REVISE
.wales

2.01 — Place value, rounding & significant figures

Mark schemes for the 2.01 question pack

Spec 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 37 questions in the corresponding revise.wales question pack (145 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes.

2.(a)	6 −3		B2	B1 for each.
2.(b)	7 correct plots. Curve drawn.		P1 C1	**Use overlay.** F.T. 'their (−1,6)' and 'their (2,−3)'. Allow ± '½ a small square'. F.T. 'their plots'. At least 6 plots required. Clear intention to draw a curve through 'their plotted points'.
2.(c)	−0·9 and 3·4		B2	B1 for each. Allow (−0·9, 5) and (3·4, 5). F.T. intersection of 'their curve' with $y = 5$ provided exactly 2 intersections seen on graph. Allow ± '½ a small square'. If no marks gained then SC1 for either of the following. $y = 5$ drawn correctly, OR Two correct F.T. values given for 'their straight line' and 'their curve' provided exactly 2 intersections seen on graph.
2.(d)	$2x^2 - 5x - 6 = 0$		B1	

Autumn 2016		
3(a) 605 cm	B1	
3(b) 249.5 cm	B1	
3(c) Consistent use of units for comparison, e.g. desk 200cm if another measure is given in cm	B1	Penalise -1 only the use of the 'their desk' ≠ 200 Accept comparison with one other length, e.g. sight of 2000mm = 200cm is sufficient if any other working seen in cm (irrespective of use of bounds)
Use of 147.5 (cm) or 250.5 (cm) or 595(cm)	B2	'Use of' can be any of these values used within a length calculation (including the bookcase, the wardrobe and either the wall or the desk), or 595(cm) used in the interpretation within a conclusion Allow 147.49*(cm) or 250.49*(cm) respectively throughout (Otherwise award:) B1 for sight of 147.5 (cm), 250.5 (cm) or 595(cm)
Correctly evaluated calculation which could be interpreted to show the desk (200cm) would not fit, i.e. a counter example showing the desk can not fit	B1	Interpretation is not required for this B1, it is a calculation (showing that the wall or the gap is of insufficient length, i.e.) with an answer >595(cm) or <200(cm) as appropriate Examples (In cm, but working in m or mm is also accepted) *Giving an answer >595:* 147.5 + 250.5 + 200 = 598, or 147 + 250 + 200 = 597, or 146.5 + 249.5 + 200 = 596 OR *Giving an answer <200:* 595 – 250.5 – 147.5 = 197, or 595 – 250 – 147 = 198, or 595 – 249.5 – 146.5 = 199 i.e. working with lengths in the inclusive ranges 146.5 to 147.5 and 249.5 to 250.5 is accepted, condoning mix of upper and lower bounds provided the calculation leads to >595 or <200 appropriately
Conclusion from a correct interpretation of a correctly evaluated calculation, e.g. 'no, not certain as greater than the least length of the wall which is 595(cm)', 'no, 197(cm) is less than the length of the desk which is 200(cm)', 'no, 598(cm) > 595(cm)'	E1	This E1 depends on the award of the previous B1 Sight of 200(cm) or 595(cm) as appropriate for the comparison is required, i.e. 'no, not certain as greater than the least length of the wall' or 'no, 197 cm is less than the length of the desk' would only be awarded E1 if 595(cm) or 200(cm) respectively, has been seen previously

3(a) (diagonal^2 =) $3.3^2 + 3.3^2$ diagonal^2 = 21.78 or diagonal = $\sqrt{21.78}$ diagonal is 4.7 (cm)	 M1 A1 A1	*Scale drawings are not accepted in Q3* FT from M1 for the correctly evaluated square root of 'their 21.78' provided 'their answer' > 3.3 (cm) Must be to 1 d.p. Accept an unsupported 4.7(cm)
3(b) 11 × 4.6(669…) × 9.5 × 4.6(669…) or 11 × 4.7 × 9.5 × 4.7 or 104.5 × $(4.7)^2$ (Area =) 2276(.01cm^2)	M2 A1	FT for 'their derived diagonal', but not 3.3 cm M1 for sight of either 11 × 4.6(669…) or 9.5 × 4.6(669…) *(Height 44.3355… cm; width 51.3359…cm)* Accept answers in the range 2211 (cm^2) to 2308.41 (cm^2) from appropriate working *(Note: e.g. use of a diagonal such as 5.27(cm) allow appropriate calculation with 5.2 (cm) or 5.3 (cm) for M2, A1; however use of 5 throughout is a possible M2, A0)*

Autumn 2016		
3(a) 605 cm	B1	
3(b) 249.5 cm	B1	
3(c) Consistent use of units for comparison, e.g. desk 200cm if another measure is given in cm	B1	Penalise -1 only the use of the 'their desk' ≠ 200 Accept comparison with one other length, e.g. sight of 2000mm = 200cm is sufficient if any other working seen in cm (irrespective of use of bounds)
Use of 147.5 (cm) or 250.5 (cm) or 595(cm)	B2	'Use of' can be any of these values used within a length calculation (including the bookcase, the wardrobe and either the wall or the desk), or 595(cm) used in the interpretation within a conclusion Allow 147.49*(cm) or 250.49*(cm) respectively throughout (Otherwise award:) B1 for sight of 147.5 (cm), 250.5 (cm) or 595(cm)
Correctly evaluated calculation which could be interpreted to show the desk (200cm) would not fit, i.e. a counter example showing the desk can not fit	B1	Interpretation is not required for this B1, it is a calculation (showing that the wall or the gap is of insufficient length, i.e.) with an answer >595(cm) or <200(cm) as appropriate Examples (In cm, but working in m or mm is also accepted) *Giving an answer >595:* 147.5 + 250.5 + 200 = 598, or 147 + 250 + 200 = 597, or 146.5 + 249.5 + 200 = 596 OR *Giving an answer <200:* 595 – 250.5 – 147.5 = 197, or 595 – 250 – 147 = 198, or 595 – 249.5 – 146.5 = 199 i.e. working with lengths in the inclusive ranges 146.5 to 147.5 and 249.5 to 250.5 is accepted, condoning mix of upper and lower bounds provided the calculation leads to >595 or <200 appropriately
Conclusion from a correct interpretation of a correctly evaluated calculation, e.g. 'no, not certain as greater than the least length of the wall which is 595(cm)', 'no, 197(cm) is less than the length of the desk which is 200(cm)', 'no, 598(cm) > 595(cm)'	E1	This E1 depends on the award of the previous B1 Sight of 200(cm) or 595(cm) as appropriate for the comparison is required, i.e. 'no, not certain as greater than the least length of the wall' or 'no, 197 cm is less than the length of the desk' would only be awarded E1 if 595(cm) or 200(cm) respectively, has been seen previously

