Mark scheme

Question			Answer/Indicative content	Marks	Guidance	
1			61[cm] with correct working	6	**M1** for $8x + 3 = 6x + 8$ **M1** for $8x - 6x = 8 - 3$ **oe** **A1** for $x = 2.5$ **oe** **M1** for $8x + 3 + 6x + 8 + 4x + 5$ **soi** **M1** for substitution of *their x* into $8x + 3$ or $6x + 8$ or $4x + 5$ or *their* $18x + 16$ If **0** or **1** scored, instead award **SC2** for answer 61	Correct working requires evidence of at least **M1M1A1M1** or **M1M1A1M2** **FT** *their* equation if wrong sides equated Accept only: $8x + 3 = 4x + 5$ or $6x + 8 = 4x + 5$ After **M1**, $x = 2.5$ implies **M1M1A1** Do not penalise if their value of x is not subsequently used in their work leading to an **algebraic** final answer e.g. $18x + 16$ Implied by $18x + 16$ *Their x* must be > 0 and clearly stated as $x = \ldots$. Substitution of their x into $8x + 3$, $6x + 8$ and $4x + 5$ and then adding implies **M1 M1**. <u>Alternative method using trials:</u>

					If **0** scored, instead award **SC1** for $x = 2.5$	In all trials x must be > 0 **M1M1A1** for both $8x + 3$ and $6x + 8$ correctly evaluated with $x = 2.5$ or **M1M1** for three correctly evaluated trials of both $8x + 3$ and $6x + 8$ with consistent value of x or **M1** for two correctly evaluated trials of both $8x + 3$ and $6x + 8$ with consistent value of x AND **M2** dep on at least **M1** for *their* x substituted into their $18x + 16$ oe or **M1** dep on at least **M1** for their x substituted into $4x + 5$ **M1** dep on previous **M1** adding their three lengths
			Total	**6**		
2			30 [°] with correct working	5	M2 for $\sqrt{4^2+3^2}$ oe or **M1** for $4^2 + 3^2$ oe **A1** for [BC +] 5	Correct working requires evidence of at least **M2A1M1** Condone stating 3, 4, 5 or $3^2 + 4^2 = 5^2$ for **M2** After **M1**, [BC =] 5 implies **M2A1** [BC =] 5 might be on the diagram

					M1 for $\frac{their\,5}{10} = \sin[\ldots]$ **oe** If **0** or **1** scored, instead award **SC2** for final answer of 30 **nfww** If **0** scored, instead award **SC1** for [BC =] 5	Do not penalise if Pythagoras is not subsequently used in work leading to their answer Note that: 3 × 10 = 30 is **SC0**
			Total	**5**		
3	a		Candidate clearly shows that: 23 + 490 = 513	4	**M2** for [£]0.07 × 7000 or 7[p] × 7000 and [£]0.23 × 100 or 23[p] × 100 or **M1** for [£]0.07 × 7000 or [£]0.23 × 100 or 7[p] × 7000 or 23[p] × 100 **B1** for £23 or [£]490 or for 2300[p] or 49 000[p]	"Shows that" requires evidence of at least **M2**, **B1** For **M2**, **M1** & **B1** if units (£ or p) are given they must be correct
	b		8.5 [p]	4	**B1** for 35 × 100 or 3500[p] or [0].35 × 100 or £35 **M2** for (885 – *their* 35) ÷ 100 **oe** or **M1** for (885 – *their* 35) ÷ 10 000 **oe**	Condone answer of 9 or 10 after 8.5[p] or [£]0.085 seen Ignore units for **M2** and **M1** **M2** Implied by 850

					÷ 100 **M1** implied by 850 ÷ 10 000 or 0.085 If **0** or **1** scored, instead award **SC2** for figs 85 as final answer	
			Total	**8**		
4			35	2	**M1** for 7 × 5	Extra incorrect work e.g. $\frac{7\times5}{2}$ is **M0**
			Total	**2**		
5	a	i	29 000	1		
		ii	0.308	1		
		iii	700	1		
	b		1 hours 15 minutes	3	**B2** for 1.25[hours], $1\frac{1}{4}$[hours] or 75[mins] or **M1** for 100 ÷ 80 oe or for *their* decimal hours correctly converted or for *their* minutes correctly converted to hours and minutes If **0** scored **SC1** for answer 1 hr 25 mins	Condone incorrect units for distance e.g. 10 ÷ 8 or $\frac{10}{8}$ Decimal hours must be > 0 *Their* minutes must be > 60
			Total	**6**		

6	a		96	2	**M1** for $\frac{12\times16}{2}$ **oe**	
	b		1632 with correct working	5	**B2** for [hypotenuse =] 20 or **M1** for $12^2 + 16^2$ AND **M2** for 2 from 2 × *their* **part(a)**, 30 × 12, 30 × 16, 30 × *their* $\sqrt{12^2+16^2}$ or **M1** for 1 from 2 × *their* **part(a)**, 30 × 12, 30 × 16, 30 × *their* $\sqrt{12^2+16^2}$ If **0** or **1**, scored instead award **SC2** for 1632 with no or insufficient working	Correct working requires evidence of at least **M1** or **B2** (Pythagoras) and **M2** (area) Allow restart for area of triangle May be implied by 192, 360, 480, 600
	c		Reason that recognises the loss of part of the surface [of the triangular prisms] e.g. [The value of] two rectangular areas are lost /no longer on the surface **oe**	1		Accept e.g. faces/rectangles/slanting faces/sections for rectangular areas less/reduced for lost
			Total	**8**		
7			8.97×10^3	4	**B3** for 8970 or **B2** for figs 897 or **M2** for $\frac{1.495\times10^{11}\times\ 6\times10^{-6}}{1000}$ **oe** or	May be in stages

					M1 for $1.495 \times 10^{11} \times 6 \times 10^{-5}$ **oe**	May be seen as product of two st form numbers converted
			Total	**4**		
8			9	1		
			Total	**1**		
9			651.4	3	**M1** for 16 × 10.4 **oe soi** by 166.4 **M1** for 350 + 80 + 55 + *their* 166.4 **oe**	e.g. 160 × 1.04 May be ratio method with × 16 **oe** seen *Their* 166.4 from attempt at first **M1** and ≠ 160 Addition may be a series of sums or implied by a vertical list with number below Accept 485 + *their* 166.4
			Total	**3**		
10			22.5	2	**M1** for 180 ÷ 8	
			Total	**2**		
11			6.7	3	**B2** for 6.68… or **M1** for 21 ÷ *Π*	
			Total	**3**		
12			62.37 with correct working	6	**M1** for (8 + 4) × 4.4[0] oe	"Correct working" requires evidence of at least 3 method marks May be implied by 52.8[0] or 35.2[0] and

					M2 for $3 \times 4.4[0] \times 1\frac{1}{4}$ oe or M1 for $3 \times 1\frac{1}{4}$ oe or $4.4[0] \times 1\frac{1}{4}$ oe AND **M2** for 0.9 × (*their* 52.8 + *their* 16.5) oe or **M1** for 0.1 × (*their* 52.8 + *their* 16.5) oe If **0**, **1** or **2** scored, instead award **SC3** for 62.37 with no working or insufficient working If **0** or **1** scored, instead award **SC2** for 69.3[0] with no working or insufficient working If **0** scored, instead award **SC1** for 35.2[0] or 17.6[0] with no working or insufficient working	17.6[0] for Thursday May be implied by 16.5[0] for Saturday May be implied by 5.5[0] *Their* 16.5[0] may be 5.5[0]
			Total	**6**		
13	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	**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

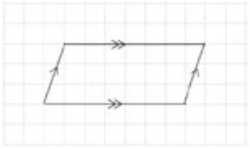
					A2 dep on **B1M1M1** or **A1 dep** on **B1M1** for 600 or 150	*their* 30 can be 30.18 or 31
	b		The calculation is an underestimate	1		All values were rounded down **oe** Mark best response as long as not contradictory or incorrect For additional information refer to 'Qn16b, 2024 June, Alternative J560/02, Mark Scheme Appendix' within downloadable resource materials.
			Total	**6**		
14		i	$8k$ final answer	3	**B2** for correct answer unsimplified or **B2** for $8k - 2\underline{g}$ [+ g + g] or **M2** for $3k + k + 3k - g + k - g$ [+ g + g] **oe** **or** **M1** for [height =] $k - g$ or [length =] $3k - g$	Condone $8k + 0[g]$ for **3** marks Accept in any order Accept e.g. $2g$ for $g + g$ Identified or seen on diagram in correct position
		ii	10.2 **nfww**	2	**M1** for *their* **part (i)** = 81.6 or $\frac{81.6}{8}$	*Their* part (i) must be algebraic in terms of k or k and g *Their* (a) can be rearranged

						Note : $8k - 2g = 81.6$ scores M1 but does not score the second mark as from wrong working
			Total	**5**		
15		i	6	1		
		ii	216	2	**M1** for $6 \times 9 \times 4$ **oe**	Accept e.g. 54×4
			Total	**3**		
16			$\frac{2}{5}$	3	**B2** for $\frac{1200}{3000}$ **oe** **or** **B1** for 3000 [m] or 1.2 [km]	Condone $\frac{1.2}{3}$ or 0.4 or 40% for **B2** Conversion must be correct
			Total	**3**		
17			113 or 113.1 or 113.09 to 113.11	2	**M1** for $\pi \times 6^2$ **oe**	Allow 36π for **2** marks π gives 113.0973... 3.142 gives 113.112 For **M1** π may be evaluated allowing $\frac{22}{7}$ or 3.14 or 3.142
			Total	**2**		
18			$(x - 3)(x + 10)$ $x^2 - 3x + 10x - 30$ or better $x^2 + 7x - 30 = 90$	B1 M2 A1		**B1** implied by $(x - 3)$ and $(x + 10)$ in a multiplication

			or $x^2 - 3x + 10x - 30 = 90$		**M1** for 3 out of 4 terms correct **A1 dep** on **B1M2** With no errors leading to the answer	grid Condone missing final bracket e.g. $(x - 3)(x + 10)$ $+7x$ is two terms <u>A1 alternatives:</u> $x^2 + 7x - 30 - 90 = 0$ or $x^2 - 3x + 10x - 30 - 90 = 0$
			Total	**4**		
19	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**		
20			210	2	**M1** for 14 × 15 **oe** If **0** scored, **SC1** for 210000[ml]	Repeated addition, we must see their method, allow one arithmetic error e.g. 14, 28, 42, 56, 70 then 70×3 [=210]
			Total	**2**		
21			< > =	3	**B1** for each	
			Total	**3**		
22			13	4		

					M3 for $\sqrt{(\text{their}5)^2+12^2}$ or $\sqrt{169}$ or **M2** for (*their* 5)^2 + 12^2 or **B1** for **5**	*their* 5 must be from an attempt at 16 − 11 5 must be their missing base length **B1** for 5 may be implied by use of 5^2 in a Pythagoras statement e.g. 12^2 = 5^2 + x^2
			Total	**4**		
23			20	3	**M2** for $\frac{4\times1000\times100}{20000}$ **oe** or **M1** for 4 × 1000 × 100 may be implied by 400 000 or for $\frac{\text{figs}4}{\text{figs}2}$ may be implied by answer figs 2	
			Total	**3**		
24			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 $\frac{600\times0.4\times7}{400}$ **oe** or for 400 ÷ 240 × 4 or for 1680 with both 5 × 400 and 4 × 400 OR **M2** for 600 × 0.4 × 7	"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

					or for $\frac{600 \times 0.4}{400}$ or for 400 ÷ 240 or for 400 – 240 or for both 5 × 400 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 1680 or 0.6 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**		
25			106.2[5] or 106 or 106 $\frac{1}{4}$	2	**M1** for $\frac{51000}{480}$ or **B1** for answer 106 with no working	
			Total	**2**		
26		i		1 1 dep	Correct parallelogram drawn **dep** on parallelogram drawn Accept other, complete, standard notations that indicate a parallelogram e.g. two pairs of opposite sides have equal length or two pairs of opposite angles are equal or any combination of these	Accept reasonable freehand, tolerance ± 2 mm by eye Mark intent Arrows must be correct single/double and pointing in correct direction

					properties that define a parallelogram	
		ii	21 **nfww**	2	**FT** *their* parallelogram **M1** for *their* length × *their* perpendicular height **oe**	e.g. 7 + 3.5 + 7 + 3.5 = 21 scores 0 **M1** and **2** marks are dependent on a parallelogram being drawn in (i) Must be in cm^2 If not 7 and 3 *their* dimensions need to be verifiable e.g. shown on the diagram e.g. **M0** for $\sqrt{13}$ or 3.6… etc as *their* perpendicular height **oe** includes two triangles + the 6 × 3 rectangle or the 8 × 3 rectangle – two triangles Need to be certain that 3 is slant height to withhold the marks
			Total	**4**		
27			28[cm] with correct working	6	**M1** for $5x + 4 = 3x + 7$	Correct working requires evidence of at least **M1M1A1M1** or **M1M1A1M2** FT *their* equation if wrong sides equated

					M1 for $5x - 3x = 7 - 4$ oe	Accept only: $4x - 1 = 5x + 4$ or $4x - 1 = 3x + 7$
					A1 for $x = 1.5$ oe	After **M1**, $x = 1.5$ implies **M1M1A1** Do not penalise if their value of x is not subsequently used in their work leading to an **algebraic** final answer e.g. $12x + 10$.
					M1 for $5x + 4 + 3x + 7 + 4x - 1$ soi	implied by $12x + 10$
					M1 for substitution of *their x* into $5x + 4$ or $3x + 7$ or $4x - 1$ or their $12x + 10$	*their x* must be > 0 and clearly stated as $x =$.... Substitution of their x into $5x + 4$, $3x + 7$ and $4x - 1$ and then adding implies **M1 M1**. <u>Alternative method using trials:</u>
					If **0** or **1** scored, instead award **SC2** for answer 28 If **0** scored, instead award **SC1** for $x = 1.5$	In all trials x must be > 0 **M1M1A1** for both $5x + 4$ and $3x + 7$ correctly evaluated with $x = 1.5$ or **M1M1** for three correctly evaluated trials of both $5x + 4$ and $3x + 7$ with consistent value of x or

						M1 for two correctly evaluated trials of both $5x + 4$ and $3x + 7$ with consistent value of x AND **M2** dep on at least **M1** for their x substituted into their $12x + 10$ oe or **M1** dep on at least **M1** for their x substituted into $4x - 1$ **M1** dep on previous **M1** adding their three lengths

Examiner's Comments

Candidates who attempted this question generally achieved at least one mark.

