REVISE
.wales

F1.17 — Volume & surface area of prisms & cylinders

Mark schemes for the F1.17 question pack

Spec 3.6.3 — Unit 1

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 27 questions in the corresponding revise.wales question pack (85 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes.

4. (a)	obtuse		B1	
4 (b)	cuboid		B1	

			allow SC1 for sight of 15 e.g. '15/50', 15 : 35.
5.(a)	Correct cuboid	B2	For B2, their cuboid must have edges along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). B1 for any one edge dealt with correctly for all its three occurrences in a cuboid. For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'.
5.(b)	(Volume =) 6 × 4 × 3 = 72 cm^3.	M1 A1 U1	Any further manipulation to 6 × 4 × 3 is M0. Independent of other marks.

18. (Volume A =) $5 \times 5 \times 5$ (cm^3) OR (Volume B =) $4 \times 4 \times 5$ (cm^3)	M1	For use of Vol = l × b × h with <u>either</u> A or B.
(Volume A =) 125 (cm^3) AND (Volume B =) 80 (cm^3)	A1	C.A.O. for <u>both</u> volumes. One correct implies previous M1.
(Volume of B as a percentage of the volume of A) $= \frac{80}{125} (\times 100\%)$	M1	F.T. their derived volumes.
$= 64(\%)$	A1	An answer of 64(%) gains all four marks. *Allow marks if they work with base areas (as heights are equal).*
<u>Alternative method</u> *(Where 125 cm^3 and 80 cm^3 not shown.)* $5 \times 5 \times 5$ (cm^3) OR $4 \times 4 \times 5$ (cm^3)	*M1*	
$\frac{4 \times 4 \times 5}{5 \times 5 \times 5} (\times 100\%)$	*M2*	
$= 64(\%)$	*A1*	

12.(a)	Sight of (£)720 ÷ 9 or (£)80 (£)160 AND (£)560	M1 A1	Allow in any order. Allow (£)160 : (£)560 or (£)560 : (£)160 Sight of (£)160 or (£)560 implies M1
12.(b)	5	B2	B1 for sight of $\frac{1}{0{\cdot}2}$ or $\frac{10}{2}$ or $\frac{5}{1}$ or equivalent. Mark final answer.

WJEC GCSE MATHEMATICS

AUTUMN 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	72 150 52 59 168 158	B1 B1 B1 B1	
2.(a)	(44), 88, 132, 176, 220	B1	Ignore any additional multiples
2.(b)	33	B1	
3.	> < > <	B2	For all four correct. B1 for any three correct.
4.	(Perimeter of triangle = 14 + 14 + 14) = 42 (cm) (Length of side of square =) 42 ÷ 4 = 10.5 (cm)	 B1 M1 A1	 May be implied. F.T. 'their 42' provided ≠ 14
OCW	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 • write a conclusion that draws together their results and explains what their answer means.
	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
5.	0.1(0) 10% $\frac{2}{25}$ 0.08	B4	B1 for each correct response.
6.(a)	32.16	B1	Accept $32\frac{4}{25}$ and $\frac{804}{25}$. B0 for 804 ÷ 25.
6.(b)	0.4	B1	Accept $\frac{2}{5}$. B0 for 2 ÷ 5 or $\frac{1.6}{4}$
7.(a)	trapezium	B1	
7.(b)	cuboid	B1	
7.(c)	a reflex angle	B1	
7.(d)	parallelogram	B1	
8.(a)	Point R plotted correctly	B1	
8.(b)	(-3, 2)	B1	
9.	275	B2	B1 for sight of 301.

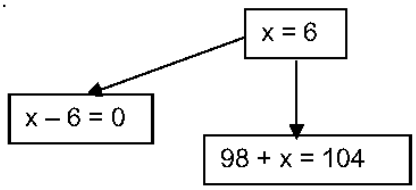
		MN = 12(·0..)(cm) ISW A1
15. Method to eliminate variable e.g. equal coefficients with intention to <u>appropriately</u> add or subtract' First variable found $x = 4$ or $y = -3$. Substitute to find the 2nd variable. Second variable found.	 M1 A1 m1 A1	*No marks for 'trial and improvement'.* *No marks for an unsupported answer.* Allow 1 error in one term, not one with equal coefficients. C.A.O. F.T. their '1st variable'.