		length
5(a)(i) Mid points : 1.5, 3, 4.5, 7 1.5 × 2 + 3 × 6 + 4.5 × 8 + 7 × 4 (= 3 + 18 + 36 + 28 = 85) ÷ 20 4.25 (microns)	B1 M1 m1 A1	 FT 'their mid points' provided each one lies within the appropriate group, including bounds Accept 4.3 from correct working, i.e. 85 ÷ 20 seen in working Do not accept 4.2 unless 4.25 or 85 ÷ 20 seen in working
5(a)(ii) 45 dust particles means 3×7 : 3×8 21 : 24 or 21 in total equivalent (A further) 13 (dust particles)	M1 m1 A1	Accept 7×45/(7+8) : 8×45/(7+8) Allow M1, m1, A0 for sight of 8 + 13 = 21 *Alternative:* *Trial & improvement, e.g.* *18 : 27 (is 2 : 3 incorrect)* *19 : 26 (incorrect)* *20 : 25 (is 4 : 5 incorrect)* *21 : 24 (is 7 : 8 correct!!)* *M1 for sight from the above list:* *a trial with correct simplification shown* ***AND*** *--- either for a second trial with correct simplification shown* *--- or the second trial has clearly been dismissed* *m1 Selection of 21 : 24* *A1 (a further) 13 (dust particles)*

GCSE Mathematics – Numeracy Unit 2: Higher Tier Autumn 2016	Mark	Comment
5(b) (Circumference) $5 = 2 \times \pi \times r$ or $5 = \pi \times d$ Radius of the cylinder $\frac{5}{2\pi}$	M1 A1	$(5/2\pi = 0.79577\ldots)$
Volume $\pi \times (5/2\pi)^2 \times 2$	m1	FT 'their r' provided M1 awarded provided 'their r' $\neq 5/\pi$
4 (microns^3)	A2	A1 for $25/2\pi$ or 3.9(…) or 4.0 (microns^3)

1.(a)	25·1		B2	B1 for 25(·….).
1.(b)	11.2		B2	B1 for 11.2 OR 11.2(…)

GCSE MATHEMATICS Unit 2 : Higher tier Summer 2017	✓	Mark	MARK SCHEME Comments

= 0·16 or equivalent.		A1	
2.(a) −4		B1	
2.(b) At least 6 correct plots and no incorrect plot. A smooth curve drawn through their plots.		P1 C1	F.T. 'their (3,−4)'. Allow ± '½ a small square'. F.T. 'their 7 plots'. OR a curve through the 6 given points and (3,-4). Allow intention to pass through their plots. (± '1 small square horizontal or vertical)'.
2.(c) Line y = −3 drawn 1·4 AND 3·6		B1 B1	 F.T. intersection of 'their curve' with 'their $y = -3$' only if exactly two points of intersection.

5.(a) (Length^2 =) $44^2 - 16^2$ or 44^2 = Length^2 + 16^2 (Length =) $\sqrt{1680}$ or Length^2 = 1680 41 (inches)	M1 A1 A2	 2 sig.fig. is required A1 for 41.0, 41.00 or 40.9878… rounded or truncated FT from M1 for the correctly evaluated square root of 'their 1680' provided 'their answer' < 44 (inches) for possible A2 or A1
5.(b) (100 ×) 710.40 ÷ 74 (£)960	M1 A1	
5.(c)(i) 23.52 p	B1	
5.(c)(ii) 27.44 p	B1	

3.		Accept rounding or truncation of 1/2p throughout
(Balls of wool per pair) 135 ÷ 20 (× 40) 6.75 (balls) or 7 (balls) or 270 (balls) or 280 (balls)	M1 A1	
(Costs are 40 ×) 1.42 × 135 ÷ 20 (+(40 ×) 8)	m1	FT 135 ÷ 20 = 6.75 balls and 7 balls *Costs / 1 pair / 40 pairs* *6.75 balls / £9.585 / £383.40* *7 balls / £9.94 / £397.60*
(Profit = Sales – Costs), e.g. (Profit per pair) 18.95 - 1.42 × 135 ÷ 20 - 8 OR (Profit for 40 pairs) 40 × 18.95 – 40 × (1.42 × 135 ÷ 20 + 8) OR Appropriate amounts used to calculate (100 ×) total sales - 1(× 100) total costs	M2	*Profit using 6.75 balls* *1 pair: 18.95 - 9.585 - 8 = 18.95 – 17.585 = £1.365* *40 pairs: 758 - 383.40 - 320 = 758 – 703.40 = £54.60* *Profit £, using 7 balls* *1 pair: 18.95 – 9.94 - 8 = 18.95 – 17.94 = £1.01* *40 pairs: 758 - 397.60 - 320 = 758 – 717.60 = £40.40* M1 for any 1 amount Paying sister 40 prs: 320 Total sales 40prs: 758 Total costs 40prs: 6.75 balls: 703.4(0) 7 balls: 717.6(0) Total cost 1 pair: 6.75 balls: 17.585 7 balls: 17.94 OR M1 for any 1 of the following: • omitting to pay her sister: 18.95 - 1.42 × 135 ÷ 20 or 40 × 18.95 - 40 × (1.42 × 135 ÷ 20) • inconsistent use of × 40: 40 × 18.95 - 1.42 × 135 ÷ 20 - 8 or 18.95 – 40 × (1.42 × 135 ÷ 20 + 8)
Use of appropriate amounts to calculate: (Percentage profit = 100 ×) profit / costs or (100 ×) sales / costs - 1(× 100)	m1	FT from previous M1 or M2 *FT 18.95 – 'their cost per pair' OR 'their cost per pair'* *'40 × 'their 18.95' – 'their total costs'' / 'their total costs'* *OR equivalent*
7.8(%) or 5.6(%)	A1	No other FT, must be 2 s.f. 7.8% CAO comes from use of 6.75 balls, 5.6% CAO comes from use of 7 balls
See next page for OCW strands.		