This question was challenging for most candidates, but those who scored did so in one of two ways. The most common was to find the sum of the three sides as an expression (this was given 1 mark). Some candidates however incorrectly equated this to 180.

The other way was to equate the two correct sides ($5x + 4 = 3x + 7$), which a small number of candidates did and this was also given M1. Some were then not able to solve this equation correctly, while those that did correctly find $x = 1.5$ often did not continue the question any further.

Of those candidates who did find a value for x, some summed the sides algebraically and then substituted their value for x, while others substituted it into all three sides and then added (some of these evaluated one

					or more of the expressions incorrectly and therefore lost marks). A very small proportion of candidates attempted trials, but when they did so they often were unsure how to interpret their values and therefore subsequent trails appeared random. It was very rare for candidates to be given the Special Case (SC) marks, which shows that generally candidates were showing sufficient workings.
			Total	**6**	
28			60 [°] with correct working	5	**M2** for $\sqrt{12^2+5^2}$oe A1 for [BC =] 13 or **M1** for $5^2 + 12^2$ oe **M1** for $\frac{their13}{26} = \cos[\ldots]$ oe If **0** or **1** scored, instead award **SC2** for final answer of 60 nfww If **0** scored, instead award **SC1** for [BC =] 13 Correct working requires evidence of at least **M2A1M1** Condone stating 5, 12, 13 or $5^2 + 12^2 = 13^2$ for M2 After M1, [BC =] 13 implies M2A1 [BC =] 13 might be on the diagram Do not penalise if Pythagoras is not subsequently used in work leading to their answer. Note that: 5 x 12 = 60 is SC0 **Examiner's Comments** A significant proportion of candidates found this question challenging.

					Of those candidates who scored marks, it was either due to the correct use of Pythagoras' theorem or them scoring the Special Case (SC) mark for BC. Those candidates who did correctly use Pythagoras' theorem to find BC often then struggled to fully show the trigonometry method to find angle BCA. 60 was a common answer, but was often obtained through an incorrect method (e.g. 5 × 12). This did not score the Special Case (SC) mark.
			Total	**5**	
29	a		Candidate clearly shows that: 27 + 560 = 587	4	**M2** for [£]0.08 × 7000 or 8[p] × 7000 and [£]0.27 × 100 or 27[p] × 100 or **M1** for [£]0.08 × 7000 or [£]0.27 × 100 or 8[p] × 7000 or 27[p] × 100 **B1** for £27 or [£]560 or for 2700[p] or 56 000[p] "Shows that" requires evidence of at least **M2, B1** For M2, M1 & B1 if units (£ or p) are given they must be correct **Examiner's Comments** Many candidates answered this question correctly. As a 'Show that' question, it is important that candidates use the given information and arrive at an answer of

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>£587. Lower performing candidates often started with £587 and tried to work back to the given information.

Candidates needed to show their calculations and have the correct units and conversions between pence and pounds. Lower performing candidates mixed up the units and/or made arithmetic errors, for example 0.8 × 7000 = 560 was common, as was answers of 560p and 27p being equated to £587.</td></tr>
<tr><td></td><td>b</td><td></td><td>9.5 [p]</td><td>4</td><td><table><tr><td>B1 for 25 × 100 or 2500[p]

or [0].25 × 100 or £25

M2 for (975 – their 25) ÷ 100 oe

or M1 for (975 – their 25) ÷ 10 000 oe

If 0 or 1 scored, instead award

SC2 for figs 95 as final answer</td><td>Condone answer of 9 or 10 after 9.5[p]

or [£]0.095 seen

Ignore units for M2 and M1

M2 Implied by 950 ÷ 100
M1 implied by 950 ÷ 10,000 or 0.095</td></tr></table>
<u>Examiner’s Comments</u>

Most candidates received either 0 or 1 mark on this question. Candidates were usually able to find the standing charge for 100 days (25p × 100 = £25) for the B1 mark. Some candidates were then able to go on to 975 – 25 = 950, but then struggled to divide this by either 100 or 10 000 (the Special Case mark of 2 (SC2) was common here).

A small number of candidates gave their final answer in pounds rather than pence.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>8</td><td></td></tr>
<tr><td>30</td><td></td><td></td><td>24</td><td>2</td><td></td></tr>
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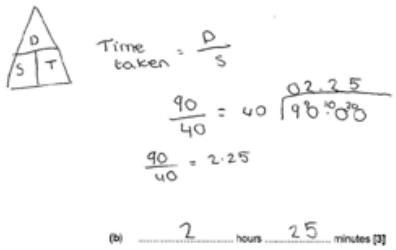
					M1 for 6 × 4 | Extra incorrect work e.g. $\frac{6\times4}{2}$ is M0 **Examiner's Comments** Many candidates scored full marks here. A common misconception was to calculate 6 × 4 and then halve the answer, presumably confusing area of a rectangle with area of a triangle. Others added four lengths to calculate the perimeter of the rectangle.
			Total	**2**	
31	a	i	35 000	1	**Examiner's Comments** A small proportion of candidates correctly answered this question, but most candidates scored no marks throughout Question 5 (a). The most common incorrect answers here were 3500, 350 or 3.5.
		ii	0.203	1	**Examiner's Comments** A small proportion correctly answered this question. The most common incorrect answers were 20300, 203, 20.3, 23, 2.3 and 2.03.
		iii	400	1	**Examiner's Comments** Again, a small proportion of candidates correctly answered this question. The most common incorrect answers were 0.4, 4, 40 and 4000. **Key point: Metric conversions**

					Candidates did struggle at times where they were expected to convert metric units. This included knowing the conversions of weight, capacity and area. Very few candidates stated any conversions (e.g. '1000 grams = 1 kg') before attempting any part of Question 5 (a).
	b		2 hours 15 minutes	3	**B2** for 2.25[hours], $2\frac{1}{4}$ [hours] or 135[mins] — Condone incorrect units for distance or **M1** for 90 ÷ 40 oe — e.g. 90 ÷ 40 $\frac{9}{4}$ or for *their* decimal hours correctly converted — Decimal hours must be > 0 or for *their* minutes correctly converted to hours and minutes — their minutes must be > 60 If 0 scored **SC1** for answer 2 hr 25 mins **<u>Examiner's Comments</u>** Most candidates did not score any marks in this question. The most common misconception was to calculate 90 × 40 rather than 90 ÷ 40. Others did not show an explicit method at all and just wrote numbers in the response. Candidates who were able to correctly find 90 ÷ 40 = 2.25 were given 2 marks, however a significant number of these then incorrectly gave the final answer 2 hours 25 minutes. A small number of candidates were given 1

					mark, either the Special Case (SC) mark for 2 hours 25 minutes (where no other marks had been given) or the M1 mark for correctly converting their total minutes or decimal hours into hours and minutes. **Key point: Time calculations and conversion to hours and minutes.** In questions like Question 5 (b), candidates should show their method clearly and set their work out accordingly. A very common misconception is that 2.25 hours = 2 hours 25 minutes. Candidates who worked in fractions (e.g. $\frac{90}{40} = \frac{9}{4} = 2\frac{1}{4}$hours) tended to be more successful as many recognised that $\frac{1}{4}$hour is 15 minutes. Candidates also made errors in time conversions in Question 19 (a), where 4 hours was often incorrectly converted into 400 mins. Exemplar 1  The above shows a very common misconception. The candidate correctly calculates $\frac{90}{40}$to be 2.25 and this is given 2 marks. The candidate then however equates 2.25 hours to 2 hours and 25 mins, which is incorrect. The final answer should be 2 hours 15 minutes.
			Total	**6**	
32			9.93×10^4	4	

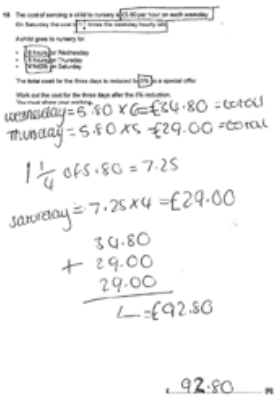
					B3 for 99 300 or **B2** for figs 993 or **M2** for $\frac{1.655\times10^{12}\times 6\times10^{-5}}{1000}$ oe or **M1** for $1.655 \times 10^{12} \times 6 \times 10^{-5}$ oe	May be in stages May be seen as product of two st form numbers converted
					Examiner's Comments This was often omitted and was not answered well by those who attempted it. Only a few candidates scored marks here. Those who responded often realised they had to multiply the mass of a raindrop by the number of raindrops, with some reaching an answer with the digits 993. A lot of candidates attempted to convert the standard form numbers into ordinary numbers and combine them, but then seemed unsure how to proceed (likely due to the size of the figures they arrived at). The responses seen suggested that most candidates did not know how to use their calculator to work with the standard form numbers. Few candidates realised that a conversion from grams to kilograms was necessary, but those that did sometimes multiplied by 1000. **Key point** Candidates will benefit from being able to use their calculators efficiently, including with standard form.	
			Total	**4**		
33	a		54	2	**M1** for $\frac{9\times12}{2}$ oe **Examiner's Comments**	

					A significant proportion of candidates calculated just 9 × 12 and 108 was the most common answer. A small number of candidates worked out the length of the hypotenuse instead (often correctly), but thisscored 0 marks.
	b		828 with correct working	5	**B2** for [hypotenuse =] 15 or **M1** for $9^2 + 12^2$ AND **M2** for 2 from 2 × *their* **part(a)**, 20 × 9, 20 × 12, 20 × *their* $\sqrt{9^2 + 12^2}$ or **M1** for 1 from 2 × *their* **part(a)**, 20 × 9, 20 × 12, 20 × *their* $\sqrt{9^2 + 12^2}$ If **0** or **1**, scored instead award **SC2** for 828 with no or insufficient working Correct working requires evidence of at least M1or B2 (Pythagoras) and M2 (area) Allow restart for area of triangle May be implied by 108, 180 , 240 , 300 **Examiner's Comments** Most candidates attempted this question, but very few scored more than one mark. Many responses suggested that candidates did not understand what was meant by 'surface area'. Common wrong methods were 9 × 12 × 20 and 9 + 9 + 12 + 12 + 20 + 20 (+ 20). A few candidates gained M1 for calculating the area of one face area correctly, usually 9 × 20 or 12 × 20. Some found two different areas correctly to score M2. Very few identified that Pythagoras'

					theorem was necessary (even those who had used it in the previouspart).
	c		Reason that recognises the loss of part of the surface [of the triangular prisms] e.g. [The value of] two rectangular areas are lost /no longer on the surface oe	1	Accept e.g. faces/rectangles/slanting faces/sections for rectangular areas less/reduced for lost **Examiner's Comments** Almost no correct answers were seen from the candidates who attempted this question. Responses were generally poorly expressed. Statements such as 'Because it is now a rectangle', 'It will be different lengths' and 'It's a different shape' suggested that few candidates understood what was being requested.
			Total	**8**	
34			12	1	**Examiner's Comments** Around half the candidates scored this mark. 9 was a common error. **Misconception** Many candidates confused perimeter with area.
			Total	**1**	
35			682.2	3	**M1** for 18 × 10.4 oe soi by 187.2 **M1** for 360 + 90 + 45 + *their* 187.2 oe e.g. 180 × 1.04 May be ratio method with × 18 oe seen *Their* 187.2 from attempt at first M1 and ≠ 180 Addition may be a series of sums or implied by a vertical list with number below

					Accept 495 + *their* 187.2 **Examiner's Comments** This question was less answered well than expected, although a significant number of good answers were presented. The best candidates answered it efficiently. Less successful candidates multiplied 180 by 10.4 rather than 1.04. Candidates who were not successful generally knew they had to do something with 180 and 10.4, but were unsure which operation to use. Some multiplied each of the quantities by 10.4 before adding and some added 360, 90, 45 and 10.4.
			Total	**3**	
36			17.5	2	**M1** for 140 ÷ 8 **Examiner's Comments** Some candidates gave the correct answer, though others multiplied rather than dividing. A small number of candidates calculated 140 ÷ 8^2 or 140 × 8^2.
			Total	**2**	
37			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**		
38			88.16 with correct working	6	**M1** for (6 + 5) × 5.8[0] oe **M2** for $4 \times 5.8[0] \times 1\frac{1}{4}$ oe or **M1** for $4 \times 1\frac{1}{4}$ oe or $5.8[0] \times 1\frac{1}{4}$ oe AND **M2** for 0.95 × (*their* 63.8 + *their* 29) oe or **M1** for 0.05 × (*their* 63.8 + *their* 29) oe If **0, 1** or **2** scored, instead award **SC3** for 88.16 with no working or insufficient working If **0** or 1 scored, instead award **SC2** for 92.8[0] with no working or insufficient working If **0** scored, instead award **SC1** for 34.8 or 29 with no working or insufficient working	"Correct working" requires evidence of at least **3** method marks May be implied by 63.8[0] or 34.8[0] and 29 for Thursday May be implied by 29 for Saturday May be implied by 7.25 *Their* 29 may be 7.25

					Examiner's Comments Many candidates set out their work neatly in a logical order and well labelled, usually leading to at least 3 marks (M1, M2) or (M1, M0, M2). Saturday's cost proved to be the most difficult, as dealing with $1\frac{1}{4}$ was problematic for some. Many were able to correctly calculate the percentage reduction; however, some continue to use non-calculator methods for percentage calculations, often leading to errors. Most candidates who attempted this question gained 1 mark (usually for calculating the cost for Wednesday and Thursday). Exemplar 3  This candidate gained 3 marks for their response. They have correctly calculated and totalled the costs for the three days but have not reduced the total cost by 5%.
			Total	**6**	
39			180	4	**B3** for answer that rounds to 180 OR **M3** for $\frac{[\pi\times]120}{[\pi\times]42} \times 63$ **oe** or **M2** for $\frac{[\pi\times]120}{[\pi\times]42}$ or [π×]120×63 or **M1** for [π×]120 **soi** May be in stages or in metres Implied by 2.85[7...] or 7560 or 23750. …

					376.9... or π × 42 **soi** 131.9...	If multiple calculations refer to general guidance
			Total	**4**		
40			36	2	**M1** for (13 + 5) [× 2] **oe soi** 18	
			Total	**2**		
41			270 g or grams	2 1	**M1** for 300 × 0.9	<u>Alternative method in kg</u> 0.27[0] for **2** marks or **M1** for 300 × 0.0009 If alternative method used **A1** for kg
			Total	**3**		
42			200 with correct working	6	**M1** for 2(x + 1) = 3x – 7 **oe** **M1** for reaching $ax = b$ **FT** *their* equation **A1** for x = 9 OR <u>Trials</u> **M1** for one trial into 2(x + 1) and 3x – 7 evaluated correctly **M1** for two trials of 2(x + 1) and 3x – 7 evaluated correctly **A1** for [w =] 10 and [l =] 20 AND **M2** for (*their* x + 1) × (3 × *their* x – 7) or	"Correct working" requires evidence of at least **M1M1A1** or alternate convincing approach **FT** from an equation with x on both sides only *Their* x must be a positive integer and stated