9. (Length of sides of Ivy's Cuboid B =) 3cm, 12cm, 20cm (Volume of Ivy's Cuboid =) 3 x 12 x 20 = 720 (cm^3)	B1 M1 A1	May be implied in further working. F.T. provided two of the dimensions are correct.
Alternative method *(Volume of Gareth's cuboid = 3 x 2 x 4 =) 24 (cm^3)* *(Volume of Ivy's cuboid =) 24 x 6 x 5* *= 720 (cm^3)*	*B1* *M1* *A1*	*F.T. for their stated volume for 'Gareth's cuboid'*
9. OCW Organisation and Communication Accuracy of 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 explanation 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.
10.(a)(i) 16	B1	
10.(a)(ii) 2160	B2	B1 for sight of 2155(·.....) OR 2150 OR 2156. Mark final answer.
10.(b) 0·62 × 7·8 or equivalent. = 4·836 ISW	M1 A1	Unsupported 4·8.... implies M1. Accept $4\frac{209}{250}$ (ISW). Allow 1209/250 (ISW)
10.(c)(i) 247	B1	
10.(c)(ii) 2197	B1	
11.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' − 11 **only** if it leads to a negative answer.
11.(b) 15	B2	B1 for sight of 28·8 OR −13·8. Mark final answer.
12. $\frac{400}{17·5}$ or $\frac{4}{0·175}$. = 22·8(....) or 22·9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228..... implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
12. Alternative method (trial and improvement) *Working with a multiple of 17·5 or 0·175.* *(n × 17·5 or n × 0·175)* *22 × 17·5 (= 385) or 22 × 0·175 (= 3·85)* *23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)* *(Number of rods =) 22*	*S1* *B1* *B1* *B1*	*Award this S1 only if* *n > 2 and n ≠ 4 and n ≠ 400.* *This implies previous S1.* *This implies previous S1 and previous B1 if 402·5 seen.* *Must be seen in answer space or unambiguously identified (not simply embedded).* *Answer of 22 gains all 4 marks.* *Unsupported answer of 23 gains S1B0B1B0.*

WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
1.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
2.(a) $\frac{1}{9}$	B1	
2.(b) 0·016	B1	
2.(c) 0·015	B1	
3.(a) 1/10 or 0·1	B1	Mark final answer.
3.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
4.(a) (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.
4.(b) Sight of 5 × 3 (=15) AND 5 × 2 (=10) AND 3 × 2 (=6) (Total Surface Area =) (5×3 + 5×2 + 3×2) × 2 62 (cm^2)	B1 M1 A1	For addition of all six surface areas. (Must be three different pairs.) FT 'their 15', 'their 10' and 'their 6' C.A.O.
5. Sight of 9 AND 49 n + 9 = 49 (n =) 40	B1 M1 A1	Any unambiguous indication that this linear relationship is being considered (including 'trial and improvement'). FT their $\sqrt{81}$ (≠81) AND their 7^2 (≠7) for M1 and possibly A1 if at least one correct value used. FT for M1 only if neither correct value used. Award M1 if 49 – 9 seen. Mark final answer.
6. Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6}$ × 24 or equivalent = 8 (Points gained =) 8 × 10 = 80 (points) AND 'No' (Leah is not expected score 100 points)	B1 M1 A1 M1 A1	Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT 'their derived 8' × 10 only if 'their derived 8' < 24. FT their derived number of points
Alternative method 1 *Indicates 2 (letters out of 6 gain points)* *(Each letter expected to be drawn) 24 (times)* *6* *= 4 (times)* *(Points gained =) 4 × 2 × 10* *= 80 (points) AND* *'No' (Leah is not expected score 100 points)*	*B1* *M1* *A1* *M1* *A1*	*Any unambiguous indication.* *FT 'their derived 4' and 'their stated 2'.* *FT their derived number of points.*

7. 	B2	B1 for 2 correct answers and 1 incorrect answer B1 for 1 correct answer and 1 incorrect answer B1 for 1 correct answer and 0 incorrect answer
8. **Use** of 360(°), e.g. 8x = 360(°) (x =) 360/8(°) (x =) 45(°)	B1 M1 A1	M1 implies B1 If B0 M0 A0, award SC1 for x = 22.5(°) from accurate working from 8x = 180(°)
9. (Perimeter of rectangle =) 15+15+7+7 = 44 (cm) (Length of side of square =) 44 ÷ 4 (cm) 11 (cm)	M1 A1 M1 A1	FT 'their stated 44', but not 15 or 7.
9. OCW Organisation and Communication Accuracy of 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 explanation 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
10.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
10.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
11.(a) $\frac{1}{9}$	B1	
11.(b) 0·016	B1	
11.(c) 0·015	B1	
12.(a) $\frac{1}{10}$ or 0·1	B1	Mark final answer.
12.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
13. (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.