12.	137.5 ÷ 10.5	M1	Use of 137.4 and 137.49 gains M0, but the correct use of $137.4\dot{9}$ (with only the 9 recurring) can gain M1. If other calculations shown, then the relevant calculation must be identified.
	= 13.1(cm)	A1	CAO

Unit 2 : Higher Tier Summer 2018			
1.(a)	8·27	B2	Mark final answer. B1 for sight of 8·26(……) or for sight of 8·270 or for sight of 8·30 or for sight of 8·3
1.(b)	0·0213	B2	Mark final answer. B1 for sight of 0·0212(…….)

2.(c) 280°	B1	
3. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4{\cdot}25 \le x \le 4{\cdot}45$, one < 0, one > 0. 2 correct evaluations $4{\cdot}25 \le x \le 4{\cdot}35$, one < 0, one > 0. (x =) 4·3	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* *Look out for equating $x^3 - 7x = 51$* x $x^3 - 7x - 51$ 4 −15 4·1 −10·779 4·2 − 6·312 4·25 −3·984... 4·3 − 1·593 4·34 0·366... 4·4 3·384 4·35 0·862... 4·5 8·625 4·45 5·971... 4·6 14·136 4·7 19·923 4·8 25·992 4·9 32·349 5 39 *For this question A1 can only be awarded if M1 given.*
Organisation and Communication	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical
Accuracy of writing	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc

8. $2x - y = 6$ or equivalent e.g. $12(2x - y) = 72$ $3x + y = 16{\cdot}5$ or equivalent e.g. $3x + y + 3x + y = 33$	B1 B1	B1 for sight of correct equation. B1 for sight of correct equation. FT 'their two simultaneous equations'.
Correct method to solve simultaneous equations.	M1	Equating a variable (if necessary) AND adding or subtracting as appropriate. Allow one slip.
$x = 4{\cdot}5$ $y = 3$	A1 A1	C.A.O. from 'their equations' for 1st variable. F.T. from substituting 'their 1st variable' if M1 gained. SC1 if $x = 4{\cdot}5$ AND $y = 3$ given without using simultaneous equations method. This could happen after a B1 (or B1B1) gained or just appear with no equations shown.

10(a) $\frac{6 \times 10^9}{1{\cdot}5 \times 10^8}$ or equivalent 40 or 4×10^1	M1 A1	A calculation, using approximations, that would lead to an answer of < 50 FT their calculation e.g. $\frac{5{\cdot}9 \times 10^9}{1{\cdot}5 \times 10^8}$ leads to an answer of 39·33
10(b) $63000 \times 1{\cdot}5 \times 10^8$ OR $60000 \times 1{\cdot}496 \times 10^8$ OR $60000 \times 1{\cdot}5 \times 10^8$ $= 9{\cdot}4(5) \times 10^{12}$ (km) OR $8{\cdot}9(76) \times 10^{12}$ (km) OR 9×10^{12} (km)	M2 A1	Acceptable options for M2 and A1 Award M1 only for $63000 \times 1{\cdot}496 \times 10^8$ Or M1 for 1 slip in the power of 10, but otherwise correct FT from M2 only If no marks awarded, SC1 for $6(\cdot 3) \times 10^{12}$ (km)

		solving an equation.
11. $13200 \times 460 \div 3$ $= 2024000\ (cm^3)$ $= 2.024(m^3)$	M1 A1 B1	Or equivalent. Strict FT of a correct conversion of their volume to m^3.
Alternative method *Sight of 1.32 AND 4.6* *$1.32 \times 4.6 \div 3$* *$= 2.024(m^3)$*	B1 M1 A1	 *FT 'their 1.32' and 'their 4.6' from place value errors for M1A1.*

13.	$\frac{26.5-1.95}{0.815}$ or $\frac{24.55}{0.815}$	M2	If many attempts are offered without a method/answer being identified then mark final attempt. Award M1 for correct use of values $26.5 \leq a < 27$, $1.9 < b \leq 1.95$ and $0.81 < c \leq 0.815$. OR award M1 for use of 2 of the 3 correct limits.
	= 30(.12…)	A1	Mark final answer. Only award A1 if M2 gained. If no marks gained award SC1 for an unsupported answer of 30.12(…).

14. Attempt to find a [face diagonal]^2.	S1	E.g. $3^2 + 5^2 = 34$ OR $3^2 + 7^2 = 58$ OR $5^2 + 7^2 = 74$
$\sqrt{3^2 + 5^2 + 7^2} (= \sqrt{83})$	M2	M1 for $3^2 + 5^2 + 7^2$. May be seen in stages. This mark implies S1.
= 9.11(cm)	A1	CAO (must be correct to 2 decimal places). Unsupported answer of $\sqrt{83}$ gains S1 M2 A0.

Unit 2: Higher Tier		
1. Sight of 9.95 (m) or 99.95(m) or 995 (cm) or 9995 (cm) (Least length) 9.95 + 99.95 + 9.95 or equivalent in cm 119.85 (m)	B1 M1 A1	If units are given they must be correct FT 'their least measurements' x and y, provided 9.9 (m) ≤ x <10(m) and 99.9 (m) ≤ y <100(m) as appropriate CAO Award all 3 marks for a correct response If no marks, award SC1 for an answer of 118.5(m) or 119.985(m) or (9.95 + 9.95 + 99.5 =) 119.4(m)
1. Alternative method: *100 + 10 + 10 – 3 × 0.05 or equivalent in cm* *119.85 (m)*	*M2* *A1*	*M1 for sight of - 5 cm or -0.05 (m) used* *CAO* *If no marks, award SC1 for an answer of 119.7.(m)*

		Final B1 may be awarded after B0B0B0.
5. Sight of any TWO of 30, 2 or 0·5 OR Sight of any TWO of 30, 8 or 0·5 as appropriate approximations.	B1	Allow 30·2 for 30.
$\frac{30 \times 8}{0{\cdot}5}$ or equivalent.	M1	Equivalent e.g. $\underset{\frac{1}{2}}{\frac{30 \times 2 \times 2 \times 2}{}}$ or $\frac{30 \times 2^3}{0{\cdot}5}$ Must be seen, but allow if attempted calculation done in steps. M0 for exact calculation.
= 480	A1	C.A.O. Allow 483·2 if 30·2 used