					M1 for (*their x* + 1) or (3 × *their x* – 7) If **0** or **M1** scored, instead allow **SC2** for answer 200 with no or insufficient working If **0** scored, instead allow **SC1** for $x = 9$ with no or insufficient working	*Their x* or *their* length/width may be on the diagram
			Total	**6**		
43			No with either 121 ≠ 106 or 96 ≠ 81 or 40 ≠ 25	4	**B3** for 106 and 121 OR **M1** for $9^2 + 5^2$ **oe** **M1** for 11^2 or 121 <u>Alternative method 1</u> **B3** for 96 and 81 OR **M1** for $11^2 – 5^2$ **oe** **M1** for 9^2 or 81 <u>Alternative method 2</u> **B3** for 40 and 25 OR **M1** for $11^2 – 9^2$ **oe** **M1** for 5^2 or 25	Do not accept scale drawing Other acceptable comparisons: $\sqrt{106} \neq 11$ or $11^2 \neq 106$ $\sqrt{96} \neq 19$ or $9^2 \neq 96$ $\sqrt{40} \neq 5$ or $5^2 \neq 40$ Note: $9^2 + 5^2 \neq 11^2$, max **M1M1**
			Total	**4**		
44			£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**		

45			$\pi \times 7^2$ *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) $\times \frac{50}{360}$
			Total	**3**	
46	a		e.g. cos must be ≤ 1 *their* adj is > than *their* hyp	1	**Response Mark** The fraction cannot be bigger than 1 **1** The numerator cannot be bigger than the denominator **1** Not using degrees with cos and putting B in the wrong place **0** The student must be wrong because the question said so **0** That is upside down $\frac{5}{6}$ **0** It's the wrong calculation **0** The fraction cannot be bigger than 1 otherwise it's a reflex angle in a triangle which is not possible **0**
	b		38.6[8…] or 38.7	3	**M2** for $\sin^{-1}\frac{20}{32}$ or **M1** for sin[*x*] [=] $\frac{20}{32}$ or 0.625 Accept 38 or 39 after **M1** or **M2** scored Accept full methods using Pythagoras' or cos or tan
			Total	**4**	
47			600	3	**M1** for a correct conversion of litres to millilitres **M1** for figs 16 ÷ (3 + 5) [×3] If **0** scored **SC1** for answer 600 : 1000 or for answer figs 6 e.g. **M1** implied by 1600 with no further conversions
			Total	**3**	

48			7 [cm]	3	**M2** for 420 ÷ (10 × 6) or **M1** for 10 × 6 × *x* [= 420] may be implied by 60*x*	May be done in stages
			Total	**3**		
49			6 hours 15 minutes	4	**B3** for 6.25 **oe** or for answer 6 h 25 min OR **M2** for 5 × 40 ÷ 32 or **M1** for 5 × 40 may be implied by 200	
			Total	**4**		
50			5 with correct working	5	**M1** for 480 × 0.7 or 480 × 70 **M1** for 766 – 110 or 766 – *their* (480 × 0.7) **M1** for 766 – (110 + *their* (480 × 0.7)) **M1** for (766 – (110 + *their* (480 × 0.7))) ÷ 80 <u>Trials</u> **M4** for 480 × 0.7 + 4 × 80 + 110 = 766 **oe** or **M3** for two trials of the form 480 × 0.7 + *n* × 80 + 110 **oe** seen and correctly evaluated where *n* ≥ 1, *n* ≠ 4 or **M2** for one trial of the form 480 × 0.7 + *n* × 80 + 110 seen and correctly evaluated where *n* ≥ 1, *n* ≠ 4	"Correct working" requires evidence of at least **M3** or **M1 M1 M1** *Their* 480 × 0.7 may be 480 × 70 with an attempt to convert to pounds ÷ 80 may be repeated subtraction or addition e.g. for Trials and + 80's **M4** for 480 × 0.7 + 3 × 80 + 110 = 686 and 686 + 80 = 766 **M3** for 480 × 0.7 + 3 × 80 + 110 = 686 **M2** for 480 × 0.7 + 2 × 80 + 110 = 606 or 480 × 0.7 + 80 + 110 = 526

					or **M1** for 480 × 0.7 [+…] If **0**, **1** or **2** scored, instead award **SC3** for answer 5 with no working or insufficient working If **0** or **1** scored, instead award **SC2** for answer 4 with no working or insufficient working If **0** scored, **SC1** for 320 with no working or insufficient working	**M1** for 480 × 0.7 [+ …] For trials and trials + 80's, accept correct rearrangements that have a target of 656, 430 or 320 rather than 766
			Total	**5**		
51		i	6*k* final answer	3	**B2** for correct answer unsimplified or **B2** for 6*k* – 2*g* [+ g + g] or **M2** for 2*k* + *k* + 2*k* – *g* + *k* – *g* [+ g + g] oe or **M1** for [height =] *k* – *g* or [length =] 2*k* – *g*	Condone 6k + 0[*g*] for 3 marks Accept in any order Accept e.g. 2*g* for *g* + *g* Identified or seen on diagram in correct position

Examiner's Comments

Responses here were similar to those of the previous part and candidates demonstrated the same lack of security with algebraic representation.

Very few candidates realised by inspection that the perimeter must be 6*k* and was independent of the value of *g*.

					A significant number did not attempt this question.
		ii	10.4 nfww	2	**M1** for *their* **part (i)** = 62.4 or $\frac{62.4}{6}$ *Their* part (i) must be algebraic in terms of k or k and g *Their* (a) can be rearranged Note : $6k - 2g$ = 62.4 scores M1 but does not score the second mark as from wrong working **Examiner's Comments** Many candidates showed no clear strategy to solve the problem. A few gained M1 for writing their answer to (c) (i) = 62.4, but if that contained g they found themselves unable to make further progress. 62.4 ÷ 2 or 62.4 ÷ 4 were popular incorrect methods. A very few candidates took 62.4 to be the value of k and tried to work out the perimeter. **Assessment for learning** Candidates need to be confident with generalising common situations.
			Total	**5**	
52			$\frac{1}{5}$	3	**B2** for $\frac{400}{2000}$ oe or **B1** for 2000 [m] or [0].4 [km] Condone $\frac{0.4}{2}$ or 0.2 or 20% for **B2** Conversion must be correct **Examiner's Comments**

					A large number of candidates did not get this right, very often due to incorrect kilometre to metre conversions. 200 metres was a popular conversion, leading to fractions such as '$\frac{400}{200}$'. Others did not convert and both '$\frac{2}{400}$' and '$\frac{400}{2}$' were seen. Some candidates gained B2 for '$\frac{400}{2000}$', with either incomplete or no further simplification. **Assessment for learning** Candidates need to be familiar with metric conversions.
			Total	**3**	
53			201 or 201.1 or 201.06 to 201.09	2	**M1** for $\pi \times 8^2$ oe π gives 201.0619... 3.142 gives 201.088 For **M1** π may be evaluated allowing $\frac{22}{7}$ or 3.14 or 3.142 **Examiner's Comments** Many candidates gained at least the method mark here for $8^2\pi$ or 64π and many gained the second mark for correctly evaluating their formula. Common incorrect methods included $8\pi^2$, $4^2\pi$ and $16^2\pi$, as well as calculations of the circumference.
			Total	**2**	
54		i	12	1	**Examiner's Comments**

					A fairly significant number of candidates did not answer this correctly. 8 was a common incorrect answer, perhaps through confusing 'edges' with 'faces', but 9, 10 and 11 were also seen.
		ii	350	2	**M1** for 7 × 10 × 5 oe | Accept e.g. 70 × 5 **Examiner's Comments** Most candidates showed working for this question. The best candidates showed the whole calculation and gave the correct answer. Some did it in stages. Common errors were to instead calculate the cuboid's surface area, or to sum all the lengths of edges around the cuboid (presumably from confusion with perimeter), both of which involved lengthy calculations. 70 and 35 (from the area of single faces) as well as 22 were also common wrong answers. Some candidates found the volume of 350 and then divided by 2.
			Total	**3**	
55			$(x – 2)(x + 7)$ $x^2 – 2x + 7x – 14$ or better $x^2 + 5x – 14 = 70$ or $x^2 – 2x + 7x – 14 = 70$	B1 M2 A1	**B1** implied by $(x - 2)$ and $(x + 7)$ in a multiplication grid Condone missing final bracket e.g. $(x - 2)(x + 7$ **M1** for 3 out of 4 terms correct | $+5x$ is two terms **A1** dep on **B1M2** With no errors leading to the answer | A1 alternatives: $x^2 + 5x – 14 – 70 = 0$ or $x^2 – 2x + 7x – 14 – 70 = 0$ **Examiner's Comments**

					This question was a challenge for almost all candidates. There was a high proportion who did not attempt it and marks were not given regularly. The majority of attempts worked with the given equation rather than using the information provided to arrive at that equation. Some candidates attempted to find the perimeter of the shape (in contrast with Question 23 earlier).
			Total	**4**	
56	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 — *their (a)* must be > 0.4 **M2** implied by repeated addition or subtraction to one less than *their* (*a*) or *their* (*a*) ×

					M1 for *their* (*a*) × 1000 or 400 ÷ 1000 or *their (a)* ÷ figs 4	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 $\frac{50}{4}$.

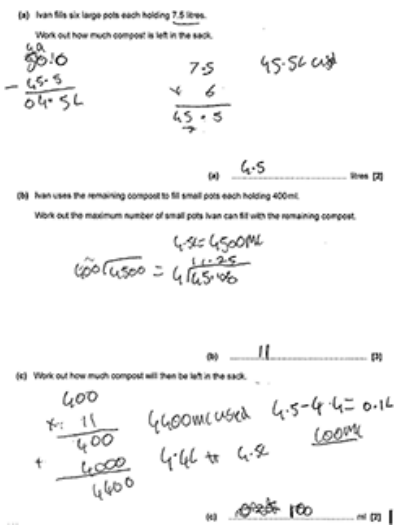
Many candidates picked up the M2 for a correct method without a correct answer, but the B2 was rarely given as almost all that reached '12.5' then went on to the correct answer and full marks.

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.

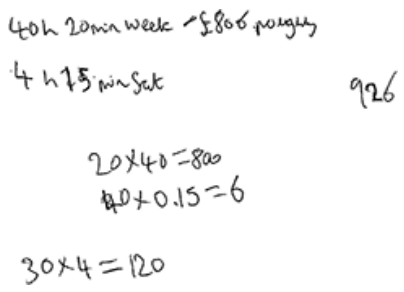
Assessment for learning

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**	
57	a		Three of 20[.00], 30[.00], 40 and 4 seen 40 × 20 4 × 30 920 or 800 and 120	B1 M1 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 $40\frac{1}{3}$, 40.3, 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.

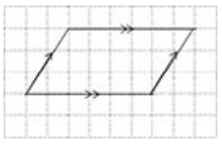
					Exemplar 3  At a glance it might look like this candidate has rounded all the values, but in fact they have not rounded the £20.15 wage. Instead, they have partitioned it and multiply both partitions by 40. Three rounded figures is sufficient for the B1 however, so it is given. M1 is given for '40 × *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**	
58			180	2	**M1** for 15 × 12 **oe** If 0 scored, **SC1** for 180000[ml] Repeated addition, we must see their method, allow one arithmetic error. e.g. 15, 30, 45, 60, 75, 90 then 90×2 [=180] **Examiner's Comments** The majority of candidates were able to achieve at least M1 with this question. The vast majority attempted 15 × 12, with many going on to achieve the correct answer of 180. Those given M1 had generally either made a mistake in their long multiplication or attempted repeated addition and made at least one numerical error. Most attempting repeated addition added up 15 twelve times rather than 12 fifteen times.
			Total	**2**	
59			= < <	3	**B1** for each **Examiner's Comments**

					The vast majority of candidates attempted this question, however there was very little evidence of converting units to a common form. Those responses that did not achieve any marks often did not show any conversions. Some candidates seemed to believe each of the three symbols had to be used once, rather than using an appropriate symbol for each statement (as has been seen in responses to similar questions in previous series). **Misconception** Candidates are **not required** to use every given symbol in questions such as this. Instead, they should separately consider which symbol is appropriate for each individual statement.	
			Total	**3**		
60			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	"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

					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	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**		
61			83.9… or 84 or $83\frac{13}{14}$	2	**M1** for $\frac{47\,000}{560}$ or **B1** for answer 83 with no working **Examiner's Comments** The majority of candidates performed the correct calculation and those that did almost always arrived at the correct response (it was rare for a candidate to choose 83 as their response). The common errors were either using 560^2 in their calculation or working out 560 ÷ 47 000.	
			Total	**2**		

62			17	4	**M3** for $\sqrt{(\text{their } 8)^2 + 15^2}$ or $\sqrt{289}$ or **M2** for (*their* 8)^2 + 15^2 or **B1** for 8	*their* 8 must be from an attempt at 20 - 12 8 must be their missing base length **B1** for 8 may be implied by use of 8^2 in a Pythagoras statement eg 15^2 = 8^2 + x^2
			Total	**4**		
63		i		1 1 dep	Correct parallelogram drawn **dep** on parallelogram drawn Accept other, complete, standard notations that indicate a parallelogram eg two pairs of opposite sides have equal length or two pairs of opposite angles are equal or any	Accept reasonable freehand, tolerance ± 2mm by eye Mark intent Arrows must be correct single/double and pointing in correct direction

Examiner's Comments

This question was only correctly answered by a few candidates, which were those who recognised it as a Pythagoras' theorem problem. Many candidates tried to use the area of a trapezium formula, responding as if it was an area question rather than one to find a length. Some candidates added the given lengths together and gave the response 47 cm, or did some other combination of calculations with the lengths on the diagram.

					combination of these properties that define a parallelogram	
					Examiner's Comments Many were able to correctly complete the parallelogram with the correct notation. The most common error was to draw a trapezium.	
		ii	18 nfww	2	**FT** *their* parallelogram **M1** for *their* length × *their* perpendicular height oe	e.g. 6 + 3 + 6 + 3 = 18 scores 0 **M1** and **2** marks are dependent on a parallelogram being drawn in (i) Must be in cm^2 If not 6 and 3 *their* dimensions need to be verifiable eg shown on the diagram eg **M0** for $\sqrt{13}$ or 3.6… etc as *their* perpendicular height oe includes two triangles + the 4 × 3 rectangle or the 8 × 3 rectangle – two triangles Need to be certain that 3 is slant height to withhold the marks
					Examiner's Comments To be given marks here, candidates needed to have drawn a parallelogram in (c)(i). Use of a slant height for the perpendicular height was a common error. Some candidates found their shape's perimeter rather than area.	
			Total	**4**		