8(a) $\sqrt{\frac{25}{\pi}}$ or $\frac{5}{\sqrt{\pi}}$ or $\frac{\sqrt{25}}{\sqrt{\pi}}$ or equivalent	B2	ISW Accept $\sqrt{(25 \div \pi)}$ or $5 \div \sqrt{\pi}$ or $\sqrt{25} \div \sqrt{\pi}$ For B1 accept π given as 3.1(4...) B1 for sight of any of the following: • $\pi \times \text{radius}^2 = 25$ • $r^2 = 25 / \pi$ • $\pi r^2 = 25$ • $\sqrt{25} / \pi$ • $\sqrt{25} \div \pi$ • $5/\pi$
8(b)(i) $500 \times 60 \div 4$ or equivalent 7500 (cm^3 per minute)	M1 A1	May be seen in stages Answer given within the statement takes precedence
8(b)(ii) $500 \div (2 \times 25)$ or equivalent 10 (cm)	M1 A1	May be seen in stages

11. (Volume of cylinder =) $\pi \times 2{\cdot}3^2 \times 5$	M1	May be seen or implied in later working.
$= 83(\cdot095\ldots)$ (cm^3) or $26{\cdot}45\pi$	A1	Accept an answer between 83 and 83·11 inclusive.
(Density of metal =) $423{\cdot}1 \div 83(\cdot095\ldots)$	M1	FT 423·1 ÷ 'their volume of cylinder', provided not 5 or 2·3 (derived or stated). Ignore any attempt to change units (e.g. 423·1 ÷ 83 ÷ 1000).
Accept an answer between 5 and 5·1 (g/cm^3)	A1	Mark final answer.

11. *Alternative method:* *(Density of metal =)* $\frac{423{\cdot}1}{\pi \times 2{\cdot}3^2 \times 5}$ *Accept an answer between 5 and 5·1 (g/cm^3)*	*M2* *A2*	*Award M1 for sight of $\pi \times 2{\cdot}3^2 \times 5$.* A1 for sight of $423.1/26.45\pi$ or $15.9(96\ldots)/\pi$ or any other simplified fraction with **one** step left to carry out.

14.(a)	11 lb	B1	
14.(b)	175 pints	B1	

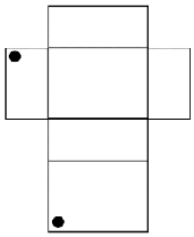
20.(a) (*AOY* =) 36(°)	B1	Check diagram.
(% shaded =) $\frac{36}{360}$ (× 100) or equivalent	M1	FT 'their derived or stated angle *AOY*' provided not 54°. Award M0A0 for $\frac{360(°)}{36(°)}$ = 10, but award M1A1 if a final answer of 10% is seen.
= 10(%)	A1	If no marks awarded, award: • SC2 for unsupported 10% (*AOY* not shown or stated to be 36(°)) • SC1 for a final answer of 15% (from using 54(°)).
20.(b) Statement explaining that, 'The **tangent** at any point on a circle is **perpendicular** (or equivalent) to the **radius** at that point'.	E1	Accept unambiguous similar wording. e.g. 'Radius and tangent 90(°)'. Diameter could be used in place of radius. Must refer to tangent and radius by name (not simply *AY* and *OA* or description).

2. Showing 41% and 35% and (45%) OR $\frac{41}{100}$ and $\frac{35}{100}$ and $\frac{45}{100}$ OR (0·41) and 0·35 and 0·45 OR three correct calculations for a common amount. 45% 0·41 $\frac{7}{20}$ in order	B2 B1	Award B2 for one of the following: • all correct % ($\frac{41}{100}$ and $\frac{35}{100}$ must be shown as 41% or 35%) • all correct fractions **with a common denominator** (could include decimals as numerators and denominators) • all correct decimals • correct work using a common amount • a valid combination that allows full comparison (e.g. $\frac{7}{20}$ = 0·35 and 0·41 = 41%). Award B1 for one of the following: • one correct **conversion** (percentage or decimal) • two correct fractions with a common denominator • two correct calculations for a common amount. Allow any unambiguous indication (e.g. 'converted' values.) If first B1 awarded then allow a **strict FT** of 'their work' for a possible final B1. If first B0 awarded, then award the final B1 for a correct final answer, only if: • no incorrect conversions seen (e.g just 45/100 given), OR • an unsupported correct final answer seen.