4.(a) an expression	B1	
4.(b) an equation	B1	
5. (Mid-points) 2·5, (7·5), 12·5 and 17·5. $8 \times 2{\cdot}5 + (0 \times 7{\cdot}5) + 7 \times 12{\cdot}5 + 5 \times 17{\cdot}5$ $(20 + 0 + 87{\cdot}5 + 87{\cdot}5 = 195)$ $\div 20$ $= 9.75$	B1 M1 m1 A1	Allow for sight of mid-points. F.T. 'their mid-points' including bounds, provided they fall within the classes (including lower and upper bounds and used consistently). C.A.O.
6. $(x =) \frac{360}{15}$ or $180 - \frac{(15-2) \times 180}{15}$ or equivalent $= 24(°)$ (BR =) $8 \times \cos 24$ or $8 \times \sin (90 - 24)$ $= 7{\cdot}3(0\ldots)(\text{cm})$ or $7{\cdot}31(\text{cm})$	M1 A1 M2 A1	May be seen in parts. FT 'their stated value for x' ($x < 90°$) M1 for $\frac{BR}{8} = \cos 24$ or $\frac{BR}{8} = \sin (90 - 24)$ Accept equivalent of using sin rule (as sin 90 = 1). *Alternative method to find BR* *A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem)* *M2* *BR = 7·3(0…)(cm) or 7·31(cm)* *A1*
7. $2{\cdot}656 \times 10^6$	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for $2{\cdot}66 \times 10^6$ or $2{\cdot}7 \times 10^6$ or $2{\cdot}6 \times 10^6$ or $2{\cdot}65 \times 10^6$
8. Sight of 24·5 AND 15·5 OR Sight of 23·5 AND 14·5 $2(24{\cdot}5 + 15{\cdot}5) - 2(23{\cdot}5 + 14{\cdot}5)$ or equivalent $= 4(\text{cm})$	B1 M1 A1	Sight of (Greatest =) 80 OR (Least =) 76 implies B1 FT only for upper bounds of 24·4 AND 15·4 or 24·49 AND 15·49 (lower bounds must be 23·5 AND 14·5 else M0) CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 AND (Least =) 76
Alternative method. *Difference between least and greatest length for each side = 1(cm)* *4 × 1* *= 4(cm)*	*B1* *M1* *A1*	 *FT only for differences of 0·9 or 0·99* *CAO*
9. Method to eliminate variable e.g. equal coefficients with appropriate addition or subtraction. First variable found, $x = 4$ or $y = -1$. Substitute to find the 2nd variable. Second variable found	 M1 A1 m1 A1	*No marks for trial and improvement.* Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1st variable'. Award no marks for unsupported correct answers.

11. $\frac{63 \cdot 5^2}{8.65}$ = 466(·156…) or 466·16 or 466·2	 M2 A1	If many attempts are offered without a method/answer being identified, then mark the final attempt. If M2 not gained, award M1 for correct use of values $63 \leq d < 64$ AND $8{\cdot}6 < e \leq 8{\cdot}7$ Mark final answer. M2 required for A1. Fractional equivalent 466(·156…) = 80645/173 Allow this A1 for an answer of 470 only from correct unambiguous working seen. If no marks gained, award SC1 for sight of 63·5 and 8·65 used within the same calculation.
12. Use of cosine rule followed by sine rule (EG =) $\sqrt{(2{\cdot}7^2 + 3{\cdot}2^2 - 2 \times 2{\cdot}7 \times 3{\cdot}2 \times \cos 79(°))}$ (EG =) 3·77…. (cm) sin EFG = EG × sin 65(°) / 6·4 OR $EFG = \sin^{-1}(EG \times \sin 65(°) / 6{\cdot}4)$ F = 32(·29…..°)	S1 M2 A1 M2 A1	 M1 for (EG^2 =) $2{\cdot}7^2 + 3{\cdot}2^2 - 2 \times 2{\cdot}7 \times 3{\cdot}2 \times \cos 79(°)$ or for (EG^2 =) 14·2(3…..) Accept 3·8 cm Allow $\sqrt{14.2(3...)}$ if used in this form in subsequent work, provided not evaluated as a decimal (at any stage) F.T. 'their derived EG' (not 2·7, 3·2, 6·4 or spurious EG). Award M1 for sin EFG / EG = sin 65(°) / 6·4 OR EG / sin EFG = 6·4 / sin 65(°) Dependent on previous M2.
13. (Numerator) Sight of $3x(2x - 3)$ (Denominator) Sight of $(2x - 3)(2x + 3)$ $\frac{3x}{2x + 3}$	B1 B2 B1	 B1 for (2x ….. 3) (2x ….. 3) Mark final answer. F.T. provided at least one previous B1 awarded AND provided simplification required.
14. *(a)* ½ × (x – 1) × (2x + 3) × sin 30° [= 6] OR ½ × ($2x^2 + 3x - 2x - 3$) × sin 30° [= 6] $2x^2 + x - 3$ (= 6 × 2 × 2) $2x^2 + x - 27 = 0$	B1 B1 B1	Use of 'Area = ½ ab sinC'. Correct expansion of brackets and correct collection of x terms. May be implied within equation. Must be convincing.
14. *(b)* (x =) $\frac{-1 \pm \sqrt{[(1)^2 - 4(2)(-27)]}}{2(2)}$ (x =) $\frac{-1 \pm \sqrt{217}}{4}$ (x =) –3·93 AND 3·43	M1 A1 A1	**This substitution into the formula must be seen for M1, otherwise award M0A0A0.** Allow one slip in substitution **for M1 only**, but must be correct formula. Can be implied from at least one correct value of x evaluated, provided M1 awarded. Both solutions required. *Using trial and improvement* *Award B3 for a method leading to both solutions, namely x = –3·93 AND x = 3·43, otherwise B0.* An unsupported answer gains zero marks.
14. *(c)* (AC =) 2·43 (cm) Length cannot be negative / must be positive.	B1 E1	F.T. 'their derived x' provided one positive and one negative solution. Accept any valid explanation, e.g. x–1>0, so x>1, x cannot be negative (as x - 1 must be > 0)
15. *(a)* $y = f(x) - 3$	B1	
15. *(b)* $y = -f(x)$	B1	
15. *(c)* $y = f(x - 10)$	B1	