64			24	3	**M2** for $\frac{6\times1000\times100}{25000}$ oe or **M1** for 6 × 1000 × 100 may be implied by 600 000 or for $\frac{\text{figs } 6}{\text{figs } 25}$ may be implied by answer figs 24	Condone (figs 6 or figs 15) × 1000 × 100 **Examiner's Comments** This part proved more challenging than (a), with few candidates given marks. Successful candidates usually started by converting 6 km to cm, however only a minority of candidates carried out the correct process and many made errors in the conversions. Some recognised that division was required and gained M1 for 'figs 6' ÷ 'figs 25', but were unable to go on to reach the correct final response. Many candidates just calculated 6 × 25 000 and gave an answer of 'figs 150 000'.
			Total	**3**		
65			20	3	**M1** for $1\frac{1}{2}$ and $\frac{1}{2}$ correct in consistent units **M1** for division in correct order between *their* converted $\frac{1}{2}$ and $1\frac{1}{2}$ OR **M1** for $1\frac{1}{2}$ and $\frac{1}{2}$ correct in consistent units	**M0 M1** is possible in either method $1\frac{1}{2}$ or $\frac{3}{2}$ or 1.5 and 30; 90 and 1800; $\frac{1}{40}$ and $\frac{1}{2}$ or 0.025 and 0.5 Conversions may be incorrect but clearly represent $1\frac{1}{2}$ and $\frac{1}{2}$ e.g. $\frac{1}{2}$ ÷ 1.5

					M1 for three correct consecutive/linked terms	$1\frac{1}{2}$ or $\frac{3}{2}$ or 1.5 and 30; 75 and 1800; $\frac{1}{40}$ and $\frac{1}{2}$ or 0.025 and 0.5 e.g. $\left[1\frac{1}{2}, 1\right]$ 3, 2 $4\frac{1}{2}, 3$ 6, 4 12, 8 24, 16 … or [1m 30s, 1] 3m, 2 4m 30s, 3 …
			Total	**3**		
66			10 with correct working	6	**M1** for $\frac{12 \times 8}{2}$ **M1** for width of rectangle = *their* $\frac{12 \times 8}{2} \div 6$ **A1** for [width of rectangle =] 8 AND **M2** for $\sqrt{6^2 + (\textit{their}\ 8^2)}$ or better or **M1** for [d^2 =] $6^2 + (\textit{their}\ 8)^2$ If **0, 1** or **2** scored, instead award **SC3** for answer 10 with no or insufficient working If **0** or **1** instead award **SC2** for [width of rectangle =] 8 with no or insufficient working If **0** scored, instead award **SC1** for [area of triangle =] 48 with no or insufficient working	"Correct working" requires evidence of at least M1A1 AND M1 M1 Allow embedded e.g. 6 × 8 = 48 Could be shown on the diagram *their* 8 must be clearly identified as the width of the rectangle, e.g. written on the diagram. Eg SC3 Insufficient working includes statement that 6, 8, 10 is a Pythagorean triple

			Total	**6**		
67			800 with correct working	6	**M1** for 3 × 1.30 + 2 × 0.85 **oe** or 3.9[0] + 1.7[0] **A1** for 5.6[0] AND **M1** for (8 – *their* 5.6[0]) **oe** **A1** for 2.4[0] AND **M1** for *their* 2.4[0] ÷ 1.2[0] [× 400] **A1FT** for *their* 2.4[0] ÷ 1.2[0] rounded down × 400 If **0** or **1** scored, instead award **SC2** for answer 800 with no or insufficient working If **0** scored, instead award **SC1** for 2.4[0] with no or insufficient working	"Correct working" requires evidence of at least two M marks and one A mark Allow working in pence provided consistent units used 5.6[0] implies M1A1 Could be implied by *their* 5.6[0] + *their* 2.4[0] + *their* 'change' [= 8.0[0]] Implied by list 1.2[0], 2.4[0], [3.6[0], …] up to one less than *their* 2.4[0] or Embedded 2 × 1.2[0] = 2.4[0] <u>Alternative Method</u>: For first M1A1 M1A1 M1 for 8 - 3 × 1.30 or 8 - 2 × 0.85 A1 for 4.1[0] or 6.3[0] AND M1 for 8 - 3 × 1.30 - 2 × 0.85 or *their* 4.1[0] - 2 × 0.85 or *their* 6.3[0] - 3 × 1.30 A1 for 2.4[0]
			Total	**6**		
68			131.24	2		

					M1 for 19.3 × 6.8	Allow 131.2 for **2** marks after **M1**
			Total	**2**		
69			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 insufficient working	"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**
			Total	**4**		
70	a		34	2	**M1** for $\frac{4\times(10+7)}{2}$ **oe** or 4 × 7 + $\frac{4\times3}{2}$ **oe** or 4 × 10 – $\frac{4\times3}{2}$	Implied by 28 + 6 Implied or by 40 – 6
	b		45	2		

					B1 for $d = 90$ seen or **M1** for $2\pi r = 90\pi$ or for $\pi d = 90\pi$ or $\frac{90}{2}$	Accept e.g. $[r =]\frac{90\pi}{2\pi}$
			Total	**4**		
71			12π final answer	3	**M1** for $\pi \times 3^2 \times \frac{4}{3}$ **oe** **M1dep** for $\pi \times 9 \times \frac{4}{3}$ or $\pi \times 3 \times 4$ or $\frac{36\pi}{3}$ or π12 **oe**	Accept 12 × π do not accept π12 for 3 marks For method marks accept π = 3.14[2…..] and 1.33[3…..] for $\frac{4}{3}$
			Total	**3**		
72			6	3	**B1** for $\cos 60 = \frac{1}{2}$ **oe** **M1** for $\cos 60 = \frac{a}{12}$ or better	Accept any letter or correct identification for *a* e.g. *x* or adjacent **M1** implied by 12 × cos 60 **oe** <u>Alternative method:</u> **B1** for $\sin 30 = \frac{1}{2}$ **oe** **M1** for $\sin 30 = \frac{a}{12}$ or better Accept equivalent Sine Rule application
			Total	**3**		
73	a		29	2	**B1** for answer 0.29 or **M1** for 123 – 94 or 1.23 – 0.94	For **M1** allow embedded calculations, e.g. 94 + 29 = 123
	b		0.2 [*Kg*], 240 [*g*], 0.249 [*Kg*], $\frac{1}{4}$[*Kg*]	2		For **2** marks accept correct equivalents

					B1 for 3 values in correct order or for 0.24 and 0.25 or for 250, 200 and 249	[with correct units stated] Use "cover up" method
			Total	**4**		
74	a		Town C marked 4.8 to 5.2 cm from B and on a bearing of 228° to 232°	2	**M1** for either length or bearing correct If 0 scored **SC1** for correct point from A	Allow unambiguous indication if a cross is not seen.
	b		35	2	**M1** for [AB=] 6.8 [cm] to 7.2 [cm] or for *their* written AB in cm × 5	For **2** marks accept answers in the range 68 to 72 AB must be stated. Method may be seen on the diagram.
			Total	**4**		
75			29	4	**M1** for 11 × 20 implied by 220 **M1** for *their* 220 + 70 implied by 290 **M1** for *their* total earnings ÷ 10 (could be implied by their answer) <u>Additional method:</u> **M1** for 70 – 20 × [10 – 11] (they are using the difference of £1) **M1** for 90/10 (difference divided by Sam's rate of pay) **M1** for 20 + 9	<u>Alternative method:</u> **M1** for 11 × 20 implied by 220 **M1** for 70 ÷ 10 and *their* 220 ÷ 10 **M1** for 22 + 7

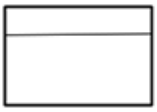
			Total	**4**		
76			44 final answer	4	**B3** for 44.46 or 44.5 OR **M1** for 130 × 190 implied by 24 700 **M1** for *their* 130 × 190 ÷ 10 000 may be implied by 2.47 or 2 hectares and 4700 or 20 000 and 4700 **M1** for *their* 2.47 × 18 If **0** scored instead award **SC1** for answer 36	Allow alternate methods e.g. **M1** for 130 × 190 implied by 24 700 **M1** $\frac{10000}{18}$ = 555.5 rec or 556 **M1** for *their* $\frac{24700}{556}$ *Their* 2.47 must come from multiplication to find area
			Total	**4**		
77			142	3	**M2** for [2](3×5 + 3×7 + 5×7) or **M1** for (3 × 5) or (3 × 7) or (5 × 7) may be implied by 15, 21, 35	Implied by 71 Any attempt at volume scores 0
			Total	**3**		
78	a		312.5	2	**M1** for 1875 ÷ 6	1875/360 must have × 60 to compare to original M1
	b		They can maintain the same average speed Same weather/track conditions No hills They don't get tired	1	**Response Mark** Will not get tired **1** They can continue to run 312.5 m per minute **1** They can run 7500 more in 24 minutes **1** That their speed stays the same the whole time **1** Their stamina will stay the same **1** They won't stop for a break **1**	

					The weather conditions will be the same **1** They can run 5 × the distance in 5 × the time **1** They might be wrong because their breathing might go and collapse before they can make it **1** They won't run out of energy **1** They assumed that they can run for longer distances than they have **1 bod** They would be going one constant speed no stops **1 bod** That their speed is constant **1 bod** That they can run further in longer time **0** They are right in calculation but they can't run with speed equal to 312.5 m/min **0** That because they did 1875 in 6 minutes they can just multiply it by 5 and do more **0** The timing is wrong nobody can do 9375 in 30 minutes **0** They won't be able to maintain their speed the whole way **0** They think they can do a longer run quicker than they can do a shorter run **0** If they double the length their time will automatically double **0** That they can run 9375 in 30 minutes/ run that far in 30 minutes **0** They can run 312.5 m per minute **0**
			Total	**3**	
79			5 nfww	4	**B2** for [*a* =] 8 or **M1** for 9*a* = 72 or better and **M1** for showing substitution/use of their *a* e.g. 4 × *their* 8 + 8*b* = 72 oe or better or [*b* =] (18 – *their* 8)/2 If another value for *a* is used to find *b* do not award B2 T&I only scores if ending at 8 or better may be e.g. *a* + 2*b* = 18 or $\frac{72-4\times \textit{their}\ 8}{8}$
			Total	**4**	
80			290.5[0]	3	

					M2 for $\frac{5}{3}\times$ 24.9[0] × 7 oe or **M1** for $\frac{5}{3}\times$ 24.9[0] oe soi by 41.5[0] or 24.9[0] × 7 soi by 174.3[0]	Accept only 290.5[0] for 3 marks Accept $1\frac{2}{3}$ or 1.6[66...] or 1.67 for $\frac{5}{3}$ oe = 24.9 ÷ 3 = *a*, *a* × 5 × 7 oe = 24.9 ÷ 3 = *a*, *a* × 5
			Total	**3**		
81			159.7[…] or 160	4	**M1** for [rectangle] 21 × 10 soi 210 **M1** for [circle] π × 4^2 oe, soi by 50.2 to 50.3 **M1** for *their* rectangle area – *their* circle area If **0** or **1** scored, instead award **SC2** for answer 8.93[…]	Method for rectangle and circle areas spoilt by additional steps in initial area calculations e.g. **M0** for 21 × 10 × 2 Do not lose **M1** for [rectangle] or **M1** for [circle] if further work does not include these, provided it is not contradicted by further method *Their* circle area should be from π × 4^2 or π × 8^2 e.g. soi by 201.[…] **not** 2π*r*
			Total	**4**		
82			10:35 [am] with correct working	5	**M1** for 5 × 25 + 85 oe **A1** for 210	"correct working" requires evidence of at least **M1 M1**

					M1 for *their* 210 correctly converted into hrs and mins or decimal hours soi by 3 h 30 m or 3.5 [h] **M1** for 2:10 – *their* time If **0**, **1** or **2** scored, instead award **SC3** for answer 10:35 [am] with no working or insufficient working If **0** or **1** scored, instead award **SC2** for 3 h 30 m or 3.5 [h] with no working or insufficient working If **0** scored, **SC1** for 210 with no working or insufficient working	Provided *their* 210 is not a multiple of 60 Do not accept 3.3 hours as a correct conversion from 3 h 30 m, but condone 3.3 used in the next step *Their* time may be in whole hours, minutes, hrs and mins or decimal hours
			Total	**5**		
83	a		$x + 160$	1		
	b		200 nfww	4	**B1** for $5x$ **M1** for $5x$ = *their* $(x + 160)$ **A1FT** for $x = 40$	*their* $(x + 160)$ cannot be numeric and must lead to an equation that can be solved when equated to $5x$ e.g. if *their* $(x + 160)$ is $5x$ then M0 FT correctly solving *their* linear equation in x

			Total	**5**		
84	a		$\frac{1}{2}$	1		
	b		9	2FT	**B2FT** for final answer 6, $9\sqrt{3}$, $6\sqrt{3}$ or 4.5 or 4½ if consistent with *their* (a) or **M1** for 18 × $\frac{1}{2}$ or 18 × *their* (a)	For 1 or 2 marks, isw attempts to simplify the surds May be implied by their answer Ignore units
			Total	**3**		
85			35.91 with correct working	6	**M1** for $\frac{1}{2}$ × 10 × 25 oe **A1** for 125 **M1** for *their* area ÷ 15 soi by 8.3... or repeated addition of 15 to at least 120 or to the multiple of 15 below *their* area oe **A1FT** for [number of bags =] 9 or *their* area ÷ 15 rounded up to an integer **M1** for *k* × 3.99 **A1FT** for 35.91 or *k* × 3.99 evaluated correctly If 0 or **M1** scored, instead award **SC2** for answer 35.91 with no or insufficient working.	correct working requires evidence of at least **M1M1** 125 implies M1A1 From an area, not a perimeter or length Allow 1 arithmetic slip in their list May be implied by their final calculation of cost Where *k* is an integer but not *k* = 1 or 10 Mark the calculation that leads to their final answer
			Total	**6**		
86			56 nfww	4	**B2** for length of rectangle = 10	