5(a) 209° ± 2°	B1	Answer space takes precedence
5(b)(i) Answer in the range 21 (km) to 25 (km)	B1	Answer space takes precedence
5(b)(ii) Correct interpretation of the map scale, e.g. • 1 cm represents 25 000 cm or 250 m • 2 cm represents 50 000 cm or 500 m or 0.5 km • 4 cm represents 100 000 cm or 1 000 m or 1 km OR Correct conversion 12 km to cm, 25 000 cm to km or equivalent, e.g. • (12 km =) 1 200 000 (cm) • (25 000 cm =) 0.25 (km) • sight of 1200 and 25 • sight of 12 and 0.25	B1	
12 ÷ 0.25 or 12 × 4 or 1 200 000 ÷ 25 000 or 1 200 ÷ 25 or equivalent	M1	Ignore place value error, e.g. 12 ÷ 'their number with digits 25', 12 × 'their number with digit 4'
48 (cm)	A1	CAO
5(b)(ii) Alternative method *(Original map scale is 3 cm : 12 km =)* *3 : 1 200 000 or 1 : 400 000 or equivalent*	*B1*	
$\frac{400\,000}{25\,000}$ × 3 or 16 × 3 or equivalent	*M1*	*Ignore errors in place value*
48 (cm)	*A1*	*CAO*

8. (Volume of the ornament is) ⅓ × 15 × 15 × 30 or ⅓ × 6750 or 6750 − ⅔ × 6750 or equivalent	M2	Allow also any of the following: • 0.33(3…) × 15 × 15 × 30 • 6750 – 0.66(6..) × 6750 • 6750 – 0.67 × 6750 M1 for sight of any of the following, or equivalents: • (Volume of the box is) 15 × 15 × 30 (= 6750 cm^3) • 0.3 × 15 × 15 × 30 (= 2025 cm^3) • ⅔ × 15 × 15 × 30 (= 4500 cm^3) • 0.6 × 15 × 15 × 30 (= 4050 cm^3) • 0.66 × 15 × 15 × 30 (= 4455 cm^3) • 0.67 × 15 × 15 × 30 (= 4522.5 cm^3) • 0.7 × 15 × 15 × 30 (= 4725 cm^3)
2250 (cm^3)	A2	CAO. Must be indicated and not ambiguously embedded A1 for any of the following: • (15 × 15 × 30 =) 6750 (cm^3) May be embedded in an inappropriate calculation • 'their 15 × 15 × 30' ÷ 3 correctly evaluated • (0.3(33..) × 15 × 15 × 30) 2025 (cm^3) ≤ 'their answer < 2250 (cm^3) • (⅔ × 6750 =) 4500 (cm^3) • (0.6 × 15 × 15 × 30 to 0.7 × 15 × 15 × 30) 4050 (cm^3) ≤ 'their answer ≤ 4725 (cm^3) • sight of a correct product with only 1 stage of calculation to evaluate, e.g. ○ 225 × 10 ○ 5 × 450 ○ 15 × 150 ○ 75 × 30

12.(a) 110(°)	B1	Award B1 for an answer in the range 108(°) to 112(°).
12.(b) 335(°)	B1	Award B1 for an answer in the range 333(°) to 337(°).

13.(a) 	B2	Accept any indication. Award B1 for one of the following: • one correct dot with no more than one incorrect dot shown • two correct dots with one incorrect dot shown.
13.(b) $3 \times 5 \times p = 90$ or $90 \div (3 \times 5)$ or equivalent $(p =)$ 6	M1 A1	M1 for complete method. Allow M1A1 for a correct embedded answer (e.g. $3 \times 5 \times 6 = 90$), BUT M1A0 if contradicted by $p \neq 6$). Unsupported 6 is awarded M1A1.

Unit 2: Intermediate Tier	Mark	Comments
4.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 (Cost of gas = Number of kWh) × 0(.)12	M1 m1	(= 1548.4474 kWh)
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas **+** 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
4. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 *(Number of kWh per day) ÷ 30* *(Cost of gas per day) × 0(.)12*	*M1* *m1* *m1*	*(= 1548.4474 kWh)* *(= 51.6149133…kWh)*
(Cost of gas per day =) (£)6.19(…) or 619(…p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day **+** (0.)32, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh*
**(£)205.12 to (£)205.19(1)* *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

5.(a) Correct cuboid	B2	Ignore orientation of cuboid. For B2, their cuboid must have edges of correct length along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). Award B1 for any one edge dealt with correctly for all its three visible occurrences in a cuboid. For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'. If no marks, award SC1 for a correct 'isometric' cuboid drawn with dimensions 6cm by 4cm by 2cm (counting dots) in any orientation.