10. $\frac{97{\cdot}5}{0{\cdot}55}$	M2	If many attempts are offered without a method/answer being identified, then mark the final attempt. If M2 not gained, award M1 A0 for correct use of values $97{\cdot}5 \leq t < 98$ and $0{\cdot}5 < w \leq 0{\cdot}55$.
$= 177{\cdot}3$	A1	CAO. Must be to 1 decimal place. Mark final answer. An unsupported answer of 177·3 gains full marks. SC2 for an unsupported answer of 177·27(2727…), fractional equivalent = 1950/11 SC1 for an unsupported answer of 177 or 177·2 or for sight of 97·5 and 0·55 used within the same calculation

16. (Sight of $2x(5x + 1) = 10x^2 + 2x$ OR (Sight of $(7 - 2x)^2 = 49 - 14x - 14x + 4x^2$ OR $2x(5x + 1) = (7 - 2x)^2$	B1	Or equivalent. Or equivalent. $2x(5x + 1) = (7 - 2x)^2$ may be implied in later working.
$10x^2 + 2x = 49 - 14x - 14x + 4x^2$	B1	
$6x^2 + 30x - 49 = 0$	B1	F.T. expansions of equivalent level of difficulty provided B1 previously awarded. '= 0' required, but may be implied by an attempt to use the quadratic formula.
$x = \frac{-30 \pm \sqrt{30^2 - 4\times6\times-49}}{2\times6}$ or $x = \frac{-30 + \sqrt{30^2 - 4\times6\times-49}}{2\times6}$	M1	Substitution into the formula must be seen for M1. F.T. 'their derived quadratic equation' equated to zero of equivalent difficulty (a, b and c must be non-zero). Allow one slip in substitution **for M1 only**, but must be correct formula.
$x = \frac{-30 \pm \sqrt{2076}}{12}$ or $x = \frac{-30 + \sqrt{2076}}{12}$ or $x = \frac{-15 \pm \sqrt{519}}{6}$ or $x = \frac{-15 + \sqrt{519}}{6}$	A1	Can be implied from at least one of their two values of x correctly evaluated (x=1·29… or x=−6·29…)
$x = 1.3$ (answer to 1 d.p.)	A1	FT for A1 for their quadratic equation provided: • rounding required to 1 d.p. AND • one positive and one negative root. Do not allow 1·30. Do not penalise if negative solution also shown ($x = -6.3$ or $-6.29(\ldots)$) Note: sight of a correct answer does not imply full marks without working.
Using trial and improvement for the final 3 marks *Two correct evaluations 1.25 ≤ x ≤ 1.35,* *(one value < 0, one value > 0)*	*M2*	*Two correct evaluations must be seen, otherwise M0.* *F.T. 'their derived quadratic equation' (=0 or ='their constant') of equivalent difficulty (a, b and c must be non-zero) and their x involves rounding to 1 d.p.*
$x = 1.3$ *(answer to 1 d.p.)*	*A1*	*FT for A1 for their quadratic equation.*

3(a) $4500 \times (1 - 0.2(0)) \times (1 - 0.14)^9$ or $4500 \times 0.8(0) \times 0.86^9$ or equivalent	M2	For M2, do not ignore any additional years considered, unless 10 years selected or implied in later working M1 for equivalent of one of the following (which may be embedded in other working): • $4500 \times (1 - 0.2(0))$ (= 3600) • $4500 \times 0.8(0)$ (= 3600) • $4500 \times (1 - 0.14)^9$ (= 1157.97...) • 4500×0.86^9 (= 1157.97...)
An answer in the range (£)926.35 to (£)926.40	A1	An answer for 10 years (not beyond) must be selected Allow an answer of (£)926 provided not from rounding an amount outside the range given Award M1, SC1 for an answer $(4500 \times 0.8 \times 0.86^{10} =)$ (£)796.68(5....) or (£)796.69 or (£)796.70 or (£)797
3(b) $100 \times 750 \div 125$ or $100 \times \frac{750}{125}$ or equivalent	M1	
(£) 600	A1	Answer space takes precedence
3(c)		Accept equivalents using the sine rule throughout '½ width' may be referred to by any unknown
Sight of appropriate 80 (cm) (height of triangle)	B1	Check if indicated on the diagram
(½ width =) $\frac{80}{\tan 33°}$ or (½ width =) $80 \times \tan(90° - 33°)$	M2	(= 123.189... cm or 123.2 cm) FT 'their 80' provided ≤ 120 and ≠ 90 M1 for sight of $\tan 33° = \frac{80}{\text{½ width}}$ or $\tan(90° - 33°) = \frac{\text{½ width}}{80}$
× 2	m1	FT provided at least M1 previously awarded, i.e. for intention to double 'their ½ width'
(Width of garage is) 246(cm) to 246.4(cm)	A1	CAO. ISW
3(d) (Maximum space =) 555 – 395 – 70 or 550 – 400 + 2 × 5 – 70 or equivalent	M2	Check the diagram M1 for any of the following • use of 550 < 'their 555' ≤ 560 AND 390 ≤ 'their 395' < 400 • for sight of 555 and 395 • for sight of 550 – 400 + 2 × 5
90 (cm)	A1	CAO Award M1 and SC1 for an answer of (555 – 395 =) 160 (cm)

4.(a)	1·2	B2	Mark final answer. Award B1 for one of the following: • sight of 1·1(5519…..). • an answer of 1·20. Do not award B2 or B1 for answers obtained from incorrect work (e.g. rounding and/or estimating).
4.(b)	0·043	B2	Mark final answer. Award B1 for sight of one of the following: • $\frac{1}{23}$ • 1 ÷ 23 • 0·0434(…) • 0·0435 • 0·04.
4.(c)(i)	12	B1	
4.(c)(ii)	5	B1	

6. Sight of 4(hr) 35(min) AND 2(hr) 45(min) OR Sight of 275(min) AND 165(min) OR sight of 2 × 5(min) in an appropriate calculation.	B1	Allow incorrect notation for time (e.g. 4:35 for 4(hr) 35(min)).
Valid method e.g. • 4(hr) 35(min) + 2(hr) 45(min)(=6(hr) 80(min)) 275(min) + 165(min) (= 440 (min)) • 6 (hr) 90 (min) – 10 (min) • 7 (hr) 30 (min) – 10 (min) • 4(hr) 40(min) + 2(hr) 50(min) – 10 (min) • 280 (min) + 170 (min) – 10(min)	M1	If B0, FT provided unambiguously chosen: '4h 30m ≤ t_1 < 4h 40m' and '2h 40m ≤ t_2 < 2h 50m' OR '270m ≤ t_1 < 280m' and '160m ≤ t_2 < 170m' Allow incorrect notation for time (e.g. 4:35 for 4(hr) 35(min)).
7 (hr) 20 (min)	A1	CAO. If units are given they must be correct. Award B1M1A0 for a final answer of 6hrs 80min, 6:80 or 7:20.