					Or **M1** for 6 ÷ 3 × 5 **M1** for 6 × 6 + 2 × *their* length **oe**	
			Total	**4**		
87	a	i	Rectangle 7 by 6 with one internal line 2 cm from the longer edge 	3	**B1** for a rectangular side **B1** for 7 by 6 or for any rectangle with one line drawn inside parallel to longer edge	Accept in any orientation e.g. 7 by 6 scores **B1B1** 7 by 6 with wrong line scores **B1B1** 7 by 5 scores **B1B0** 7 by 5 with one line scores **B1B1**
		ii	6 × 3 × 7 ÷ 2 [=63]	M2	**M1** for 6 × 3 ÷ 2 **oe** or for their area or cross section × 7	May be done in stages
	b		14	3	**M2** for 56 ÷ 2^2 **oe** Or **M1** for h × 2 × 2 = 56 **oe** or for 2^2 = 4 **oe**	
			Total	**8**		
88			14 **nfww**	3	**M2** for $[h=]\frac{7}{\sin 30}$ Or **M1** for sin30 = $\frac{7}{h}$	Accept alternative methods e.g. **M2** for $[h=]\frac{7}{\cos 60}$ Or **M1** for cos60 = $\frac{7}{h}$
			Total	**3**		
89			4 [hours] 46 [minutes] with correct working	6	**B5** for 4.76[…] or 4 [hours] 45.7[6…] [minutes]	'Correct working' requires evidence of at least **M2** or

					or $4\frac{16}{21}$ or 286 [minutes] with correct working **oe** OR **M1** for 48 × 5 **soi** by 240 **M2** for $\frac{14\times60\times60}{1000}$ or better Or **M1** for 14 × 60 × 60 **oe** or $\frac{14}{1000}$ **oe** **M1** for *their* 240 ÷ *their* $\frac{14\times60\times60}{1000}$ <u>Alternative method</u> **B5** for 4.76 [...] or 4 [hours] 45.7[6…] [minutes] or $4\frac{16}{21}$ or 286 [minutes] with correct working OR **M1** for 48 × 5 **soi** by 240 **M2** for $\frac{\textit{their}\ 240\times1000}{14}$ Or **M1** for *their* 240 × 1000 or for *their* $\frac{240}{14}$ **M1** for $\frac{\textit{their}\ 17142\ \text{to}\ 17143}{60\times60}$ If **0** or **M1** scored, instead award **SC2** for 4 [hours] 46 [minutes] with no working or insufficient working	**M1M1** Accept other alternative methods 'Correct working' requires evidence of at least **M2** or **M1M1**
			Total	**6**		
90			89.2 to 89.3 **nfww**	4	**M1** for 5 × 10 may be implied by 50 AND	50 must not come from wrong working Not part of

					M2 for $\frac{1}{2} \times 5^2\pi$ **soi** by 39.2 to 39.27 Or **M1** for $5^2\pi$ **soi** by 78.5 to 78.54	longer multiplication e.g. 5 × 10 × 5
			Total	**4**		
91	a		$x \times x$ or $4(x + 3)$ seen $x^2 = 4x + 12$ or $x^2 = 4(x + 3)$ Correctly rearranging to $x^2 – 4x – 12 = 0$ without error	M1 M1dep A1	Dependent on first **M1** and not from rearrangement of original equation	Allow [area of] square = x^2 or [area of] rectangle = $4x + 12$ x^2 and/or $4x + 12$ may be written with correct shape(s)
	b		$^-2$ 6 **nfww**	3	**B2** for one correct solution **nfww** OR **M2** for $(x + 2)(x – 6) = 0$ Or **M1** for $(x + a)(x + b)$ where $ab = -12$ or $a + b = ^-4$ OR **M2** for two correct trials using $^-4 \le x \le 0$ and two correct trials using $4 \le x \le 8$ Or **M1** for two correct trials using $^-4 \le x \le 0$ or two correct trials using $4 \le x \le 8$ If **0** scored **SC1** for answers 2 and $^-6$	e.g. one trial is when $x = 2$, $2^2 – 4 \times 2 – 12 = ^-16$ Accept as trial $x = 2$ and $^-16$ x

$^-4$	16	16	$^-12$	20
$^-3$	9	12	$^-12$	9
$^-2$	4	8	$^-12$	0
$^-1$	1	4	$^-12$	$^-7$
0	0	0	$^-12$	$^-12$

4	16	$^-16$	$^-12$	$^-12$
5	25	$^-20$	$^-12$	$^-7$
6	36	$^-24$	$^-12$	0
7	49	$^-28$	$^-12$	9
8	64	$^-32$	$^-12$	20

	c		Length [of square] cannot be negative	1	Dependent on negative answer in **(b)**	Do not accept *x* cannot be negative
	d	i	36	1	FT (*their* positive root from **(b)**)^2	If two positive roots seen in **(b)** accept either or both used in **(d)(i)** and in **(ii)** BUT, if one answer right and one wrong in any part, **0** marks
		ii	9	1	FT (*their* positive root from **(b)**) + 3	
			Total	**9**		
92			120 with correct working	5	**B3** for 15 as third side with correct working Or **M2** for $\sqrt{17^2-8^2}$ **oe** Or **M1** for $17^2 = 8^2 + [DC^2]$ OR **M1** for $\angle BDC = \sin^{-1}\left(\frac{8}{17}\right)$ **oe** or $\angle CBD = \cos^{-1}\left(\frac{8}{17}\right)$ **oe** **M1** for 17 cos *their* ∠BDC or 17 sin *their* ∠CBD AND **M1** for 8 × *their* DC (or AB) If **0** or **1** scored with no/insufficient	For full marks, correct working requires Pythagoras or trig leading to 15 For **B3** 'correct working' requires evidence of **M2** or **M1** or mention of 8 : 15 : 17 triangle 28.0 to 28.1 or 61.9(…) **oe** may be in ΔABD *Their* DC (or AB) not = 17 If **M1** scored and **SC2** available,

					working, **SC2** for answer 120 Or if **0** scored with no/insufficient working, **SC1** for 15 as third side	award **SC2** only May be on diagram
			Total	**5**		
93			450	4	**B1** for [area of face =] 25 **B1** for [total number of faces =] 18 **M1** for *their* number of faces × *their* 25 <u>Alternative method</u> **B1** for [area of face =] 25 **B1** for [total surface area of cube =] 150 **M1** for *their* 150 × 4 – 6 × *their* 25 **oe** <u>Alternative method</u> **B1** for [area of face =] 25 **M1** for 24 × *their* 25 **soi** 600 **M1** for *their* 600 – 6 × *their* 25	e.g. 1 + 1 + 2 + 1 + 2 + 3 + 4 + 4 or 4 + 6 + 8 May be in stages e.g. 4 × 25 + 6 × 25 + 8 × 25 Accept other alternative methods
			Total	**4**		
94			10 with correct working	5	**B1** for 4000 [cm] or [0].7[0] [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 both seen and one incorrect award **B0** Correct working requires all part marks **soi** At least 4 repeated additions or repeated subtractions May have indication of

					If **0** scored with no/insufficient working **SC2** for answer 10 Or **SC1** for answer 0.1	continuing 57 implies **M2 B1** 4000 – 3990 implies **M3 B1** May be (*their* 57.1(…) – 57) × 70
			Total	**5**		
95			195	4	**B3** for answer that rounds to 195 OR **M3** for $\frac{[\pi\times]130}{[\pi\times]46}\times 69$ oe or **M2** for $\frac{[\pi\times]130}{[\pi\times]46}$ or $[\pi\times]130\times 69$ or **M1** for π × 130 soi 408.4... or π × 46 soi 144.5...	May be in stages or in metres Implied by 2.82[6...] or 8970 or 28180. … If multiple calculations refer to general guidance
			Total	**4**		

Examiner's Comments

Most candidates attempted this question, but very few showed an idea of how to answer it.

As candidates were not directed towards circumference, few calculated it for either wheel and most just tried as many calculations with 130, 46 and 69 as they could, but without success. A number of candidates calculated the area of the wheels.

Some correct partial calculations were seen, but then spoiled such as (130 ÷ 46) ÷ 69. A few candidates worked out 130 ÷ 46 = 2.826..., but then used 2.8 in further calculations (rather than keeping it on their calculator) causing their response to not be integer.

96			28	2	**M1** for (11 +3) [× 2] oe soi 14 **Examiner's Comments** Many correct calculations were seen. The common error was 11 × 3. A few calculated 11 × 3 × 11 × 3.
			Total	**2**	
97			No with either 144 ≠ 136 or 108 ≠ 100 or 44 ≠ 36	4	**B3** for 136 and 144 OR **M1** for $10^2 + 6^2$ oe **M1** for 12^2 or 144 Alternative Method 1: **B3** for 108 and 100 OR **M1** for $12^2 - 6^2$ oe **M1** for 10^2 or 100 Alternative Method 2: **B3** for 44 and 36 OR **M1** for $12^2 - 10^2$ oe **M1** for 6^2 or 36 Do not accept scale drawing Other acceptable comparisons: $\sqrt{136} \neq 12$ or $12^2 \neq 136$ $\sqrt{108} \neq 10$ or $10^2 \neq 108$ $\sqrt{44} \neq 6$ or $6^2 \neq 44$ Note: $10^2 + 6^2 \neq 12^2$ Max M1M1 **Examiner's Comments** Most attempts at this question tried to use a 'scale drawing', but without using compasses as would have been required. Very few candidates linked the mention of a right-angled triangle and being given three side lengths to their knowledge of Pythagoras' theorem. Often, candidates attempted to use angles in a triangle.
			Total	**4**	
98			£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**		
99			630 g or grams	2 1	**M1** for 900 × 0.7	Alternative in Kg: 0.63[0] for 2 marks

					or M1 900 × 0.0007 If Alternative Method used A1 for Kg	
					Examiner's Comments Candidates often struggled to show an appreciation for the context of the question and many did not attempt it. There were very few candidates that showed understanding of density = $\frac{\text{mass}}{\text{volume}}$. Candidates often picked up a mark for an attempt to multiply the two values, however most of these struggled with the place value of the calculation. Very few candidates wrote a correct unit for their calculation, with many writing 'g^3'.	
			Total	**3**		
100			200 with correct working	6	**M1** for 2 (x + 2) = 3x – 4 oe **M1** for reaching ax = b FT *their* equation **A1** for x = 8 OR <u>Trials</u> **M1** for one trial into 2(x + 2) and 3x - 4 evaluated correctly	"Correct working" requires evidence of at least **M1M1A1** or alternate convincing approach FT from an equation with x on both sides only.

					M1 for two trials of $2(x + 2)$ and $3x - 4$ evaluated correctly **A1** for [w =] 10 and [l =] 20 AND **M2** for (*their* x + 2) × (3 × *their* x – 4) or **M1** for (*their* x + 2) or (3 × *their* x – 4) If **0** or **M1** scored, instead allow **SC2** for answer 200 with no or insufficient working If **0** scored, instead allow **SC1** for $x = 8$ with no or insufficient working	*their* x must be a positive integer and stated *their* x or *their* length/width may be on the diagram

Examiner's Comments

There were very few candidates that recognised the need to set-up and solve an equation here and very few marks were given.

There was frequent evidence of very poor algebraic skills. Often a candidate would 'simplify' the expressions given in the question and state '$x + 2 = 2x$' and '$3x – 4 = -2x$'.

Most candidates achieving marks did so for trial and improvement methods. Rarely was evidence seen to give marks for finding the value of x, but marks were given for substituting their value of x into the expressions for the width and length and subsequently multiplying these together.

					A few did reach 10 and 20, but not algebraically and so were given a maximum of 2 marks for multiplying their length of 20 by their width of 10. The most common misconception was to work with the area $(x + 2)(3x – 4)$ immediately.
			Total	**6**	
101	a		Eg sin must be ≤ 1 their opp is > than their hyp	1	The fraction cannot be bigger than 1 **1** The numerator cannot be bigger than the denominator **1** Not using degrees with sin and putting B in the wrong place **0** The student must be wrong because the question said so **0** That is upside down $\frac{4}{5}$ **0** It's the wrong calculation **0** The fraction cannot be bigger than 1 otherwise it's a reflex angle in a triangle which is not possible **0** **Examiner's Comments** Many candidates did not respond, but a few candidates showed understanding that the fraction needed to be less than one and gave a correct explanation. A common error was stating it should say sin *A* not sin *B*.
	b		53.1[3…]	3	**M2** for $\cos^{-1}\frac{24}{40}$ or **M1** for $\cos [x] [=] \frac{24}{40}$ or 0.6 Accept 53 after **M1** or **M2** scored Accept full methods using Pythagoras or sin or tan **Examiner's Comments** As with part (a), many did not attempt this question. Of those who did, few realised the need to use trigonometry. Some wrote a list of trigonometric formulae (which were included on the formulae sheet given to

					candidates this series), but few were able to select and use the correct one. More opted to use sine than cosine, however those who did correctly identify cosine were frequently unable to substitute the given values correctly.
			Total	**4**	
102			$\pi \times 5^2$ $their(\pi \times 5^2) \times \frac{70}{360}$ 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**	
103			600	3	**M1** for a correct conversion of litres to millilitres **M1** for figs 15 ÷ (2 + 3) [×2] If **0** scored **SC1** for answer 600 : 900 or for answer figs 6 eg **M1** implied by 1500 with no further conversions **Examiner's Comments** Many candidates showed some understanding of ratio and shared the given total into 5 parts. A common error was instead to either multiply or divide the given total by both 2 and 3, producing two values that were then stated to be the quantities of red and yellow paint. Several candidates made errors when converting between ml

					and litres, for example using 100 ml in a litre, while others omitted the conversion entirely. Successful candidates mostly first divided by 5 (× 2) and then multiplied by 1000.
			Total	**3**	
104			4 [cm]	3	**M2** for 240 ÷ (12 × 5) or **M1** for 12 × 5 × *x* [= 240] may be implied by 60*x*. May be done in stages **Examiner's Comments** The correct response was often provided by candidates, usually with working. A common error was to add the dimensions rather than multiply them. Some wrote 5 × 12 = 60, but were unable to make further progress.
			Total	**3**	
105			6 hours 15 minutes	4	**B3** for 6.25 oe or for answer 6 h 25 min OR **M2** for 6 × 50 ÷ 48 or **M1** for 6 × 50 may be implied by 300 **Examiner's Comments** **Misconception**

					0.25 hours is not equivalent to 25 minutes. Few candidates were able to give the correct response. Several gained 3 marks for 6 hours 25 minutes, or responding with 6.25 hours without converting the .25 of an hour into 15 minutes. Others calculated 50 × 6 = 300, but were unable to make further progress.	
			Total	**4**		
106			6 with correct working	5	**M1** for 560 × 0.6 or 560 × 60 **M1** for 916 – 130 or 916 – *their* (560 × 0.6) **M1** for 916 – (130 + *their* (560 × 0.6)) **M1** for (916 – (130 + *their* (560 × 0.6))) ÷ 90 <u>Trials</u> **M4** for 560 × 0.6 + 5 × 90 + 130 = 916 oe or **M3** for two trials of the form 560 × 0.6 + *n* × 90 + 130 oe seen and correctly evaluated where $n \geq 1$, $n \neq 5$ or **M2** for one trial of the form 560 × 0.6 + *n* × 90 + 130 seen and correctly evaluated where $n \geq 1$, $n \neq 5$ or **M1** for 560 × 0.6 [+…]	"Correct working" requires evidence of at least **M3** or **M1 M1 M1** *Their* 560 × 0.6 may be 560 × 60 with an attempt to convert to pounds ÷90 may be repeated subtraction or addition egs for <u>Trial and +90s</u> **M4** for 560 × 0.6 + 3 × 90 + 130 = 736 and 736 + 90 + 90 = 916 **M3** for 560 × 0.6 + 3 × 90 + 130 = 736 and 736 + 90 = 826 **M2** for 560 × 0.6 + 3 × 90 + 130 = 736 **M1** for 560 × 0.6 [+ …]

					If **0**, **1** or **2** scored, instead award **SC3** for answer 6 with no working or insufficient working If **0** or **1** scored, instead award **SC2** for answer 5 with no working or insufficient working If **0** scored, **SC1** for 450 with no working or insufficient working	For trials and trials + 90s, accept correct rearrangements that have a target of 786, 580 or 450 rather than 916

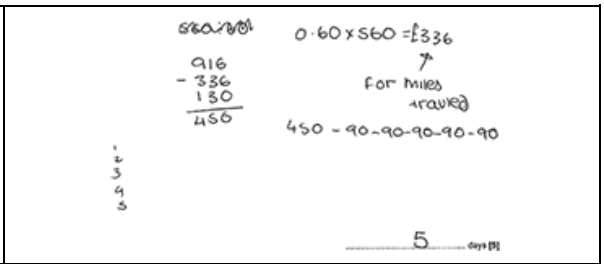
Examiner's Comments

Assessment for learning

On a calculator paper, candidates should be encouraged to use their calculators for division,rather repeated division.

