Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1	a		6 [×] 80 or 6 [×] 0.8 and 4.8[0]	M1 A1	Not from 82 × 5.8 and rounded to 480 or truncated 470 Accept e.g. 80 + 80 + 80 + 80 + 80 + 80 for **M1** Condone units included in product Condone answer 480p with £ crossed through or £4.80p
	b		Recognition that the figures are not all to the same number of sig fig e.g. They're not all the same accuracy **oe**	1	For additional information refer to '2024 November, J560/03, Alternative, Mark Scheme Appendix' within downloadable extra resource materials. Allow complete and correct example(s)
			Total	**3**	
2			3.15 and 3.25	2	**B1** for each If **0** scored **SC1** for both correct but reversed
			Total	**2**	
3			6.7	3	

					B2 for 6.68… or **M1** for 21 ÷ *Π*	
			Total	**3**		
4			8.77	3	**B2** for 8.773…or 8.774 or **B1** for 2771.288 or 76.98… If **0** scored, instead award **SC1** for *their* answer to more than 3 figures correctly rounded to 3 sf	
			Total	**3**		
5	a		Three of 20[.00], 30[.00], 30 and 5 seen 30 × 20 5 × 30 750 or 600 and 150	B1 M1 M1 A2	for *their* 30 × *their* 20 for *their* 5 × *their* 30 **A2 dep** on **B1M1M1** or **A1 dep** on **B1M1** for 600 or 150	**B1** seen as rounding *their* 30 can be 30 $\frac{1}{4}$, 30.25 or 31 *their* 20 can be 20.23 or 21 *their* 5 can be 5 $\frac{1}{3}$, 5.3, 5.33[3…]or 6 *their* 30 can be 30.18 or 31
	b		The calculation is an underestimate	1		All values were rounded down **oe** Mark best response as

						long as not contradictory or incorrect For additional information refer to 'Qn16b, 2024 June, Alternative J560/02, Mark Scheme Appendix' within downloadable resource materials.
			Total	**6**		
6			3.8 , <	2	**B1** for each	Do not accept other figures or symbols on line with correct answer Accept trailing zeros
			Total	**2**		
7			74.7	3	**B2** for answer 74.6 or 74.65 to 74.67[0...] or $74.\dot{6}$ or **M1** for 112 ÷ 3 **soi 37.**3[3...] or 112 × 2 **soi 224**	$\frac{2}{3} \times 112$ implies **M1** but not $\frac{2}{3}$ **of** 112 Condone 0.66 to 0.67 or $0.\dot{6}$ for $\frac{2}{3}$ If $\frac{2}{3}$

						seen = a decimal < 1 allow the decimal × 112 to imply **M1**
			Total	**3**		
8			54	4	**B3** for 19.46 or answer 0.54 or**B2** for 14 OR **M2** for 20 – 1.39 × *their k* or **M1** for figs 2[0] ÷ figs 139 implied by figs 143...	Condone £0.54 for **4** marks *Their k* must be: • from figs 2[0] ÷ figs 139 and • 13 ≤ *their k* integer ≤ 15 20 ÷ 1.39 may be at least 14 implied additions or subtractions of 1.39
			Total	**4**		
9	a		5	2	**M1** for 10 × 5.5 **oe**	**M1** implied by 55 Repeated addition, we must see their method, allow one arithmetic error e.g. 5.5, 11 then 11×5 [=55]
	b		6	3		

					B2 for 6.25 or **M2** for *their* (a) × 1000 ÷ 800 or *their* (a) ÷ [0].8 or **M1** for *their* (*a*) × 1000 or 800 ÷ 1000 or *their* (*a*) ÷ figs 8	*their* (a) must be > 0.8 **M2** implied by repeated addition or subtraction to one less than *their* (*a*) or *their* (*a*) × 1000. If *their* (*a*) < 2.4 then all multiples must be seen For additional information refer to 'Qn15b, 2024 June, Alternative J560/02, Mark Scheme Appendix' within downloadable resource materials.
	c		200	2	**B2FT** for *their* (*a*) × 1000 – *their* (*b*) × 800 evaluated correctly or **M1** *their* (*a*) × 1000 – *their* (*b*) × 800	*their* (*a*) must be > 0.8 *their* (*a*) × 1000 ≥ *their* (*b*) × 800 *their* (*b*) must be an integer Implied by repeated subtraction or addition. Working may

						be seen in part (*b*) for **M1**
			Total	**7**		
10			Accept any correctly matched pair where van > garage matched pair of values or non-overlapping ranges and the values quoted are 5.5 ≤ garage < 5.55 5.5 < van < 5.55	3	**B1** for a value in 5.5 ≤ garage < 6 **B1** for a value in 5.5 < van < 5.55	Ranges must not overlap for 3 marks Values must be clearly associated with garage (or 6) or van (or 5.5) as appropriate. For **B1** if choice of values given all must be in range, unless acceptable value(s) indicated
			Total	**3**		
11			5 with correct working	5	**B4** for answer 4.2 or $\frac{21}{5}$ or $4\frac{1}{5}$ with correct working OR **M3** for $\frac{600 \times 0.4 \times 7}{400}$ **oe** or for 400 ÷ 240 × 4 or for 1680 with both 5 × 400 and 4 × 400 OR **M2** for 600 × 0.4 × 7 or for $\frac{600 \times 0.4}{400}$ or for 400 ÷ 240 or for 400 – 240 or for both 5 × 400	"Correct working" requires evidence of at least **M2** Condone for **B4** answer of 4 following 4.2 **M3** and **M2** may be seen in stages may be implied by 1680, 2000 and 1600 may be implied by 1680 or 0.6

					and 4 × 400 OR **M1** for 600 × 0.4 or for 0.4 × 7 or for $\frac{600}{400}$ **0** or **1** scored, instead award **SC2** for answer 5 with no or insufficient working If **0** scored, instead award **SC1** for answer 4.2 with no or insufficient working	may be implied by 1.6(66…) may be implied by 2000 and 1600 may be implied by 240 may be implied by 2.8 may be implied by 1.5
			Total	**5**		
12	a		5 [×] 70 or 5 [×] 0.7 and 3.5[0]	M1 A1		Not from 73 × 4.9 and rounded to 360 or truncated 350 Accept e.g. 70+70+70+70+70 for M1 Condone units included in product Condone answer 350p with £ crossed through or £3.50p

Examiner's Comments

Many candidates struggled with this question.