3(a) (Difference 60 million – 41 000 000 =) 19 000 000 or 19 million (Underspend) $\frac{19\,000\,000}{60\,000\,000}$ (× 100) or equivalent 31.67(%)	B1 M1 A1	May be implied in further working Allow 19 m(il) FT 'their 60 million – 41 000 000' including if a place value error made CAO (must be 2 d.p.) Answer space takes precedence
3(a) Alternative method *(Underspend)* *(100 -)* $\frac{41\,000\,000}{60\,000\,000}$ *(× 100) or equivalent* *31.67(%)*	*M1* *A2*	*Allow place value error* *CAO (must be 2 d.p.)* *Answer space takes precedence* *A1 for 31.6(6…%), 31.7(%), 32(%) or 68.33(%)*
3(b) 4×10^6	B1	

3(c) (Change to $) 350 × 1.25 ($)437.5(0)	 M1 A1	*Do not penalise slips in giving incorrect use of £ for $*
(Only $10 and $50 notes available so he can buy) ($)430	A1	FT 'their ($)437.5(0)' (provided not a multiple of 10) rounded down to nearest multiple of 10 Accept stated or implied as ($)7.50 can't be converted ($)430 implies previous M1 A1, provided not from incorrect working
(Fewest number of notes making up $430) **8** $50 (notes) and **3** $10 (notes)	A1	FT 'their $430' provided it is a multiple of 10 (and provided M1 previously awarded) Must be fewest number of notes, that may be listed Sight of correct number of notes with no incorrect working implies previous A1, unless contradicted
(Cost in £ to buy $430 is) 430 ÷ 1.25 or 350 – 7.5(0) ÷ 1.25 (= 350 – 6) (£)344	M1 A1	FT 'their whole number multiple of $10' ÷ 1.25 Ignore attempt at any further calculation if 430 ÷ 1.25 seen Must be <(£)350 **and** depends on M1 M1 previously awarded Mark final answer If final M0 A0, then award SC1 for (£) 6 (left) or similar on FT, provided not from incorrect or inappropriate working
3(c) Alternative method *£40 = $50 and £8 = $10* *8 $50 notes, 3 $10 notes* *(Cost to buy £350 is)* 8 × 40 + 3 × 8 *(£)344*	*M1* *A3* *M1* *A1*	*A2 for 8 $50 notes* ***and** sight of 350 – 8 × 40 or equivalent* *OR* *A1 for 8 $50 notes*
Organisation and communication Writing	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanations and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.

6. (Width of poster) $2 \times \frac{26.4}{2.4}$ or 2×11 or equivalent	M1	
22 (cm)	A1	Mark final answer for the width of the poster
(Perimeter of poster $2 \times (22 + 26.4) =$) 96.8 (cm)	A1	FT 'their 22' provided M1 previously awarded
100 (cm)	B1	FT provided 95 < 'their 96.8' <100, as 100 correct to 1 significant figure Accept working in mm or m, units must then be given in the final answer Do not accept an unsupported answer of 100 (cm)
6. Alternative method *(Perimeter of stamp) 8.8 (cm)* ***AND*** *sight of* $\frac{26.4}{2.4}$ *(= 11) or* $\frac{2.4}{26.4}$ $(= \frac{1}{11})$	*B1*	
(Perimeter of poster) *(2 + 2.4 + 2 + 2.4)* $\times \frac{26.4}{2.4}$ *or 8.8* $\times \frac{26.4}{2.4}$ *or 8.8 × 11 or equivalent*	*M1*	*FT 'their 2 + 2.4 + 2 + 2.4'*
96.8 (cm)	*A1*	
100 (cm)	*B1*	*FT provided 95 < 'their 96.8' <100, as 100 correct to 1 significant figure* *Accept working in mm or m, units must then be given in the final answer* *Do not accept an unsupported answer of 100 (cm)*

8(a) $\frac{360-15}{360} \times \pi \times 60$ (+60) = 241 (mm)	M1 A2	A1 for any one of the following: • answer of 240.5(5) to 240.7 • answer of $\frac{115\pi}{2} + 60$ or $57.5\pi + 60$ • sight of (180.5(5) to 180.7) + 'their 60' correctly rounded to the nearest mm • sight of 181

8(b)		An answer of 68 tins does not imply full marks should be awarded, as it can be a result of inaccuracy in workings
(Greatest possible area of a part =) $\pi\times80.5\times30.25 + \frac{4\times\pi\times30.25^2}{2}$ (7646.2 to 7651.2) (5746.59 to 5750.3)	M3	M2 for • $\pi\times80.5\times30.25 + 4\times\pi\times30.25^2$ OR • $\pi\times$'their 80.5'$\times$'their 30.25' + $\frac{4\times\pi\times\text{'their } 30.25^2\text{'}}{2}$ where 80 < 'their 80.5' ≤ 81 and 30 < 'their 30.25' ≤ 30.5 and where 'their 30.25' could have different values in the two terms, but both have to be in the range shown M1 for • the sum of 2 terms with 1 correct and with bounds in the same ranges as for M2 OR • $\pi\times80\times30 + \frac{4\times\pi\times30^2}{2}$ (= 4200π)
= 13392.79 to 13401.5 or 4265.25π (mm^2)	A1	CAO. May be implied by sight of 267 857 600 to 268 028 400 (total surface area of 20 000 parts)
(Minimum number of tins needed =) 20 000 × 13399.678.. ÷ 3 950 000	M1	FT 'their 13399.678…' provided it has come from the use of 'their upper bounds' of 80mm and 60mm if bounds used Allow M1 only for 20 000 × 13399.678.. ÷ 'their 3 950 000' where 3 900 000 ≤ 'their 3 950 000' < 4 000 000
= 68 (tins)	A1	A0 for 67.8…tins If no marks awarded, and from a misinterpretation of the question, SC3 for an **answer of 65** tins from $20000\times(\pi\times79.5\times29.75 + \frac{4\times\pi\times29.75^2}{2}) \div 4\,050\,000$ OR SC2 for an **answer of 64(.1...)** tins from $20000\times(\pi\times79.5\times.29.75 + \frac{4\times\pi\times29.75^2}{2}) \div 4\,050\,000$ OR SC1 for a correct evaluation (rounded, truncated or unrounded) of the calculation $20000\times(\pi\times79.5\times29.75 + \frac{4\times\pi\times29.75^2}{2}) \div 4\,050\,000$ where 79 ≤ 'their 79.5' < 80 and 29.5 ≤ 'their 29.75' < 30 and 4 000 000 < 'their 4 050 000' ≤ 4 100 000 OR If no marks awarded, SC1 for use of 80.5 and 30.25