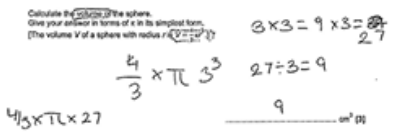
A significant number of candidates showed complete and well-presented correct methods, scoring all 5 marks. Some showed correct working, but omitted to add 1 at the end for the first day and gave an answer of 5, scoring 4 marks (as shown in the exemplar below). Others were successful using trials. Several candidates were given the first mark.

Exemplar 1

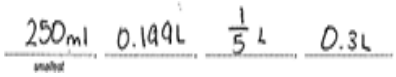
					
			Total	**5**	
107	a		30	2	**M1** for $\frac{4\times(9+6)}{2}$ oe or $4\times6+\frac{4\times3}{2}$ oe Implied by 24 + 6 or $4\times9-\frac{4\times3}{2}$ Implied or by 36 – 6 **Examiner's Comments** Most candidates attempted this question. The candidates who used the formula for the area of a trapezium (which was given on the formulae sheet) were generally more successful than those who used another approach. Some candidates substituted into the formula incorrectly, usually using 5 cm as the height rather than the vertical height. The most common wrong methods were to find the perimeter (24 was often seen) or to find the product of the lengths. Some divided the shape into a rectangle and a triangle; these could generally find the area of the rectangle, but often not the area of the triangle (once again, 5 was often misused as the height). The modal mark for the question was 0.
	b		50	2	**B1** for d = 100 seen or

					M1 for $2\pi r = 100\pi$ or for $\pi d = 100\pi$ or $\frac{100}{2}$	Accept e.g. $[r =]\frac{100\pi}{2\pi}$
					Examiner's Comments This question posed a considerable challenge to many candidates, but around a quarter gave the correct answer. Sometimes the answer was seen with no working. Where working was seen, it often involved πr^2 or substitution of 3.142. Candidates who formed an appropriate equation such as $\pi d = 100\pi$, or compared πd or $2\pi r$ with 100π, were usually successful. Few candidates seemed confident working with π.	
			Total	**4**		
108			36π final answer	3	**M1** for $\frac{4}{3} \times \pi \times 3^3$ **oe** **M1 dep** for $\frac{4}{3} \times \pi \times 27$ or $4 \times \pi \times 3^2$ or $\frac{108\pi}{3}$ or $4 \times \pi \times 9$ or $\pi 36$ **oe**	Accept $36 \times \pi$ do not accept $\pi 36$ for 3 marks For method marks accept $\pi = 3.14[2\ldots..]$ and $1.33[3\ldots..]$ for $\frac{4}{3}$
					Examiner's Comments Candidates attempting this question were	

					often able to substitute $r = 3$ into the formula. Some were able to correctly evaluate $3^3 = 27$, but did not know how to evaluate with the fraction. Some candidates wrote 27 as their final answer and others did not write π in subsequent working. A number of candidates attempted to complete the question in one attempt, leading to loss of the second method mark. Common errors seen were substituting into $V=\frac{4}{3}\pi r^2$, the conversion of $\frac{4}{3}$ to a decimal, the conversion of π to 3 and $3^3 = 9$ rather than 27. There was a high number of candidates who did not attempt this question. **Assessment for learning** Substitution into formulae should be treat like a BIDMAS question. Single steps written can gain a method mark. **Assessment for learning** Candidates should be confident to respond 'in terms of π'. Incorporate the symbol π into calculations and use it throughout (i.e. not replacing it with 3.14 or similar), so that candidates become more accustomed and confident to leave their answer in terms of π. Exemplar 5

					 This candidate correctly substitutes $r = 3$ into the formula, scoring M1. The candidate then correctly writes $\frac{4}{3} \times \pi \times 27$, scoring M1M1. The candidate doesn't complete the required working as they only divide 27 by 3 and don't multiply it by 4. They also don't include π in their answer.
			Total	**3**	
109			7	3	**B1** for $\sin 30 = \frac{1}{2}$ oe **M1** for $\sin 30 = \frac{a}{14}$ or better Accept any letter or correct identification for *a* e.g. *x* or opposite M1 implied by 14 x sin 30 oe <u>Alternative Method:</u> B1 for $\cos 60 = \frac{1}{2}$ oe M1 for $\cos 60 = \frac{a}{14}$ or better Accept equivalent Sine Rule application **<u>Examiner's Comments</u>** Very few candidates recognised the need for trigonometry in this question. The most common error seen was to attempt to use Pythagoras' theorem. When trigonometry was identified, candidates were often unable to write a

					correct trigonometric equation. Missing the angle out was a common error, e.g. $\sin = \frac{8}{14}$. Candidates who received credit often scored M1 for sin(30) × 14 or B1 for $\sin(30) = \frac{1}{2}$, but were rarely able to complete the question. **Assessment for learning** Using trigonometry involves setting up an equation to solve, as with any basic equation. When teaching 'SohCahToa' or an equivalent, make sure that the emphasis is on writing an equation to solve, try not to teach 'tips and tricks'. This will help with retention.
			Total	**3**	
110	a		39	2	**B1** for answer 0.39 or **M1** for 134 – 95 or 1.34 – 0.95 For M1 allow embedded calculations, e.g. 95 + 39 = 134 **Examiner's Comments** Most candidates attempted to convert 1.34 m to 134 cm and subtract, many successfully. There were a few candidates who gave an answer of 0.39, scoring B1. Some candidates did not set up their column subtraction correctly and a few candidates used incorrect figures (often 94 cm instead of 95 cm).
	b		0.199 [*l*], $\frac{1}{5}$[*l*], 250 [*ml*], 0.3 [*l*]	2	

					B1 for 3 values in correct order or for 0.25 and 0.2 or for 200, 300 and 199	For 2 marks accept correct equivalents [with correct units stated] Use "cover up" method
					Examiner's Comments Many candidates did not successfully attempt this question. The most common mark given was B1 for 3 values in correct order (using the 'cover up' method). The challenge for many candidates was in converting $\frac{1}{5}$ into a decimal/percentage, or in converting 0.199 litres and 0.3 litres into ml. There were a few candidates who had written the largest value where the smallest value should have been placed. To aid candidates, 'smallest' was written under the first missing answer space. Exemplar 1  If you cover up the 250ml, this candidate has three capacities in correct order (0.199 L, $\frac{1}{5}$L and 0.3 L). This response scored B1.
			Total	**4**		
111	a		70	2	**M1** for [AB=] 6.8 [cm] to 7.2 [cm] or for *their* written AB in cm × 10	For 2 marks accept answers in the range 68 to 72 AB must be stated.

					Method may be seen on the diagram. **Examiner's Comments** The vast majority of candidates were able to measure the length AB and multiply by 10 correctly, often without writing their initial measurement down or joining A and B with a line. The most common errors seen were writing their measurement (e.g. 7) as the answer (not understanding the scaled nature of the question) and not multiplying by 10 correctly. Those that gave no working and responded just with an answer such as 60.7 received zero marks.
	b		Town C marked 5.3 to 5.7 cm from B and on a bearing of 328° to 332°	2	**M1** for either length or bearing correct If 0 scored **SC1** for correct point from A Allow unambiguous indication if a cross is not seen. **Examiner's Comments** Few fully correct responses were given here. Most marks given in this question were for marking a point within 5.3 cm−5.7 cm from B. Candidates found measuring the bearing difficult, often giving their C at either 030°, 060°, 120°, 150°, 210° or 240° from B. There was a high number of candidates who did not attempt this question.
			Total	**4**	
112			32	4	

					M1 for 9 x 30 implied by 270 **M1** for *their* 270 + 50 Implied by 320 **M1** for *their* total earnings ÷ 10 (could be implied by their answer)	<u>Alternative Method:</u> M1 for 9 x 30 implied by 270 M1 for 50 ÷ 10 and *their* 270 ÷ 10 M1 for 27 + 5
					Additional Method: M1 for 50 − 30x[10−9] (they are using the difference of £1) M1 for 20/10 (Difference divided by Ling's rate of pay) M1 for 30+2 **<u>Examiner's Comments</u>** This question was answered well by many candidates. Almost all showed organised calculations and part-marks could often be awarded when the correct answer was not reached. The most common response seen was 90 × 3 = 270, followed by 270 + 50 = 320 and then $\frac{320}{10} = 32$. When numerical errors occurred (often with 90 × 3 or 270 + 50) candidate were often able to score M1M1M1 as their method was shown. There were a few candidates who correctly found 32, but due to writing an embedded calculation of 10 × 32 = 320, wrote 10 as their final answer and scored M1M1M1 only.	
			Total	**4**		
113			43 final answer	4	**B3** for 43.2	Allow alternate methods e.g.

					OR **M1** for 120 x 180 implied by 21600 **M1** for *their* 120 x 180 ÷ 10000 may be implied by 2.16 or 2 hectares and 1600 or 20 000 and 1600 **M1** for *their* 2.16 × 20 If **0** scored instead award **SC1** for answer 40	**M1** for 120 x 180 implied by 21600 **M1** $\frac{10000}{20}=500$ **M1** for *their* $\frac{21600}{500}$ *Their* 2.16 must come from multiplication to find area

Examiner's Comments

The majority of candidates made an attempt to answer this question. Candidates who scored well on this question were most often the ones who had a logical structured approach to their answer and showed all steps taken. Most candidates realised that since the field was rectangular they needed to multiply the sides together and many did so correctly to reach 21 600. At this point, some then proceeded correctly by dividing by 10 000 to reach 2.16 hectares. Some attempted to subtract 20 000, but often did not show the remaining figure of 1600 that was needed along with this to score the M1 mark. Candidates who showed 21 600 ÷ 10 000 = 2.16 and rounded this to 2 fared better, but often did not show 2 × 20 = 40.

Of the few candidates who did correctly carry out 2.16 × 20 to get to 43.2, some did not realise the 'difficulty' in having 0.2 of a sheep and gave 43.2 as the answer, while others incorrectly rounded up to an answer of 44. Those who took the approach of finding that each sheep required 500 m² usually reached a successful conclusion.

			Total	**4**	
114			148	3	**M2** for [2](4×5 + 4×6 + 5×6) Implied by 74 or **M1** for (4×5) or (4×6) or (5×6) may be implied by 20, 24, 30 Any attempt at volume scores 0 **Examiner's Comments** Many candidates calculated the volume correctly. Presentation was sometimes unclear. For example, 4 × 5 = 20 and then 20 × 6 = 120 is ambiguous, it could be calculating six faces of area 4 by 5, or a volume calculation performed in two steps. A better response (although still incorrect) was 4 × 5 = 20, 20 × 2 = 40, with 5 × 6 = 30, 30 × 4 = 120 and then 40 + 120 = 160. Despite the presence of 120, it is clear from the presentation that that it represents the area of four faces each with area 30. **Assessment for learning** Present working clearly. Words or annotations on a diagram may help to clarify working.
			Total	**3**	
115	a		307.5	2	**M1** for 2460 ÷ 8 2460/480 must have × 60 to compare to original M1 **Examiner's Comments** Generally, this question was well answered, with most candidates knowing they had to divide distance by time and successfully getting the answer of 307.5.

	b		He can maintain the same average speed Same weather/track conditions No hills He doesn't get tired	1	**Response** For additional information refer to **2023 June (J56001) Mark scheme Appendix** within downloadable additional mark guidance. **Examiner's Comments** Some candidates struggled to articulate themselves fully to get an assumption that was correct. For those who did, 'will not get tired' and 'will not stop' were common correct responses. Few candidates considered external factors such as the weather or the route.
			Total	**3**	
116			24	3	**M0 M1** is possible in either method M1 for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208…) and 0.5 **M1** for division in correct order between *their* converted $\frac{1}{2}$ and $1\frac{1}{4}$ Conversions may be incorrect but clearly represent $1\frac{1}{4}$ and $\frac{1}{2}$ OR e.g. $\frac{1}{2} \div 1.25$ **M1** for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208…) and 0.5