Common errors were to multiply the given numbers and then round the answer, to round 4.9 to 5 and then multiply it by 73, or to work out 5 × 70 and give the answer £350 (this scored the method mark only).

					For additional information refer to '2024 November, J560/03, Mark Scheme Appendix: item 1' within downloadable extra resource materials. Allow complete and correct example(s)
	b		Recognition that the figures are not all to the same number of sig fig e.g. They're not all the same accuracy oe	1	**Examiner's Comments** A few correct answers were seen to this question. Candidates generally did not pick out the key words 'same number of significant figures' from the question. Common incorrect responses were 'He rounded wrong', 'The 5.099 should have been rounded to 6', 'He made it a top-heavy fraction' and 'He didn't use significant figures correctly'. **Misconception** Many appeared to be trying to find an error in the rounding rather than in the method and may not have read the question carefully.
			Total	**3**	
13			2.75 and 2.85	2	**B1** for each If **0** scored **SC1** for both correct but reversed **Examiner's Comments**

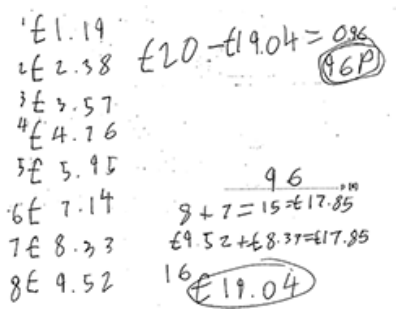
					The most common answers were 2.7 and 2.8. Several wrote 2.75 and 2.84. Many candidates did not attempt this question.
			Total	**2**	
14			5.4	3	B2 for 5.41... or M1 for 17 ÷ π **Examiner's Comments** Many candidates did not know how to answer this question. A common incorrect method was to multiply 17 by π, while others divided 17 by 2. **Assessment for learning** Candidates should consider the reasonableness of their answer. This may have helped some realise the diameter of a circle cannot be larger than its circumference.
			Total	**3**	
15			3.16	3	**B2** for 3.158...or 3.159 or **B1** for 249.41 or 9.9764 If **0** scored, instead award **SC1** for *their* answer to more than 3 figures correctly rounded to 3 sf **Examiner's Comments** Few scored full marks here, though many scored B2 for 3.159 or 3.158. Many gave their answer to three

					decimal places rather than three significant figures.
			Total	**3**	
16	a		Any value of r in $4.25 \leq r < 4.3$	1	
	b		Any value of h in $4.35 \leq h < 4.4$	1	
	c		Any pair of values where $r > h$ and $4.3 < r < 4.35$ and $4.3 \leq h < 4.35$	1	
			Total	**3**	
17			£4.20	3	**B2** for 420 or 4.34 or 4.2 OR **M2** for 7 × *their* 0.6 or 60 × *their* 7 or 0.6 × *their* 7 or **B1** for one of 7 or 60 or 0.6 **isw** rounding after 4.20 **3** marks *Their* 0.6 can be 60, 62, 0.62 only *Their* 7 can be 7.3 or 7.5 only Condone trailing 0s after rounding e.g. 7.0
			Total	**3**	
18			$\pi \times 7^2$ *Their*$(\pi \times 7^2) \times \frac{50}{360}$ **oe** 21.36 to 21.39 [rounds to 21.4]	M1 M1 A1	Accept (153.8 to 154) × $\frac{50}{360}$
			Total	**3**	
19	a		[£]5.47	1	Condone 547p but not £547p or £5.47p Do not condone extra zeros

	b		5700	1	
			Total	**2**	
20			2.6 <	2	**B1** for each Do not accept other figures or symbols on line with correct answer Accept trailing zeros **Examiner's Comments** This was rarely answered correctly. Many didn't recognise the need for both one number and one symbol. Candidates often seemed unsure about truncating and instead responded as if the number had been rounded. 2.6 was rarely given on the first answer line, with 2.5, 2.55 and 2.65 seen on a few occasions. On the second answer line, a number was often given, or sometimes both a number and a symbol. Incorrect symbols often seen here were =, > and ≤. Placing 2.6 above the *n* was also quite common. Many did not respond at all.
			Total	**2**	
21			68.7	3	**B2** for answer 68.6 or 68.65 to 68.67[0...] or $68.\dot{6}$ or **M1** for 103 ÷ 3 soi 34.3[3…] or 103 × 2 soi 206 $\frac{2}{3}\times$ 103 implies **M1** but not $\frac{2}{3}$**of** 103 Condone 0.66 to 0.67 or .0.6 for $\frac{2}{3}$

