 33 there is no 32 • 10 × 3 = 30 and 32 is 2 away.	1m	**Do not** accept responses that restate the question, e.g. Jack is not correct because if you multiply 3 by any whole number you will not get 32. **Do not** accept vague or incomplete explanations, e.g. • If you multiply by 3 you will get 30, not 32 • 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 • 32 is not a factor of 3 **Do not** accept explanations which include incorrect mathematics or incorrect information relevant to the explanation.

Qu.	Requirement	Mark	Additional guidance
10	3	**1m**	Accept the answer of 9 as long as the exponent has been crossed out.
11	Award **TWO** marks for correct answer of 2,458 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 7,918 + 4,624 = 12,542 15,000 – 12,542 **OR** • 15,000 – 7,918 = 7,182 (*error*) 7,182 – 4,624 **OR** • 15,000 – 4,624 = 10,376 10,376 – 7,918 = 2,558 (*error*)	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark.

Qu.	Requirement	Mark	Additional guidance
12	Award **TWO** marks for two boxes correctly ticked, and no incorrect boxes ticked, as shown:  ☐  ✓  ☐  ✓ If the answer is incorrect, award **ONE** mark for: • two boxes ticked correctly and one incorrect box ticked. **OR** • only one box ticked correctly and no incorrect boxes ticked.	**Up to 2m**	Accept alternative unambiguous positive indication of the correct answer.

Qu.	Requirement	Mark	Additional guidance
13	9	**1m**	
14a	$\frac{1}{4}$	**1m**	**Do not** accept equivalent fractions.
14b	$\frac{2}{5}$	**1m**	**Do not** accept equivalent fractions.
15a	Award **ONE** mark for: • 5:50, (0)5:50 pm **OR** 17:50	**1m**	Accept answer in words, e.g. ten to six **OR** Answer written unconventionally, e.g. 10 to 6 Refer to section 6.2 on pages 15 and 16 for additional guidance on marking answers involving a time.
15b	Award **ONE** mark for: • 1 (hours) 45 (minutes)	**1m**	Award the mark if the answer is given in hours only or minutes only, i.e. • 1.75 (hours) Blank (minutes) **OR** • Blank (hours) 105 (minutes)
16	Award **TWO** marks for correct answer of 35(g) If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 870 – 30 = 840 840 ÷ 24 **OR** • 870 – 30 = 850 (*error*) 850 ÷ 24 = 35 r10	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. If the pupil reaches an answer with a remainder and subsequently rounds to the nearest integer value either side, then the method remains appropriate for the award of **ONE** mark, e.g. 840 ÷ 24 = 36 r10 Acceptable rounded answers would be 36 **OR** 37
17	$\frac{5}{6}$	**1m**	Accept equivalent fractions, e.g. $\frac{10}{12}$

Qu.	Requirement	Mark	Additional guidance
18a	Award **ONE** mark for drawing the bar in the range of 650 mm to 750 mm, e.g.  	**1m**	Ignore the width of the bar.
18b	Award **TWO** marks for the correct answer of 1,543 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 1,452 + 1,669 + 1,508 = 4,629 4,629 ÷ 3 **OR** • 1,452 + 1,669 + 1,508 = 4619 (*error*) 4619 ÷ 3 **OR** Award **ONE** mark for sight of 4629 (as evidence of the sum of sunshine hours)	**Up to 2m**	Answer need not be obtained or rounded for the award of **ONE** mark. Any acceptable rounding or truncating does not negate an appropriate method. Any value which does not result from correct rounding or truncating implies an additional step not shown.

Qu.	Requirement	Mark	Additional guidance
19	Award **TWO** marks for the correct answer of (£)2.65 If the answer is incorrect, award **ONE** mark for evidence of a complete method which contains no more than one arithmetic error, e.g. • £3.20 ÷ 2 = £1.60 $\frac{1}{4}$ of 60p = 15p 60p + 15p = 75p £1.60 + 75p = £2.25 (*error*) £5 – £2.25 = £2.75 **OR** • sight of (£)2.35 **OR** 235 (p) (as evidence of the total cost of mushrooms and carrots).	**Up to 2m**	Misreads are **not** allowed. Accept for **ONE** mark an answer of £265, £265p or £2,65 as evidence of an appropriate method. Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
20	Award **TWO** marks for the three correct expressions circled, as shown:  Award **ONE** mark for two correct expressions circled and no incorrect expressions circled.	**Up to 2m**	Accept alternative unambiguous positive indication of the correct answers.

Qu.	Requirement	Mark	Additional guidance
21	Award **THREE** marks for the correct answer of 323 Award **TWO** marks for: • An incorrect answer with evidence of an appropriate complete method with no more than one arithmetic error, e.g. $\begin{array}{r} 25 \\ \times\ 34 \\ \hline 100 \\ 750 \\ \hline 950 \end{array}$ *(error)* 62% of 950 = 589 950 – 589 = 361 **OR** • 34 × 25 = 950 (*error*) 95 × 3 = 285 9.5 × 8 = 76 285 + 76 = 361 **OR** • sight of 527 (as evidence of calculating 62% of 850) Award **ONE** mark for: • evidence of an appropriate method with more than one error. **OR** • sight of 850 (as evidence of the multiplication step completed correctly)	**Up to 3m**	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. Within an appropriate method, if the pupil has rounded appropriately with no more than one arithmetic error, the pupil may be awarded **TWO** marks. Answer need not be obtained for the award of **ONE** mark.
22	Number machine boxes completed correctly, as shown: **octagon** **8** **×5** **÷2** **20**	**1m**	

Qu.	Requirement	Mark	Additional guidance
23	Award **TWO** marks for two correct answers in the boxes, as shown: a | b | $\frac{a}{b}$ 1 | 4 | 0.25 3 | 20 | **0.15** 5 | 8 | **0.625** Award **ONE** mark for one correct answer.	**Up to 2m**	