					M1 for three correct consecutive/linked terms	e.g. $\left[1\frac{1}{4}, 1\right]$ $2\frac{1}{2}, 2$ $3\frac{3}{4}, 3$ 5, 4 10, 8 20, 16… or [1m 15s, 1] 2m 30s, 2 3m 45s, 3…
					<u>Examiner's Comments</u> This question was not answered well. A significant number of candidates thought that $1\frac{1}{4}$ was a time in hours and wrote it as 1 hour 15 minutes, 1.15 minutes or 1 hour 25 minutes. Similar errors occurred where it was understood that the time was in minutes. Many, but far from all, understood that it was necessary to change the $1\frac{1}{4}$ minutes and the $\frac{1}{2}$ hour to common units. Instead of just changing $\frac{1}{2}$ hour to minutes and dividing by $1\frac{1}{4}$ many attempted to change the $1\frac{1}{4}$ into something else. Quite a number said that $1\frac{1}{4} = 5$ minutes (1 × 4 + 1). Similarly, not all gave 30 minutes as the conversion for $\frac{1}{2}$ hour. Those who scored 3 marks often used 30 and 1.25 or 1800 and 75. Generally, candidates did not understand how to deal with fractions and could not use the functions on their calculators that would have allowed them to work this answer out.	
			Total	**3**		
117			10 with correct working	6	M1 for $\frac{24 \times 4}{2}$	"Correct working" requires evidence of at least M1A1 AND M1

					M1 for height of rectangle = $\textit{their}\ \frac{24\times4}{2} \div 8$ **A1** for [height of rectangle =] 6 AND **M2** for $\sqrt{8^2 + (\textit{their}\ 6^2)}$ or better or **M1** for [d^2 =] $8^2 + (\textit{their}\ 6)^2$ If **0, 1** or **2** scored, instead award **SC3** for answer 10 with no or insufficient working If **0** or **1** instead award **SC2** for [height of rectangle =] 6 with no or insufficient working If **0** scored, instead award **SC1** for [area of triangle =] 48 with no or insufficient working	M1 Allow embedded e.g. 8 × 6 = 48 Could be shown on the diagram *their* 6 must be clearly identified as the height of the rectangle, e.g. written on the diagram. Eg SC3 Insufficient working includes statement that 6, 8, 10 is a Pythagorean triple

Examiner's Comments

Many candidates were able to find the area of the triangle or rectangle. Many candidates did not use the formula for finding the area of a triangle as provided on the formulae sheet, multiplying base by height only. Some candidates proceeded to correctly use their triangle area to find the

					width of the rectangle. This was often seen in a product calculation, e.g., 8 × 6 = 48. Very few candidates were able to correctly use Pythagoras' theorem to find the diagonal length of the rectangle, often because they did not have the correct rectangle width. Some candidates initially used Pythagoras' theorem to find the length of the hypotenuse of the original triangle instead of finding its area. Exemplar 4  In this exemplar the candidate has correctly stated the answer of 10 cm, but they have not provided full step-by-step workings of how they have worked this out, as requested by the instruction 'You must show your working.'. The candidate has correctly worked out the area of the triangle as 48 to score M1 but no further workings lead to the answer of 10. This candidate was given 3 special case marks for providing the answer of 10 with insufficient working.
			Total	**6**	
118			400 with correct working	6	"Correct working" requires evidence of at least two M marks and one A mark Allow working in pence provided

						consistent units used
					M1 for 2 × 1.15 + 3 × 0.70 **oe** or 2.3[0] + 2.1[0]	
					A1 for 4.4[0]	4.4[0] implies M1A1
					AND	
					M1 for (7 – *their* 4.4[0]) **oe**	Could be Implied by *their* 4.4[0] + *their* 2.6[0] + *their* 'change'
					A1 for 2.6[0]	[=7.0[0]]
					AND	
					M1 for *their* 2.6[0] ÷ 1.3[0] [× 200] **A1FT** for *their* 2.6[0] ÷ 1.3[0] rounded down × 200	Implied by list 1.3[0], 2.6[0], [3.9[0], ……] up to one less than *their* 2.6[0] or Embedded 2 × 1.3[0] = 2.6[0]
						<u>Alternative Method</u>: For first M1A1 M1A1
						M1 for 7 – 2 × 1.15 or 7 – 3 × 0.70
						A1 for 4.7[0] or 4.9[0]
						AND
						M1 for 7 – 2 × 1.15 – 3 × 0.70
					If **0** or **1** scored, instead award	or *their* 4.7[0] – 3 × 0.70

					SC2 for answer 400 with no or insufficient working If **0** scored, instead award **SC1** for 2.6[0] with no or insufficient working	or *their* 4.9[0] – 2 × 1.15 A1 for 2.6[0]

Examiner's Comments

Many candidates set out their working clearly, showing every step required to get to the correct answer, and many scored the full 6 marks. Some candidates did not provide a complete solution. As the question states 'You must show your working' it is essential to communicate each calculation required for each step, however simple they seem.

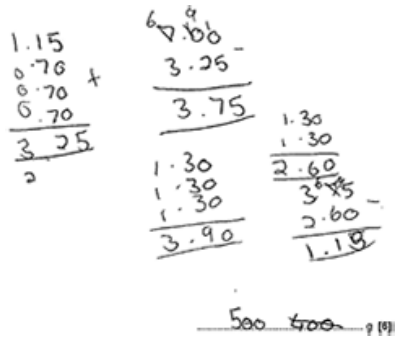
Errors seen included calculating the cost of 2 pineapples as £2.20 or working out 2 kg of banana. Some made errors subtracting £4.40 from £7 with the results £3.60 and £3.40 often seen. Many candidates avoided using division so £1.30 + £1.30 = £2.60 was commonly seen. Candidates who made an error in getting to their value of £2.60 were often able to gain follow through marks for finding their correct number of packets of strawberries and hence their correct weight. Some did not consider that strawberries were sold in 200g packs and incorrectly attempted to find an exact weight.

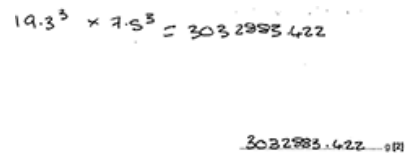
'**You must show your working**.'

A limited response in these questions can often be the difference between 2 or 3 marks and 6 marks. In Question 10, if 400g was seen with insufficient working the candidate scored 2 special case marks.

These types of questions are in every examination series, so candidates should be made aware that all workings must be shown.

Exemplar 1

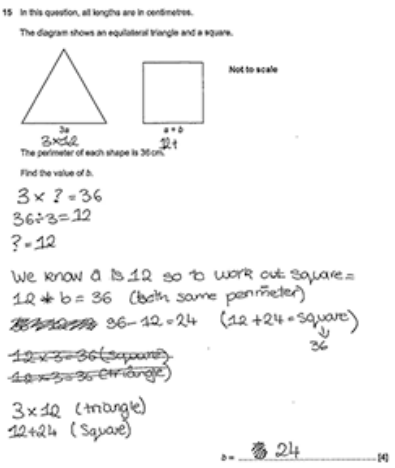
					 In this response, the candidate has attempted to add pineapples and bananas, but they have only included one pineapple, so score M0A0. They proceed to subtract their total from £7 which scores M1. They then list multiples of £1.30 to find how many strawberries they could buy. This scores M1. The final answer of 500 is incorrect so this response scores a total of 2 marks. If the original answer of 400 had been given then a follow through A1 would have been scored.
			Total	**6**	
119			144.75	2	**M1** for 19.3 × 7.5 | Allow 144.8 for 2 marks after M1 **Examiner's Comments** Candidates who understood the relationship between mass, density and volume were able to give the correct answer. A common error was to divide rather than multiply. Candidates also included the units in their calculation, cubing the quantities in error. **Misconception** A unit of measurement defines the magnitude of a quantity. Units of measurement may contain index notation, such as acceleration (m/s^2), volume (cm^3) and density (g/cm^3). Some candidates mistakenly include the index notation in their calculation.

					Exemplar 1  This exemplar shows the misconception of including the units in the working.	
			Total	**2**		
120			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 = [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 If **0** scored **SC1** for answer	“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 Dep on at least M1

					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**		
121			131.7[…] or 132	4	**M1** for [rectangle] 16 × 10 soi 160 **M1** for [circle] $\pi \times 3^2$	Method for rectangle and circle areas spoilt by additional steps in

					oe soi 28.2 to 28.3 **M1** for *their* rectangle area – *their* circle area If **0** or **1** scored, instead award **SC2** answer 46.9[…]	initial area calculations e.g. **M0** for 16 × 10 × 2 Do not lose **M1** for [rectangle] or **M1** for [circle] if further work does not include these, provided it is not contradicted by further method *Their* circle area should be from π × 3^2 or π × 6^2 eg soi by 113.[…] **not** 2π*r*
					Examiner's Comments Most candidates attempted this question and the majority gained at least M1 for the area of the rectangle. Several found the area of the circle correctly but errors included using the diameter instead of the radius and doing π × 6^2 or 3 × π^2 or π × 6. Most who did correctly find both areas then did subtract. A lack of understanding of area or area calculations used was demonstrated by those who had found the areas of the rectangle and the circle but then went on to add the areas rather than subtract. A small number of candidates found the perimeter rather than the area.	
			Total	**4**		
122			[0]9:45 [am] with correct working	5	**M1** for 6 × 20 + 90 oe **A1** for 210 **M1** for *their* 210 correctly converted into hrs and mins or decimal hours soi by 3 h 30 m or 3.5 [h] **M1** for 1:15 – *their* time If **0**, **1** or **2** scored,	"correct working" requires evidence of at least **M1 M1** Provided *their* 210 is not a multiple of 60 Do not accept 3.3 hours as a correct conversion from 3 h 30 m, but condone 3.3 used in the next step *Their* time may be in whole hours,

					instead award **SC3** for answer 9:45[am] with no working or insufficient working If **0** or **1** scored, instead award **SC2** for 3 h 30 m or 3.5 [h] with no working or insufficient working If **0** scored, **SC1** for 210 with no working or insufficient working	minutes, hrs and mins or decimal hours **Examiner's Comments** Many candidates were able to do the time conversion and the subtraction to score full marks. Many were able to correctly convert 210 minutes to 3.5 hours. A small number made errors and common conversions were 2 hours 10 minutes or 3.3 hours. Candidates need to check their answers are reasonable in the context of the question.
			Total	**5**		
123			5 nfww	4	**B2** for [a =] 4 or **M1** for 9*a* = 36 or better and **M1** for showing substitution/use of their a e.g. 4 × *their* 4 + 4*b* = 36 oe or better or [b =] 9 − *their* 4	If another value for *a* is used to find *b* do not award B2 T&I only scores if ending at 4 or better may be e.g. $a + b = 9$ or $\frac{36 - 4 \times \textit{their } 4}{4}$ **Examiner's Comments** A number of candidates did not attempt this question. Very few systematic solutions were seen. Very few correct algebraic solutions were seen. These might have begun with 9*a* = 36 but few did. Some candidates set up incorrect equations such

					as 3*a* = 36. Some candidates showed 36 ÷ 4 = 9 rather than 36 ÷ 9 = 4 that would have led directly to *a* = 4. A common incorrect route that scored 0 marks was 36 ÷ 3 = 12 so *a* = 12 and then 36 − 12 = 24. **Using trial and improvement** Many candidates used a form of trial and improvement trying different values, usually with little success. They would have used their time more efficiently by planning a strategy that makes use of the given information. Exemplar 2  15 In this question, all lengths are in centimetres. The diagram shows an equilateral triangle and a square. Not to scale 3a a + b The perimeter of each shape is 36 cm. Find the value of b. 3 × ? = 36 36 ÷ 3 = 12 ? = 12 We know a is 12 so to work out square = 12 + b = 36 (both same perimeter) 36 − 12 = 24 (12 + 24 = square) 36 3 × 12 (triangle) 12 + 24 (square) b = 24 [4] This is a version of the common incorrect method described in the commentary on Question 15 that does not use the information correctly.
			Total	**4**	
124			249.6[0]	3	**M2** for $\frac{4}{3}$ × 23.4[0] × 8 oe or **M1** for $\frac{4}{3}$ × 23.4[0] oe soi by 31.2[0] or 23.4[0] × 8 soi by 187.2[0]	Accept only 249.6[0] for 3 marks Accept $1\frac{1}{3}$ or 1.3[33...] for $\frac{4}{3}$ oe =23.4 ÷ 3 = *a*, *a* × 4 × 8 oe =23.4 ÷ 3 = *a*, *a* × 4

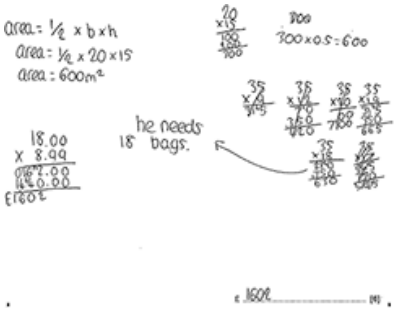
					Examiner's Comments Almost all candidates attempted the question with varying degrees of success. Many candidates scored M2 for correctly writing the full method but they were unable to complete the arithmetic correctly. Many candidates wrote $1\frac{1}{3} \times 23.40 = 7.80$, actually working out $\frac{1}{3} \times 23.40$. Others said $1\frac{1}{3} = 1.3$ and carried on using the imprecise decimal and so could not score full marks. **Assessment for learning** Candidates need to be proficient in using the fraction function on their calculator. Some candidates did not have confidence in working with fractions. The question was set up to use the exact $\frac{1}{2}$ and to test this competence.
			Total	**3**	
125	a		$x + 140$	1	
	b		210 nfww	4	**B1** for $3x$ **M1** for $3x$ = *their* $(x + 140)$ **A1FT** for $x = 70$ *their* $(x + 140)$ cannot be numeric and must lead to an equation that can be solved when equated to $3x$ eg if *their* $(x + 140)$ is $3x$ then M0 FT correctly solving *their* linear equation in x **Examiner's Comments** The most common outcome for this question was an incorrect answer in part (a) followed by part (b) not being attempted. The instruction to answer 'in terms of x' was widely not understood, with the vast majority of candidates giving numeric answers with no reference to x. Numeric answers were varied but included 140, 40

					and 220. Some measured the angle despite the "Not to scale" instruction. The most common error for attempts to write the bearing in terms of *x* was 140*x* or stating *x* = 140. Occasionally letters such as S, B, SF, BF from the diagram were used. It was very rare that a candidate tried and answered part (b) correctly. Some attempted to use their numeric answers from part (a) and those who answered part (a) correctly struggled to continue through this part. It was very rare that candidates attempted to form and solve an equation in order to calculate the bearing, and 3*x* was only seen very occasionally. A common incorrect approach was multiplying the answer to part (a) by three. A rare answer of 210 generally was arrived at without using algebra.
			Total	**5**	
126	a		$\frac{1}{2}$	1	
	b		**12**	2FT	**B2FT** for final answer $12\sqrt{3}, 8, 8\sqrt{3}$ or 6 if consistent with *their* (a) or a **M1** for $24 \times \frac{1}{2}$ or 24 × *their* (a) For 1 or 2 marks, isw attempts to simplify the surds May be implied by their answer Ignore units **Examiner's Comments** It was rare to see any method used for part (a), with the occasional lists of sin, cos and tan with 0, 30, 45, 60 and 90 seen. ⅓ was a popular incorrect choice. A significant number of candidates didn't attempt to circle any of the values. Choosing the correct answer, in most cases, unfortunately did not lead to success in part (b). Many recognised that trigonometry was needed for the question and "SOH CAH TOA" was often seen among these candidates. Quite a few also recognised that "sin" was the trigonometric ratio required. These were often able to set the equation up, $\sin 30 = \frac{x}{24}$, but struggled to proceed any further as they either didn't link their method to their answer in part (a) or they incorrectly rearranged the formula in an attempt to make *x* the subject, e.g. $x = \frac{24}{\sin 30}$.