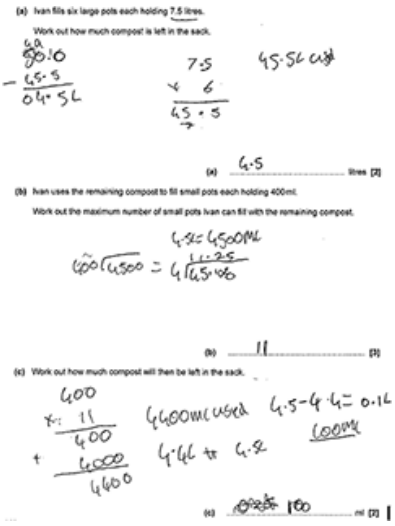
						If $\frac{2}{3}$ seen = a decimal < 1 allow the decimal × 103 to imply **M1**
					Examiner's Comments Most candidates scored at least the method mark here for having '103 × 2', '103 ÷ 3' or '$\frac{2}{3}$ × 103'. Some candidates however had incorrect calculations such as '103 × 3' or '103 ÷ 2'. Many responses chose to work in decimals from the start and made attempts to convert $\frac{2}{3}$ to a decimal. This was often truncated or rounded and accuracy was lost. Candidates should be aware that statements such as '$\frac{2}{3}$ of 103' will not score a method mark as no operation is shown. **Assessment for learning** Candidates should practice using fractions on the calculator.	
			Total	**3**		
22			96	4	**B3** for 19.04 or answer 0.96 or **B2** for 16 OR **M2** for 20 – 1.19 × *their k* OR	Condone £0.96 for 4 marks *Their k* must be: • from figs 2[0] ÷

					figs 119 and • 15 ≤ *their k* integer ≤ 17	
					M1 for figs 2[0] ÷ figs 119 implied by figs 168…	20 ÷ 1.19 may be at least 16 implied additions or subtractions of 1.19
					Examiner's Comments A significant number of candidates continue to struggle with dividing. Many carried out repeated addition of 1.19, sometimes making errors along the way. Some may have carried out the division on their calculator and were unsure how to interpret the answer 16.8067... so attempted addition instead, but candidates ought to be familiar with interpreting values. Some candidates calculated '20 ÷ 1.19 = 16.81…', but then treated this as the cost of the keyrings rather than the number of keyrings. This lead to calculations such as '20 – 16.81', or they added 1.19 to their 16.81. Some carried out the division and then responded '16'. Candidates should ensure they have carefully read the question. Exemplar 1	

					 This exemplar demonstrates the inefficient method of repeated addition. The candidate does reach the correct answer in the end, but even though they skip ahead to the cost of 15 and 16 keyrings rather than carry on the individual counting, they will still have cost themselves quite a bit of time in this method. **Assessment for learning** Candidates need to practise efficient calculator methods and become familiar with using them, as well as interpreting their results.
			Total	**4**	
23	a		5	2	**M1** for 6 × 7.5 **oe** **M1** implied by 45 Repeated addition, we must see their method, allow one arithmetic error. e.g. 7.5, 15 then 15×3 [=45] **Examiner's Comments** The majority of candidates responded and achieved at least M1. Most attempted 6 × 7.5, with many correctly reaching 45 and then subtracting this from 50.

					Where errors were made, it was often a mistake in their long multiplication or through repeated addition (most that attempted repeated addition added up 7.5 six times, but some tried 6 seven and a half times). Some candidates didn't subtract their calculation result from 50, for example giving 45 as their answer.
	b		12	3	**B2** for 12.5 or **M2** for *their* (*a*) × 1000 ÷ 400 or *their* (*a*) ÷ [0].4 or **M1** for *their* (*a*) × 1000 or 400 ÷ 1000 or *their (a)* ÷ figs 4 *their (a)* must be > 0.4 **M2** implied by repeated addition or subtraction to one less than *their* (*a*) or *their* (*a*) × 1000 see appendix If *their (a)* < 1.2 then all multiples must be seen **Examiner's Comments** Those who achieved the correct answer for part (a) were regularly able to score at least M2 here in part (b). The context of this question seemed to help candidates access the question. Many different approaches were used by candidates, including short division, repeated subtraction and repeated addition. There was good evidence of candidates making their division easier for themselves. For example, after $\frac{5000}{400}$ was seen, a number of candidates attempted $\frac{50}{4}$. Many candidates picked up the M2 for a correct method without a correct answer, but the B2 was rarely given as almost all that reached '12.5' then went on to the correct answer and full marks.

					Those who struggled were often able to score M1 for a correct conversion, generally for converting their (a) into millilitres although some converted 400ml into litres. As in Question 11, some candidates however struggled to convert correctly between relevant units; the most common error here was using 1L = 100ml. **Assessment for learning** While repeated addition and/or subtraction is rarely the most efficient approach, to support its marking we have drawn up specific marking guidance that can be used where needed. It appears in the J560/02 mark scheme appendix this year and allows for a consistent approach to be made by both markers as well as those marking student mocks. It may also be beneficial to familiarise candidates with the required working they must show in order to be given method marks where needed.
	c		200	2	**B2FT** for *their* (*a*) × 1000 – *their* (*b*) × 400 evaluated correctly or **M1** *their* (*a*) × 1000 – *their* (*b*) × 400 *their* (*a*) must be > 0.4 *their* (*a*) × 1000 ≥ *their* (*b*) × 400 *their* (*b*) must be an integer. Implied by repeated subtraction or addition. Working may be seen in part (*b*) for **M1** **Examiner's Comments** Candidates successful in parts (a) and (b) almost always achieved the correct answer here, often by using their

					working out from part (b). 'Follow Through' from both (a) and (b) was credited and some candidates with errors in part (a) and/or part (b) correctly complete the calculation '*their* (a) × 1000 – *their* (b) × 400' to pick up the 2 marks. A significant number of candidates did not respond, however these were almost always those who didn't respond to part (b) or didn't complete it fully. Exemplar 2  This candidate's response to (a) is incorrect, but they write 7.5 × 6 and it leads to the value on the answer line, so M1 is given. In (b), M2 is given for '*their* (a) × 1000 ÷ 400'. They simplify this calculation to the equivalent 45 ÷ 4. In part (c) we look for Follow Through ('FT') from their parts (a) and (b). They correctly carry out '*their* (a) × 1000 – *their* (b) × 400' (their subtraction calculation is in litres, but it is correct) and so B2FT is given.
			Total	**7**	
24	a		Three of 20[.00], 30[.00], 40 and 4 seen	B1 M1	