8(c) Statements required: • Number the parts from (0000)1 to 20000 • Consider successive 5-digit numbers • Use numbers in the range e.g. Use numbers from (0000)1 to 20000 or Do not use 0000 or numbers > 20000 • Ignore repeats (Working in rows would give parts) (0)1325, 18266, ~~(0)1325~~, (0)5929, 10429, (0)2891 OR (Working in columns would give parts) (0)5929, (0)1325, 10429, ~~(0)1325~~, (0)2891, 18266	E2 B1	All 4 needed for E2 E1 for any 2 or 3 correct statements Allow an equivalent numbering system e.g. (0000)0 to 19999 Their numbering system can be implied by the range of numbers they state they will choose from Allow the 2nd statement to be implied by their numbering of the parts (from 00001) AND their use of 5-digit numbers in their answer OR 5-digit numbers used in their answer and e.g. 01325 seen Do not allow 'Use numbers less than 20000' if they have numbered the parts from 00001 to 20000 ISW. Part numbers can be given in any order
8(c) Alternative method: *Statements required:* • *Number the parts from (0000)1 to 20000* • *Consider successive 5-digit numbers* • *Divide each number by 20000 and use the remainder to choose a part* • *If the 5-digit number is 00000, then part 20000 is chosen, and ignore repeats.* *(Working in rows would give parts)* *(0)6923, (0)1325, 18552, ~~(0)6923~~, (0)8925, 12712* *OR* *(Working in columns would give parts)* *(0)6923, (0)8925, 15775, (0)5929, ~~(0)8925~~, (0)1325*	*E2* *B1*	*All 4 needed for E2* *E1 for any 2 or 3 correct statements* *Allow an equivalent numbering system e.g. (0000)0 to 19999* *Their numbering system can be implied by the range of numbers they state they will choose from* *Allow the 2nd statement to be implied by their numbering of the parts (from 00001) AND their use of 5-digit numbers in their answer OR* *5-digit numbers used in their answer and e.g. 06923 seen* *If (0000)0 to 19999 used, when the remainder is 0, part (0000)0 is selected* *ISW*

15.	$23{\cdot}5 - \frac{0{\cdot}725}{8{\cdot}35}$	M2	If many attempts are offered without a method/answer being identified then mark final attempt. Accept 23·4999… or 8·34999… (or using recurring dot notation). Do not accept truncated values of 23·49 or 23·499 or 8·349 or 8·3499. Award M1 for correct use of values $23 < b \leq 24$, $0{\cdot}72 \leq c < 0{\cdot}73$ and $8{\cdot}3 < d \leq 8{\cdot}4$ OR award M1 for correct use of 2 of the 3 correct limits. Allow sight of 23·413(…) for M2.
	= 23·41	A1	Only award A1 if M2 gained.

Unit 1: Higher Tier	Mark	Comments
1.(c) $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$	B3	Mark final answer. Award B2 for an unsimplified evaluation as a single fraction or mixed number e.g. • $4\frac{7}{14}$ • $3\frac{21}{14}$ • $\frac{63}{14}$ • $\frac{441}{98}$ or equivalent • 4 + ½. FT for one of the following: • adding 'their improper fractions' (which incorporate the entire numbers) provided fractions have a common denominator (one numerator must be correct) and answer given in a (proper or improper) simplified form • 3 + 'their fractions' evaluated correctly and in a simplified form, provided fractions have a common denominator (one numerator must be correct) • 'their 3' + 1·5 (or equivalent) in a simplified form • a + ½ (or equivalent in its simplified form) evaluated provided ½ has come from two fractions with a common denominator (e.g. $\frac{10}{14}+\frac{11}{14}=\frac{21}{14}=1\frac{7}{14}+3=3\frac{1}{2}$). Award B1 for sight of two fractions with a common denominator (allow an error in one numerator) e.g. • (1) $\frac{10}{14}$ + (2) $\frac{11}{14}$ • $\frac{24}{14}+\frac{39}{14}$ • $\frac{168}{98}+\frac{273}{98}$ or equivalent. An unsupported answer of $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$ is awarded B3.

Unit 2: Higher Tier		Mark	Comments
15. $\frac{7\cdot15}{73\cdot85-65\cdot75}$ or $\frac{7\cdot15}{8\cdot1}$		M2	If many attempts are offered without a method/answer being identified then mark final attempt. Award M2 for sight of 143/162 if clearly identified as 'their final attempt'. Accept 7·14999… or 65·74999… (or using recurring dot notation). Do not accept truncated values of 7·149 or 7·1499 or 65·749 or 65·7499. Award M1 for correct use of values 7·1 < e ≤ 7·2, 73·8 ≤ f < 73·9 and 65·7 < g ≤ 65·8 OR award M1 for correct use of 2 of the 3 correct bounds, 7·15, 73·85 and 65·75.
	= 0·8827	A1	CAO. Must be correct to 4 decimal places. Only award A1 if M2 gained. If no marks gained award SC1 for an unsupported answer of 0·8827(16…)

Unit 2: Higher Tier	Mark	Comments
1(a) (2.31 ÷ 7) ÷ 0.30 or (2.31 ÷ 0.30) ÷ 7 or (231 ÷ 7) ÷ 30 or (231 ÷ 30) ÷ 7 or equivalent	M2	Allow if brackets are implied in further working May be shown in stages M1 for any of the following: • 2.31 ÷ 0.30 (= 7.7) • 2.31 ÷ 7 (= 0.33) • (231 ÷ 7) ÷ 0.30 (= 110) • (2.31 ÷ 7) ÷ 30 (= 0.011) • (231 ÷ 0.30) ÷ 7 (= 110) • (2.31 ÷ 30) ÷ 7 (= 0.011)
1.1 (kWh)	A1	CAO. Ignore incorrect units
1(b) (Height freezer door) 2 × 1800 ÷ 5 or $\frac{2}{5}$ × 1800 or 0.4 × 1800 or equivalent	M1	
720 (mm)	A1	
((Diagonal of freezer door)^2 =) $600^2 + 720^2$	M1	Or alternative **full** method FT 'their height of freezer door' including 1080 or 1800 Accept working in m or cm for possible M1, A1
Diagonal^2 = 878 400 or (Diagonal =) $\sqrt{878\,400}$	A1	
(Diagonal =) 937(.22... mm)	A1	Final answer must be given in mm FT from M1 for the correctly evaluated square root of 'their 878 400' provided 'their answer' > 'their 720' for possible A1 If final M0 A0 A0 awarded as a different length, not 'their 720', is used to calculate the diagonal, award SC1 for a correct statement of Pythagoras' Theorem, and SC1 for a correct evaluation of 'their diagonal'