					Other incorrect attempts involved subtracting 24, 30 and 90 from 180 to get 36 or attempting Pythagoras but taking the 30° angle as a length.	
			Total	**3**		
127			44.95 with correct working	6	**M1** for $\frac{1}{2}$ × 20 × 15 oe **A1** for 150 **M1** for *their* area ÷ 35 soi by 4.2… to 4.3 or repeated addition of 35 to at least 140 or to the multiple of 35 below *their* area oe **A1FT** for [number of bags =] 5 or *their* area ÷ 35 rounded up to an integer **M1** for *k* × 8.99 **A1FT** for 44.95 or *k* × 8.99 evaluated correctly If 0 or **M1** scored, instead award **SC2** for answer 44.95 with no or insufficient working.	correct working requires evidence of at least **M1M1** 150 implies M1A1 From an area, not a perimeter or length Allow 1 arithmetic slip in their list May be implied by their final calculation of cost Where *k* is an integer but not *k* = 1 or 10 Mark the calculation that leads to their final answer

Examiner's Comments

There were some very good responses to this multi-stage question, and the majority of candidates showing the three parts of the working set them out in a clear way using identifying words such as "Area =", "number of bags =" and "cost =". Finding the area of the triangle proved difficult for quite a few candidates and in some cases Pythagoras and/or a perimeter were attempted. The most common error in calculating the area of the triangle was to forget to halve after attempting 20 × 15. However, regardless of their area, many were then generally able to work out the number of bags needed.

					Higher scoring candidates attempted the division of their area by 35, often checking the results below and above the area by multiplication. Others used a list of multiples of 35 from which to choose the number of bags needed. Many gained marks for $k \times 8.99$ evaluated correctly, often finding k lots of £9 and subtracting k pence.  The steps of working for the 3 parts to this question are clearly shown. The correct formula for the area of a triangle is stated, however the answer of 600 is incorrect. M1 A0 is scored at this stage. The next step is to work out how many bags are needed. Following through from their incorrect area, the best method would be to work out 600 ÷ 35. Here they have trialled different multiples of 35. They have got to the correct number of bags for their area so score M1 A1, however their method is more time consuming. The final step is to work out the cost and they have attempted a long multiplication made more difficult by using 18.00 rather than 18. On a non-calculator paper it may have been better to do 18 × £9 and then subtract 18p. Here they score M1 for showing the calculation 18.00 × 8.99 but lose the final mark available. A total of 4 scored.
			Total	**6**	
128			60 with correct working	5	**B3** for 12 as third side with correct working or **M2** for $\sqrt{13^2 - 5^2}$ oe or For full marks, correct working requires Pythagoras or trig leading to 12 For B3 "correct working" requires

					M1 for $13^2 = 5^2 + [DC^2]$ OR **M1** for $\angle BDC = \sin^{-1}\left(\frac{5}{13}\right)$ oe or $\angle CBD = \cos^{-1}\left(\frac{5}{13}\right)$ oe M1 for 13 cos *their* ∠BDC or 13 sin *their* ∠CBD AND **M1** for 5 × *their* DC (or AB) If 0 or 1 scored with no/insufficient working **SC2** for answer 60 or If 0 scored with no/insufficient working **SC1** for 12 as third side	evidence of M2 or M1 or mention of 5:12:13 triangle 22.6... or 67.3 to 67.4 oe may be in ΔABD *Their* DC (or AB) not = 13. If M1 scored and SC2 available, award SC2 only May be on diagram
					Examiner's Comments Many candidates attempted the question and 65 was the common answer among those who did. There were very few attempts to use Pythagoras' theorem to find the length of DC. Most candidates who did attempt a solution performed random calculations with the given values such as 5 + 13 + 5 + 13 or 2 × 5 × 2 × 13 or $\frac{5\times13}{2}$, as though it was a triangle. Attempting to use $A=\pi r^2$ was also seen.	
			Total	**5**		
129	a		$x \times x$ or $4(2x + 5)$ seen $x2 = 8x + 20$ or $x^2 = 4(2x + 5)$Correctly rearranging to$x^2 – 8x – 20 = 0$ without error	M1M1A1	**Dep**endent on first M1 and not from rearrangement of original equation	Allow [area of] square = x^2 or [area of] rectangle = $8x + 20$ x^2 and /or $8x + 20$

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>may be written with correct shape(s)</td></tr>
<tr><td colspan="6"><u>Examiner's Comments</u>

This question was rarely answered correctly. Few could construct the equation using the given expressions for lengths and forming areas. Many tried to find a solution from the given equation.</td></tr>
<tr><td></td><td>b</td><td></td><td>−2 10 nfww</td><td>3</td><td>B2 for one correct solution nfww

OR
M2 for $(x + 2)(x – 10) = 0$
or
M1 for $(x + a)(x + b)$ where $ab = −20$ or $a + b = −8$

OR
M2 for two correct trials using $−4 ≤ x ≤ 0$ and two correct trials using $8 ≤ x ≤ 12$
or
M1 for two correct trials using $−4 ≤ x ≤ 0$ or two correct trials using $8 ≤ x ≤ 12$

If 0 scored SC1 for answers 2 and –10</td><td>e.g. one trial is when $x = 2$, $22 – 8 × 2 – 20 = –32$
Accept as trial $x = 2$ and –32

x
<table><tr><td>-4</td><td>16</td><td>32</td><td>-20</td><td>28</td></tr><tr><td>-3</td><td>9</td><td>24</td><td>-20</td><td>13</td></tr><tr><td>-2</td><td>4</td><td>16</td><td>-20</td><td>0</td></tr><tr><td>-1</td><td>1</td><td>8</td><td>-20</td><td>-11</td></tr><tr><td>0</td><td>0</td><td>0</td><td>-20</td><td>-20</td></tr></table>
<table><tr><td>8</td><td>64</td><td>-64</td><td>-20</td><td>-20</td></tr><tr><td>9</td><td>81</td><td>-72</td><td>-20</td><td>-11</td></tr><tr><td>10</td><td>100</td><td>-80</td><td>-20</td><td>0</td></tr><tr><td>11</td><td>121</td><td>-88</td><td>-20</td><td>13</td></tr><tr><td>12</td><td>144</td><td>-96</td><td>-20</td><td>28</td></tr></table></td></tr>
<tr><td colspan="6"><u>Examiner's Comments</u>

Few could correctly solve the equation. A small number of candidates gained marks for a correct root found by trial and improvement. As there were rarely solutions in this part.</td></tr>
<tr><td></td><td>c</td><td></td><td>Length [of square] cannot be negative</td><td>1</td><td>Dependent on negative answer in (b)</td><td>Do not accept x cannot be negative</td></tr>
</table>

					Examiner's Comments It could not often be answered.
	d	i	100	1	**FT** (*their* positive root from **(b)**)^2 | If two positive roots seen in (b) accept either or both used in (i) and in (ii) BUT, if one answer right and one wrong in any part, 0 marks **Examiner's Comments** Very few thought of substituting values (even their incorrect ones) to find an area and length.
		ii	25	1	**FT** (*their* positive root from **(b)**) × 2 + 5 |
			Total	**9**	
130			162	4	B1 for [Area of face =] 9 **B1** for [Total number of faces =] 18 **M1** for their number of faces × *their* 9 Alternative **B1** for [area of face=] 9 **B1** for [total surface area of cube=] 54 **M1** for *their* 54 × 4 – 6 × *their* 9 oe Alternative **B1** for [area of face=] 9 **M1** for 24 × *their* 9 soi 216 **M1** for *their* 216 − 6 × *their* 9 | e.g. 4+4+3+3+2+2 or 5+4+4+5 May be in stages e.g. 5×9+4×9+ etc Accept other alternative methods

					Examiner's Comments This was a very poorly answered problem solving question and revealed poor understanding of surface area and volume. **Misconception** Many candidates did not have a strategy to respond to this question and confused area with volume. The standard wrong response was along the lines of '1 cube = 3 × 3 × 3 = 27 so 4 cubes = 27 × 4 = 108'. Many candidates gave ambiguous working such as 1 cube = 3 + 3 + 3 = 9, which was condoned as 3 × 3 = 9 (cm^2) for the surface area of a face. Some gave 9 × 6 × 2 = 162, from the overall dimensions of the shape. Few meaningful annotations were seen.
			Total	**4**	
131			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 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 If both seen and one incorrect award B0 Correct working requires all part marks soi 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**		
132			3 [hours] 51 [minutes] with correct working	6	**B5** for 3.85[...] or 3 [hours] 51.1[1…] [minutes] or $3\frac{23}{27}$oe or 231 [minutes] with correct working OR **M1** for 52 × 4 soi by 208 **M2** for $\frac{15\times60\times60}{1000}$ or better or **M1** for 15 × 60 × 60 oe or $\frac{15}{1000}$ oe **M1** for *their* 208 ÷ *their* $\frac{15\times60\times60}{1000}$ Alternative method **B5** for 3.85[...] or 3 [hours] 51.1[1…] [minutes] or $3\frac{23}{27}$or 231 [minutes] with correct working or	"Correct working" requires evidence of at least M2 or M1M1 Accept other alternative methods. "Correct working" requires evidence of at least M2 or M1M1

					M1 for 52 × 4 soi by 208 **M2** for $\frac{their\ 208 \times 1000}{15}$ or **M1** for *their* 208 × 1000 or **M1** for *their* $\frac{208}{15}$ **M1** for $\frac{their\ 13866\ to\ 13867}{60 \times 60}$ If **0** or **M1** scored, instead award **SC2** for 3 [hours] 51 [minutes] with no working or insufficient working or **SC1** for 3.85[...] with no working or insufficient working	
					Examiner's Comments Although few candidates were able to give the final answer, several scored some of the marks. Many were able to use 52km/h to find the distance travelled. Some of these were also then able to correctly calculate 54km/h. Changing decimals of an hour to hours and minutes is not something candidates find easy.	
			Total	**6**		
133			16 nfww	3	**M2** for [h =] $\frac{8}{cos60}$ or **M1** for $\cos 60 = \frac{8}{h}$	Accept alternative methods e.g **M2** for $[h =] \frac{8}{sin\ 30}$ or **M1** for $\sin 30 = \frac{8}{h}$
			Total	**3**		
134			32.1 to 32.14 nfww	4	**M1** for 3 × 6 may be implied by 18 AND **M2** for $\frac{3^2\pi}{2}$ soi by 14.1 to 14.15 or **M1** for $3^2\Pi$ soi by 28.2 to 28.3	18 must not come from wrong working Not part of longer multiplication e.g. 3 × 6 × 3

					Examiner's Comments Many candidates here did not realise the need to use pi. Of those that did, most scored 1 mark for finding the area of the full circle, however a significant number of these then did not pick up a second mark for halving it to get the area of the half circle.
			Total	**4**	
135			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**	
136			40 nfww	4	**B2** for length of rectangle = 10 or **M1** for 4 ÷ 2 × 5 **M1** for 5 × 4 + 2 × *their* length **oe** **Examiner's Comments** Many found this difficult and few were able to use the ratio statement to calculate the length of the rectangle. A wide variety of possible rectangle lengths were suggested, some of these not connected to any of the values given. Many calculated the full perimeter of the rectangle and the pentagon and added these together, or included the internal common side. Some were confused between lengths and finding areas. A significant number did not attempt this question.
			Total	**4**	
137			5000 [ml] or 0.45 [L] soi 9 × 450 **oe** Correct attempt to find 80% or 20% of 5000 **oe** 4050 and 4000 or 950 **and** 1000 **and** [They are] correct **oe**	B1 M1 M1 A2	or $\frac{9\times450}{5000}[\times100]$ **oe** or $\frac{5000-9\times450}{5000}[\times100]$ **oe** or 81% [and 80%] or 19% [and 20%] If A0 scored **B1** for 4050 or 4000 or 950 or 1000 Correct conversion at any stage Alternate approaches are possible M1 may be implied by 4000 or 1000 or 81% or 19% seen For A2 accept in other correct consistent units for comparison eg 4.05[L] and 4[L] and must have no incorrect statement For B1 accept eg 4.05[L] or 4[L] **Examiner's Comments**

					Candidates who were organised generally scored 3 or 4 marks. There were a few errors in converting between ml and litres and candidates incorrectly converting 5 litres to 500 ml often struggled, as this implied that after one week more than 80% had been used up. Most attempted 450 × 9, although some grid methods had errors, especially when a column or row was used for 0 yet multiplication by 0 was performed the same as multiplication by 1. Many used repeat addition and errors occurred where the 450s didn't line up and carried figures were lost or added to the wrong units. Those doing 10 × 450 and then subtracting 450 were much more likely to get to the correct 4050. Finding a comparison figure to 4050 proved more difficult. Many assumed 4050 was 80% and so the mechanic was correct. In these cases, no attempt to specify the 80% of 5000 or 5 litres was made. Instead of comparing their 4050 and 80% of 5000, a number of candidates worked out 450 as a percentage of 500. In general, many candidates showed they understood the requirement, however candidates struggled if they weren't confident in converting from ml to litres and vice versa, or weren't able to be precise in deciding whether an amount is 'over 80%'.
			Total	**5**	
138	a		6 × 3 × 8 ÷ 2 [=72]	M2	**M1** for 6 × 3 ÷ 2 **oe** or for their area or cross section × 8 | May be done in stages **Examiner's Comments** In this part, most seemed to be trying various combinations of the numbers from the diagram (usually multiplying) without looking at cross sectional area. Successful attempts were very rare.
	b		6	3	**M2** for $\sqrt{\frac{72}{2}}$ **oe** or **M1** for l × l × 2 =

					72 **oe** or for 72 ÷ 2 **Examiner's Comments** Many candidates were unable to make a start in this part and those who did often struggled to progress beyond 72 ÷ 2. Some incorrectly thought the next step was 36 ÷ 4. Both **(b)** and **(c)** had very high rates of no response.
			Total	**5**	