			40 × 20 4 × 30 920 or 800 and 120	M1 A2	for *their* 40 x *their* 20 for *their* 4 x *their* 30 **A2** dep on **B1M1M1** **or** **A1** dep on **B1M1** for 800 or 120	**B1** seen as rounding *their* 40 can be $40\frac{1}{3}$, $40.\dot{3}$, 40.33[3…] or 41 *their* 20 can be 20.15 or 21 *their* 4 can be $4\frac{1}{4}$, 4.25 or 5 *their* 30 can be 30.23 or 3

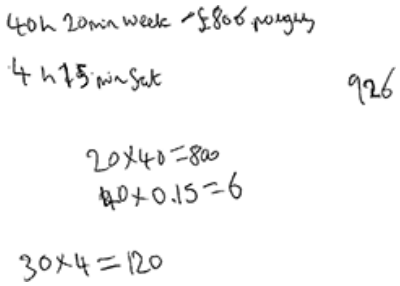
Examiner's Comments

Many did not follow the instruction to round given in this question and subsequently struggled. Those who did successfully round the values generally arrived at a correct response.

Long multiplication was often used for 40 × 20, but repeated addition was sometimes used for 4 × 30.

Responses that did not round (or did not round correctly) were frequently given M1M1 for showing working to multiply the wage by the hours worked for both the weekdays and the weekend. Some that hadn't rounded attempted to partition the values to simplify their working. For example, dividing £20.15 by 3 to get the pay per $\frac{1}{3}$ of an hour, then adding it to *their* £20.15 × 40, or similarly for the Saturday pay.

A few omitted their working altogether and just wrote 800 and 120. The questions asks candidates to '…show that Amaya may be correct' and just writing values is insufficient to show this.

					There were a number of common issues seen in candidates working. 1. Candidate working out was often poorly presented and in some cases this resulted in values being used incorrectly or omitted. 2. Converting units of time continues to be a challenge for many. Many correctly converted $\frac{1}{3}$hour to 20 minutes or $\frac{1}{4}$hour to 15 minutes, but then incorrectly used 40.20 and 4.15 in calculations. 3. Some tried to divided $40\frac{1}{3}$by 5, in an attempt to find the hours worked each day from Monday to Friday. This was often rounded to 8 hours worked per day, then multiplied by the wage (either £20 or £20.15) and this then finally multiplied by 5 to give pay across the weekdays. Exemplar 3  At a glance it might look like this candidate has rounded all the values, but in fact they have not rounded the £20.15 wage. Instead, they have partitioned it and multiply both partitions by 40. Three rounded figures is sufficient for the B1 however, so it is given. M1 is given for '40 × *their* 20', as even though they have not rounded 20.15, they carry out a valid multiplication (20.15 is noted in the mark scheme's guidance column as acceptable here).

					The second M1 is also given for '30 × 4'. A1 is then given for 120. The A2 is not given as even though '800' is seen in the response, it is part of their partitioned calculation and the final result for the weekday earnings is £806. This candidate is given 4 marks in total.
	b		The calculation is an underestimate	1	All values were rounded down oe Mark best response as long as not contradictory or incorrect We want the candidate to say WHY they are certain of the figure being at least £900. If <u>TOTAL</u> is used then this MUST be £920. IF <u>rounded figures are used</u> then **all** four must be rounded down correctly (20,30,40,4) **Response Mark** **1** It is an Underestimate **1** **2** All Values were rounded down **1** **3** This is correct because at minimum she will make 920 ('*at minimum' implies rounding and is correct*) **1** **4** The values are rounded down meaning she earnt more than this **1** **5** (40 x 20) + (4 x 30) already equal over £900 **1** **6** The underestimation is over £900 **1** **7** If you round the earnings you get over £900 (*this is true for rounding both up and down*) **1BOD** **8** Because in my working not adding the minutes, it's still over £900 as it's £928.80 (*incorrect*) **0** **9** Because I estimated it meaning she'd probably got more (*probably does not mean certain*) **0**

					10 As it has gone over £900 (*not describing rounding or underestimate*) **0** **11** This is correct because she will make 920 (*the candidate is not telling us WHY they are certain*) **0** **12** Because £20.15x40=£806 and £30.23 x4=120.92 + them = 926.92 not including the minimum (*All rounded values not used*) **0** **13** If you added everything without a fraction it adds up to almost £900 (*incorrect*) **0** **14** Because it works out that all of her work will add to over 900 (*no reference to underestimate*) **0** **15** Because it's over 900 (*not enough, need to say WHY it is certainly over £900*) **0** **16** The estimation is over £900 (*not enough, need to say WHY estimation is certainly over £900*) **0** **17** Because I rounded down (*not enough- needs to be e.g. rounded <u>all</u> numbers down*) **0** **<u>Examiner's Comments</u>** Many candidates did not attempt this question. The majority struggled to access the contextual nature in relation to what they had been asked to do in part (a). Even those with full marks in (a) struggled to understand why Amaya can be 'certain'. Most relied on their response to part (a), often just repeating working here. A number of candidates stated Amaya would earn a certain amount during the week, so adding her earnings from the weekend would take the weekly earnings over £900. Some referenced rounding down the hours worked, but not the hourly rate, while others referenced rounding down the hourly rate, but not the hours worked.
			Total	**6**	

25			4 with correct working	5	**B4** for answer 3.15 or $\frac{63}{20}$ $3\frac{3}{20}$ or 6.6[6..] or 6.7 with correct working OR **M3** for $\frac{600 \times 0.3 \times 7}{400}$ oe or for 400 ÷ 180 × 3 or for 1260 with both 4 × 400 and 3 ×400 OR **M2** for 600 × 0.3 × 7 or for $\frac{600 \times 0.3}{400}$ or for 400 ÷ 180 or for 400 – 180 – 180 or for both 4 × 400 and 3 × 400 OR **M1** for 600 × 0.3 or for 0.3 × 7 or for $\frac{600}{400}$ **0** or **1** scored, instead award **SC2** for answer 4 with no or insufficient working If **0** scored, instead award **SC1** for answer 3.15 with no or insufficient working	"Correct working" requires evidence of at least **M2** Condone for **B4** answer of 3 following 3.15 **M3** and **M2** may be seen in stages may be implied by 1260, 1600 and 1200 may be implied by 1260 or 0.45 may be implied by 2.2(22…) may be implied by 1600 and 1200 may be implied by 180 may be implied by 2.1 may be implied by 1.5
					Examiner's Comments	