3(a) (Length of the flagpole below the rod =) $3.8 \times \sin 55°$ or $3.8 \times \cos(90° - 55°)$ or $380 \times \sin 55°$ or $380 \times \cos(90° - 55°)$	M2	Or alternative full method M1 for correct working without isolating 'length' $\sin 55° = \frac{\text{length}}{3.8}$ or $\cos(90° - 55°) = \frac{\text{length}}{3.8}$ or $\sin 55° = \frac{\text{length}}{380}$ or $\cos(90° - 55°) = \frac{\text{length}}{380}$
3.11(2…m) or 311(.2.. cm)	A1	Allow 3.1 (m) or 310 (cm)
(Total length 1.5 + 3.11 =) 4.61 (m) or 461 (cm)	A1	Must be to the nearest cm FT provided at least M1 previously awarded, i.e. for 1.5 + 'their 3(.)11' correctly evaluated, to nearest cm, and 'their 3.11' is to at least 2 decimal places If units are given they must be correct
3(b)(i) $120 \times 64 \div 80$ or 64×1.5 or 120×0.8 or $120 \div 1.25$ or $64 \div \frac{2}{3}$ or equivalent	M1	
96 (cm)	A1	Answer space takes precedence
3(b)(ii) $75 \times 80 \div 120$ or $75 \div 1.5$ or $75 \times \frac{2}{3}$ or $80 \div 1.6$ or 80×0.625 or $64 \times 75 \div 96$ or equivalent	M1	FT from (b)(i) $64 \times 75 \div$ 'their 96' or equivalent
50 (cm)	A1	Answer space takes precedence

6. (Smallest possible area =) $605\times295 - 105\times205 - 225\times145$ or equivalent or $178475 - 21525 - 32625$ or equivalent or $178475 - 54150$	M4	Accept use of upper bounds e.g. 104.999… with a clear recurring digit. Do not accept use of e.g. 104.99 M3 for an appropriate calculation using 3 products with any 2 correct M2 for 'their 605×295' – 'their 105×205' – 'their 225×145' where $600 \leq$ 'their 605' < 610 and $290 \leq$ 'their 295' < 300 and $100 <$ 'their 105' ≤ 110 and $200 <$ 'their 205' ≤ 210 and $140 <$ 'their 145' ≤ 150 and $220 <$ 'their 225' ≤ 230 M1 for use of 605×295 OR 105×205 OR 225×145
$= 124325$ (cm^2)	A1	CAO May be implied by ($3 \times 124325 =$) 372975
(Least number of litres Teifion could possibly use =) $3 \times 124325 \div 55000$ or $372975 \div 55000$	M1	FT 'their derived 124325' Allow M1 for $3 \times$ 'their 124325' ÷ 'their 55000' where 50000 < 'their 55000' ≤ 60000
$= 6.78(13\ldots)$ or 6.8 (litres)	A1	Allow an answer of 6.7 or 7 from correct working On FT, accept rounding up to nearest whole number On FT, allow truncation to 1 d.p. or better If no marks awarded, and from a misinterpretation of the question, SC3 for an answer of 9.335 or 9.3 or 9.33 or 9.34 or 9.4 or 10 (litres) from $\frac{3 \times (615\times305 - 95\times195 - 215\times135)}{45000}$ or $\left[\frac{3\times(187575-18525-29025)}{45000}\right]$ OR SC2 for any one of the following: • $\frac{3 \times (615\times305 - 95\times195 - 215\times135)}{45000}$ or $\left[\frac{3\times(187575-18525-29025)}{45000}\right]$ but not evaluated correctly • correct evaluation (unrounded, rounded or truncated) from $3 \times$ ('their 615×305' – 'their 95×195' – 'their 215×135') ÷ 'their 45000' where $610 <$ 'their 615' ≤ 620 and $300 <$ 'their 305' ≤ 310 and $90 \leq$ 'their 95' < 100 and $190 \leq$ 'their 195' < 200 and $210 \leq$ 'their 215' < 220 and $130 \leq$ 'their 135' < 140 and $40000 \leq$ 'their 45000' < 50000 OR SC1 for $3 \times$ ('their 615×305' – 'their 95×195' – 'their 215×135') ÷ 'their 45000' using values in the same ranges as SC2, but not evaluated correctly

12.	$\frac{1}{4} \times \frac{4}{3} \times \pi \times 7 \cdot 3^3$ OR $\frac{1}{3} \times \pi \times 7 \cdot 3^3$ (o.e.) $= 407\ (cm^3)$	M1 A2	May be seen in stages. Award A1 for sight of one of the following: • an answer 407 (cm^3) followed by further incorrect rounding • an answer in the range 407.17 (cm^3) to 407.44(cm^3) • 129(.67...)π (cm^3) • 130π (cm^3) from correct method/work seen. • an answer 410 (cm^3) from correct method/work seen • an answer of 408(cm^3) [from 1630÷4 to 3s.f.] • an answer of 407·0(cm^3). If no marks, award SC1 for sight of 1630(cm^3) [from evaluating $\frac{4}{3} \times \pi \times 7 \cdot 3^3$ to 3s.f.].

2. Marking Abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only
MR = misread
PA = premature approximation
bod = benefit of doubt
oe = or equivalent
si = seen or implied
ISW = ignore subsequent working

F.T. = follow through ($\surd$ indicates correct working following an error and $\surd\!\!\!\!\times$ indicates a further error has been made)

Anything given in brackets in the marking scheme is expected but, not required, to gain credit.

UNIT 1: NON-CALCULATOR, HIGHER TIER

GCSE Mathematics Unit 1: Higher Tier	Mark	Comments

End of solutions