					Many candidates showed their work in a clear and logical way and were given 5 marks. Successful candidates usually started by finding 30% of 600 and then multiplied by 7 to find the amount of cereal consumed in 7 days as 1260 g. Some candidates then used repeated subtraction to reach their final answer, rather than division.
			Total	**5**	
26			Accept any correctly matched pair where car > garage matched pair of values or non-overlapping ranges and the values quoted are 4.5 ≤ garage < 4.55 4.5 < car < 4.55	3	**B1** for a value in 4.5 ≤ garage < 5 **B1** for a value in 4.5 < car < 4.55 Ranges must not overlap for 3 marks Values must be clearly associated with garage (or 5) or car (or 4.5) as appropriate. For **B1** if choice of values given all must be in range, unless acceptable value(s) indicated **Examiner's Comments** Only a few candidates were given 3 marks, with many not making any attempt to give an answer. A few candidates wrote a correct value for either the car or garage and were given 1 mark. Others wrote multiple values, but didn't make it clear which were associated with the car and which were associated with the garage. Some wrote a list or gave boundaries that included unacceptable values and so were given 0 marks.
			Total	**3**	
27	a		No **oe** and	1	

			[because] the answer should be close to 240 **oe**		Eg No his answer is ten times too big No the decimal point is in the wrong place See AG **Response Mark** **1** The answer should be 242.76 **1** **2** The decimal point should be between the 2 and the 7 **1** **3** The number is a lot higher than my estimate. I think they placed a decimal point wrong *(the first part is not enough without seeing what their estimate is, 'placed a decimal point wrong' scores the mark)* **1** **4** Their answer should be in 200s not 2000s she must have placed decimal incorrectly **1** **5** There should be 2 numbers behind the decimal place and not one **1** **6** Because if you do 60 × 4 you'll get 240 *(implies the answer is 10 times too big)* **1** **7** It should be closer to 240 (*this is the correct estimate, so no need for calculation to be shown here*) **1** **8** Their answer was in thousands which is too large (*with 'it should be in the hundreds', this would have scored the mark*) **0** **9** Has not put decimals in **0** **10** The answer is too high and shouldn't have a decimal at the end *(the first part of answer is not enough to score and 'shouldn't have a decimal at the end' is incorrect)* **0** **11** The answer that Harper got is bigger than the estimate by 1 significant figure **0** **12** There is only one two digit number so it cannot be above 1000 **0** **13** It would be less than 2427.6 due to 60 × 4 *(if the candidate had also written '= 240', this would be enough)* **0** **14** The answer is significantly larger **0** **15** There is no way it can be higher than 300 (*not enough, as we need to see the calculation of their 'estimate'*

					of 300) **0** **16** The place value is not in the correct position (*'place value' is not an equivalent for decimal point*) **0**	
	b		240 with working	2	**B1** for rounded value of 60 or 4 If 0 scored **SC1** for 60.0 and 4.0 and 240.0 as answer	For 2 marks 60 and 4 must be seen
			Total	**3**		
28			2.52 with correct working	4	**M2** for $\frac{16\times17}{110}$ Or **M1** for 16 × 17 , may be implied by 272 **M1** for *their* number of rolls × 84 or for *their* number of rolls × [0].84 If **0** scored **SC1** for answer 2.52 with no working or insufficient working <u>Alternative method</u> **M2** for 110 ÷ 17 = [6.4 to 6.5] and either 6 + 6 = 12 or 6 + 6 + 6 = 18 oe Or **M1** for 110 ÷ 17, may be implied by 6.4 to 6.5 or 6 **M1** for 3 × 84 or 3 × [0].84 If **0** scored **SC1** for answer 2.52 with no or	"Correct working" requires evidence of at least the first **M1** For **M2** and **M1** accept in other correct consistent units i.e. m or mm *Their* number of rolls dependent on at least **M1** and must be 3, 25 or 248 Dep on at least **M1**

					insufficient working	
			Total	**4**		
29	a		33 500	1		
	b		Accept any correctly matched pair of values in which rugby < football from these ranges rugby: 34 450 to 34 498 and football: 34 451 to 34 499	2	**B1** for one value for rugby or football in these ranges rugby from 34 450 to 34 498 or football from 34 451 to 34 499	Error interval alone scores **0** Only mark candidate's chosen value(s) Rugby < football does not need to be stated If a pair of values and rugby or football not stated assume the value on the left or below another is rugby For **B1** if one or multiple values seen and no clear choice/designation all must be in range 34 451 to 34 498
			Total	**3**		
30	a		21.5 22.5 cao	2	**B1** for each If **0** scored **SC1** for correct but reversed or for 21.50[0] and 22.50[0]	
	b		3 × 22.5 or 3 × *their* upper bound in (a) 67.5 or correct answer to 3 × *their* upper bound No and *their* 67.5 >/≥ 67.3 in symbols or words <u>Alternative method 1</u> 67.3 ÷ 3	M1 A1 1 dep M1 A1 1 dep M1 A1 1 dep	Dep on previous 2 marks Conclusion and clear comparison **FT**	**M0** if $w = 22$ used Yes/no conclusions must be consistent

			22.4[3…] No and *their* 22.5 >/≥ 22.4[3…] in symbols or words <u>Alternative method 2</u> 67.3 ÷ 22.5 or 67.3 ÷ *their* upper bound 2.99 or correct answer to 67.3 ÷ *their* upper bound No and 3 >/≥ *their* 2.99		their upper bound in (a) Dep on previous 2 marks Conclusion and clear comparison **FT** their upper bound in (a) Dep on previous 2 marks Conclusion and clear comparison **FT** their upper bound in (a)	with their working
			Total	**5**		
31			497	1		
			Total	**1**		
32			No, they need 7 boxes oe with correct working	2	**M1** for 350 ÷ 57, 350 ÷ 6 or 57 × 6 If **0** scored, **SC1** for 6.14[0…], 6.1, 58.3[3…], 342 or 8 **Response Mark** 57 × 6 No, 6 boxes hold 342 pencils **2** No, 6 boxes hold 342 pencils **SC1** 57 × 6 No, Ling needs an extra box for the other 8 pencils **2** There are 8 remaining pencils **SC1**	Correct working requires **M1** Allow **M1** for repeated addition/subtraction if method shown. If only numbers listed addition must reach 342, subtraction must reach 8

					350 ÷ 57 = 6.14 you can't have a fraction of a box *(doesn't say whether Ling is correct)* **M1** Ling is incorrect 6 boxes will only hold 342 pencils **SC1** Ling is correct 350 ÷ 57 = 6 **M1** No, they need an extra box **0**	
			Total	**2**		
33			441.84 cao	4	**B3** for 8441.84 **soi** or for 441[.8…] as final answer Or **M3** for (8000 × 1.009^6) – 8000 Or **M2** for 8000 × 1.009^6 **oe** implied by 8441[.84…] or 8000 × r^6 – 8000 **oe** Or **M1** for 8000 × 1.009^n **oe** implied by 8144[.64…] ($n \neq 6$ and $n \geq 2$) or 8000 × r^n **oe** ($n \geq 2$)	Answers of 432 and 8432 are from simple interest and score 0 For **M2** and **M1** where r = 1.9, 1.09 or 1.009
			Total	**4**		
34	a		460 cao	1		
	b		749 000 cao	1		
			Total	**2**		
35		i	10 cm [between 2.45 and 2.55] **oe** or [If to nearest cm it should be between] 2.495 and 2.505	1		Mention of 10 cm (range or difference) **oe**
		ii	2.505	1		
			Total	**2**		
36			10 with correct working	5	**B1** for 4000 [cm] or [0].7[0]	If both seen and one incorrect

					[m] **M1** for $\frac{\text{figs } 4}{\text{figs } 7}$ **soi** 57.1(…) or $57\frac{10}{70}$ **oe** **M1** for *their* 57.1… truncated **soi** 57 **M1** for figs 4 – *their* 57 × figs 7 If **0** scored with no/insufficient working **SC2** for answer 10 Or **SC1** for answer 0.1	award **B0** Correct working requires all part marks **soi** At least 4 repeated additions or repeated subtractions May have indication of continuing 57 implies **M2 B1** 4000 – 3990 implies **M3 B1** May be (*their* 57.1(…) – 57) × 70
			Total	**5**		
37			2.54 and 2.49 only	2	**B1** for one only or for two correct and one extra	
			Total	**2**		
38	a		Any value of r in $6.15 \leq r < 6.2$	1	**Examiner's Comments** Some candidates did not attempt this question and very few correct responses were seen. Common wrong values were 6, 6.1 and 6.2. Other responses seen were 3.1, 9 and 10. Very few candidates showed any working.	
	b		Any value of h in $6.25 \leq h < 6.3$	1	**Examiner's Comments**	

					Some candidates did not attempt this question and very few correct answers were seen. Some wrong values were 6, 6.21 and 6.22, along with others such as 2, 6.4 and 7. As with (a), very few showed any working.
	c		Any pair of values where $r > h$ and $6.2 < r < 6.25$ and $6.2 \leq h < 6.25$	1	**Examiner's Comments** Many candidates did not attempt this question. Of those who did, only a small proportion were given a mark. There was no apparent pattern to the responses. Few candidates showed any working, although a very small number of diagrams were seen.
			Total	**3**	
39			£5.60	3	**B2** for 560 or 5.84 or 5.6 OR **M2** for 8 × *their* 0.7 or 70 × *their* 8 or 0.7 × *their* 8 or **B1** for one of 8 or 70 or 0.7 Isw rounding after 5.60 3 marks *their* 0.7 can be 70, 73, 0.73 only *their* 8 can be 8.2 or 8.5 only Condone trailing 0's after rounding e.g. 8.0 **Examiner's Comments** Most candidates rounded at least one of the numbers correctly. Rounding 8.2 kg to 8 kg was done well, however a few rounded to 9 kg instead. A few candidates did not show their rounding of 73p in the working space and went onto complete 8 × 7 = 56.

					Struggles with place value were also evident, with responses of £0.56, 56p or £56 seen. The most common issues were candidates not rounding 73p to 1 significant figure and just using 73p in a calculation, or not acknowledging the request to round at all and attempting 8.2 × 73. **Assessment for learning** Candidates should show their rounded numbers **before** they use them in calculations. Here, a first step should have been: 8.2kg ≈ 8kg 73p ≈ 70p
			Total	**3**	
40			$\pi \times 5^2$ *their*$(\pi \times 5^2) \times \frac{70}{360}$ oe 15.26 to 15.284 [rounds to 15.3]	M1 M1 A1	Accept (78.5 to 78.6) × $\frac{70}{360}$ **Examiner's Comments** Very few candidates made any attempt to respond to this question. Of those who did, a few showed some knowledge of circles, but not sectors.
			Total	**3**	
41	a		3600	1	**Examiner's Comments** There were many correct responses, with the most common incorrect responses being 600 and 365.

	b		[£] 3.29	1	Condone 329p but not £329p or £3.29p Do not condone extra zeros **Examiner's Comments** As with part (a), many correct responses were seen. The most common incorrect response was 3.3(0).
			Total	**2**	
42	a		29 500	1	**Examiner's Comments** This question was not understood by most candidates. Nearly 70% of candidates gave the incorrect answer. 25 000, 29 005 and 30 000 were common incorrect responses.
	b		Accept any correctly matched pair of values in which rugby < football from these ranges rugby: 30 450 to 30 498 and football: 30 451 to 30 499	2	**B1** for one value for rugby or football in these ranges rugby from 30 450 to 30 498 or football from 30 451 to 30 499 Error interval alone scores 0 Only mark candidate's chosen value(s) Rugby < football does not need to be stated If a pair of values and rugby or football not stated assume the value on the left or below another is rugby

					For B1 if one or multiple values seen and no clear choice/designation all must be in range 30 451 to 30 498 **Examiner's Comments** This part was poorly answered and it seemed clear that many candidates did not understand what was needed. A number of error intervals (often incorrect) were presented that did not answer the question. Very few candidates annotated their values and examiners were left to guess which might represent football and which rugby.
			Total	**3**	
43	a		240 with working	2	**B1** for rounded value of 80 or 3 If 0 scored **SC1** for 80.0 and 3.0 and 240.0 as answer For 2 marks 80 and 3 must be seen **Examiner's Comments** Many candidates were able to round to 1 significant figure, scoring at least B1 for one correct rounding. A common error was to give 240 correct to 1 significant figure, stating 200 as the final answer.
	b		No **oe** and [because] the answer should be close to 240 **oe**	1	Eg No his answer is ten times too big No the decimal point is in the wrong place

						See AG
					For additional information refer to **2022 November (J56002) Mark scheme Appendix** within downloadable additional mark guidance. **Examiner's Comments** Many candidates referred to the full stop as a problem, implying a second decimal point. Many answers were too vague, such as 'the answer is too high'. Many candidates did not see the link between parts (a) and (b). Others tried to work out the answer to 79.8 × 3.1, usually incorrectly, to use this as a justification.	
			Total	**3**		
44			2.76 with correct working	4	**M2** for $\frac{15 \times 18}{120}$ or **M1** for 15 × 18 may be implied by 270 **M1** for *their* number of rolls × 92 or for *their* number of rolls × [0].92 If **0** scored **SC1** for answer 2.76 with no working or insufficient working Alternative method **M2** for 120 ÷ 18	"Correct working" requires evidence of at least the first M1 For M2 and M1 accept in other correct consistent units i.e m or mm *their* number of rolls dep on at least M1 and must be 3, 23 or 225

					= [6.6 to 6.7] and either 6 + 6 = 12 or 6 + 6 + 6 = 18 oe or **M1** for 120 ÷ 18 may be implied by 6.6 to 6.7 or 6	
					M1 3 × 92 or 3 × [0].92	Dep on at least M1
					If **0** scored **SC1** for answer 2.76 with no or insufficient working	

Examiner's Comments

Almost all candidates attempted the question. While a full clear method was sometimes lacking, sufficient working was shown to enable the credit of full marks for the correct answer in almost every instance. The mark scheme's two methods were seen with similar frequency. Those who started by finding the total length of ribbon required (15 × 18 = 270) were more likely to continue with clear method or reasoning, such as one roll = 120 cm, two rolls = 240 cm, three rolls = 360 cm, so 3 rolls required. Candidates who found the number of cakes that could be decorated with one roll (120 ÷ 18 = 6.67) often struggled to fully justify why 3 rolls were needed.

A common error was to assume each cake needed one roll, leading to 15 × 92p = £13.80. For others, a common starting point was to find 92 × 15 (the cost of one roll of ribbon, multiplied by the number of cakes), suggesting that these candidates had not interpreted all the information given in the question and so were unable to

					identify all the necessary calculations to solve the problem. **Misconception** In problems where a quantity of material is needed for a particular purpose, the quantity purchased may have to be more than required and there may be some left over. In Question 7, some candidates did not realise the need to buy full rolls.
			Total	**4**	
45	a		24.5 25.5 cao	2	**B1** for each If **0** scored **SC1** for correct but reversed or for 24.50[0] and 25.50[0] **Examiner's Comments** Some candidates were able to give the correct answers. Several scored 1 mark, usually for the lower bound of 24.5. 25.4 was a common error for the upper bound.
	b		4 × 25.5 or 4 × *their* upper bound in (a) 102 or correct answer to 4 × *their* upper bound Yes and *their* 102 </≤ 102.4 in symbols or words Alternative method 1 102.4 ÷ 4 25.6 Yes and *their* 25.5 </≤ 25.6 in	M1 A1 1 dep M1 A1 1 dep M1 A1 1 dep	Dep on previous 2 marks Conclusion and clear comparison **FT** their upper bound in (a) Dep on previous 2 marks Conclusion and clear comparison **FT** their upper bound in (a) Dep on previous 2 marks	**M0** if $w = 25$ used Yes/ no conclusions must be consistent with their working

			symbols or words <u>Alternative method 2</u> 102.4 ÷ 25.5 or 102.4 ÷ *their* upper bound 4.01(…) or correct answer to 102.4 ÷ *their* upper bound Yes and 4 </≤*their* 4.01(…)		Conclusion and clear comparison **FT** their upper bound in (a) **<u>Examiner's Comments</u>** Several candidates realised the need to use their upper bound. Some did not realise the connection between parts (a) and (b). The most common error was to use 25 as the upper bound, regardless of their upper bound in part (a). Many just did the calculation and did not give a reason.
			Total	**5**	
46			No, they need 9 boxes oe with correct working	2	**M1** for 590 ÷ 73, 590 ÷ 8 or 73 × 8 If **0** scored, **SC1** for 8.08[2…], 8.1, 73.7[5], 73.8, 584 or 6 Correct working requires M1 Allow **M1** for repeated addition/subtraction if method shown. If only numbers listed addition must reach 584, subtraction must reach 6 **Exemplar responses** 73 × 8 No 8 boxes hold 584 pencils **2** No 8 boxes hold 584 pencils **SC1** 73 × 8 No Jamie needs an extra box for the other 6 pencils **2** There are 6 remaining pencils **SC1** 590 ÷ 73 = 8.08 you can't have a fraction of a box *(doesn't say whether Jamie is correct)* **M1** Jamie is incorrect 8 boxes will only hold 584 pencils **SC1** Jamie is correct 590 ÷ 73 = 8 **M1** No, they need an extra box **0** **<u>Examiner's Comments</u>** A large majority of candidates were able to score M1 having applied a correct method. Many candidates were then able to interpret their

					answer correctly and score both marks. However some did not gain the second mark due to an incomplete explanation, e.g. “No, because 73 × 8 = 584” without relating the figures to boxes or pencils.
			Total	**2**	
47			283	1	**Examiner’s Comments** A very small number showed working to determine which value was closer to 300 (283 or 328). A small number of candidates used digits other than 2, 3 and 8.
			Total	**1**	
48	a		3.39 and 3.44 only	2	**B1** for one only or for two correct and one extra **Examiner’s Comments** Many candidates gained 1 or 2 marks. few chose the two correct values. Some chose the two correct and one other to score 1 mark and some chose one correct and one incorrect to score 0 marks.
	b	i	10 cm [between 3.35 and 3.45] oe or [If to nearest cm it should be between] 3.395 and 3.405	1	Mention of 10 cm (range or difference) oe
		ii	3.405	1	**Examiner’s Comments** This part was almost never correctly answered, although a very few did give the correct upper limit.
			Total	**4**	
49			40 with correct working	5	**B1** for 2800 [cm] or [0].6[0] [m] **M1** for $\frac{\text{figs } 28}{\text{figs } 6}$ soi 46.6 to 46.7 If both seen and one incorrect award B0 Correct working requires all part marks soi

					or $46\frac{40}{60}$ oe **M1** for *their* 46.6… truncated soi 46 **M1** for figs 28 – *their* 46 × figs 6 If 0 scored with no/ insufficient working **SC2** for answer 40 or **SC1** for answer 0.4	At least 4 repeated additions or repeated subtraction May have indication of continuing 46 implies M2 B1 2800 – 2760 implies M3 B1 May be (*their* 46.6... – 46) × 60
					Examiner's Comments This problem solving question was attempted by most candidates and many scored some marks. Many however did not score the first B1 for converting from metres to centimetres or vice versa. The general error was to think that there are 10 cm in 1 m and so 280 cm was a common error. **Misconception** Some candidates though that there were 10 or 1000 cm in 1 metre. Most candidates scored a mark for dividing 28 m by 60 cm, in some form. It was regrettable to see many candidates attempt this division by repeated subtraction, even for candidates with 2800 cm or even 28000 cm; such inefficient methods lead to errors and wasted time. Some candidates found 46.66… in some form and truncated this to the nearest integer for a further mark.	
			Total	**5**		
50			1.5 × 10^4 nfww isw	4	**B3** for 15 000 oe or 1.49[0..] × 10^4	e.g. 15 000 may be 15 × 10^3

					or **B2** for 14 900 oe or **M1** for figs 181 – figs 32 If 0 scored **SC1** for *their* value correctly rounded to 2 significant figures	Subtraction may be implied e.g. by figs 15 or figs 149 *Their* unrounded value must be seen
					Examiner's Comments Many scored the first mark for subtracting the correct values, but very few correctly rounded to 2 significant figures and even fewer wrote this in standard form correctly. A number attempted to subtract the standard form numbers in the wrong order.	
			Total	**4**		
51			319.44 cao	1	**B3** for 9319.44 soi or for 319[.4…] as final answer OR **M3** for (9000 × 1.007^5) – 9000 OR **M2** for 9000 × 1.007^5 oe implied by 9319[.44…] or 9000 × r^5 – 9000 oe OR **M1** for 9000 × 1.007^n oe implied by 9126[.44…] ($n \neq 5$ and $n \geq 2$) or 9000 × r^n oe ($n \geq 2$)	Answers of 315 and 9315 are from simple interest and score 0 For **M2** and **M1**where $r = 1.7$, 1.07 or 1.0007
					Examiner's Comments	

					Candidates should be encouraged to use the compound interest formula rather than the 'year on year' method, as that often lead to the loss of the accuracy mark due to rounding off values for each year. Several candidates gave the value of the investment rather than the interest.
			Total	**4**	
52	a		560 cao	1	
	b		439 000 cao	1	**Examiner's Comments** In this part, just 439 was often seen, i.e. missing off the final zeros.
			Total	**2**	
53			10 nfww	4	**M1** for 5 × 4 **M1** for 200 or 199 used **M1dep** for *their* 200 ÷ *their* area, dep on first M1 nfww for 4 marks no errors in calculating values and at least one of 5, 4, 200 or 199 used Allow for 20 or for 4.9 × 4.1 [20.09] or with one unrounded value [19.6 or 20.5] Allow for 198.5 ÷ (4.9 × 4.1) **Examiner's Comments** Candidates who gained credit here multiplied length and width of the rectangle together, mostly using the exact dimensions of 4.9 and 4.1. A further mark was earned for dividing 198.5 (or their estimate of this) by the answer to their area. Some used perimeter, or just added together the length and width, scoring 0. Very few gained 3 or 4 marks here, since the

					key component of this question (to work out an **estimate** of the pressure) was largely ignored. This was another question with a significant number of no response.  **AfL** Candidates need to take particular note of key information written **in bold** in questions. When they see a question ask them to **estimate**, they should be rounding any values in the question to one significant figure before attempting any calculations.
			Total	**4**	