5.(b)	(Volume =) $7 \times 5 \times 3$	M1	M1 must be for a complete correct method. e.g. any further manipulation to $7 \times 5 \times 3$ is M0.
	$= 105$	A1	CAO An unsupported final answer of 105 is awarded M1A1U0.
	cm^3	U1	Independent of other marks (e.g. M0 could have been previously awarded or no volume given). An unsupported answer of $105cm^3$ is awarded

Unit 2: Foundation Tier	Mark	Comments
9.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6	M1	(= 1548.4474 kWh)
(Cost of gas = Number of kWh) × 0(.)12	m1	
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas **+** 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
9. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6	*M1*	*(= 1548.4474 kWh)*
(Number of kWh per day) ÷ 30	*m1*	*(= 51.6149133…kWh)*
(Cost of gas per day) × 0(.)12	*m1*	
(Cost of gas per day =) (£)6.19(…) or 619(...p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day **+** (0.)32, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh*
**(£)205.12 to (£)205.19(1)* *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

12.(a) 1740 (minutes)	B2	Answer line takes precedence. Award B1 for sight of one of the following: • 24 × 60 + 5 × 60 • 24 × 'their 60' + 5 × 'their 60' • 'their 24 × 60' + 5 × 60 • 29 × 60 • 29 × 'their 60' • 'their 24 + 5' × 60 • 1440 (24 × 60) • 300 (5 × 60) • 104 400 (seconds). An unsupported answer of 1740 (minutes) is awarded B2.
12.(b) Sight of 6·3 OR 630 0·46 (m) OR 46 (cm)	B1 B2	**If units given, they must be correct.** Mark final answer. FT 6.76 – 'their 6.3' provided 6.2 ≤ 'their 6.3' ≤ 6.4 **OR** 676 – 'their 630' provided 620 ≤ 'their 630' ≤ 640. Award B1 for one of the following: • 6·76 − 6·3 • 676 – 630. An unsupported answer of: • 0·46 or 46 is awarded B1B2 (if units given, they must be correct) • 0·46 cm or 46 m is awarded B1B1.
13.(a) Correct cuboid	B2	Ignore orientation of cuboid. For B2, their cuboid must have edges of correct length along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). Award B1 for any one edge dealt with correctly for all its three visible occurrences in a cuboid. For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'. If no marks, award SC1 for a correct 'isometric' cuboid drawn with dimensions 6cm by 4cm by 2cm (counting dots) in any orientation.
13.(b) (Volume =) 7 × 5 × 3 = 105 cm^3	M1 A1 U1	M1 must be for a complete correct method. e.g. any further manipulation to 7 × 5 × 3 is M0. CAO Unsupported final answer of 105 is awarded M1A1U0. Independent of other marks (e.g. M0 could have been previously awarded or no volume given). Unsupported answer of $105cm^3$ is awarded M1A1U1.

Unit 2: Intermediate Tier	Mark	Comments
14. (Volume of tank =) $70 \times 40 \times 30$	M1	Answer line takes precedence. May be seen in stages.
$= 84000\ (cm^3)$	A1	
(Volume of cylinder =) $\pi \times 10^2 \times 30$	M1	May be seen in stages.
$= 9424(\cdot 7\ldots cm^3)$ or $3000\ \pi\ (cm^3)$	A1	Accept answers between 9420 and 9426 inclusive.
(Capacity = 84000 – 9424(·7 =) 74575(·…cm^3)	B1	Accept answers between 74574 and 74580 inclusive. FT 'their derived volume of tank'– 'their derived volume of cylinder', provided: • M1 previously awarded • π used when calculating the volume of the cylinder • 'their derived volume of tank' > 'their derived volume of cylinder'.
74·575(…litres)	B1	FT 'their volume/capacity in cm^3' ÷ 1000. Award B1 for a final answer of • 74·6 (litres) • 74·5 (litres) • 74·58 (litres) • 74·57 (litres) • 75 (litres) • 74 (litres) provided from correct workings. This final B1 can be awarded if the volume of the cylinder and tank are converted to litres correctly before the subtraction. An unsupported final answer of 74575(·…cm^3) is awarded M1A1M1A1B1B0. Unsupported answers in the above list is awarded M1A1M1A1B1B1.
14. Alternative method *(Interior base area of container =) $70 \times 40 - \pi \times 10^2$*	*M2*	*Award M1 for an appropriate 70×40 OR $\pi \times 10^2$ **within a subtraction***
$= 2485(\cdot 8\ldots cm^2)\ (cm^2)$ or $2800 - 100\pi$	*A1*	*CAO Accept answers between 2485·8 and 2486 inclusive.*
(Capacity of container =) 2485(·8…) × 30	*M1*	*FT 'their derived base area', provided at least M1 previously awarded.*
74575(·…cm^3)	*A1*	*Accept answers between 74574 and 74580 inclusive.*
74·575(…litres)	*B1*	*FT 'their volume/capacity in cm^3' ÷ 1000.* *Award B1 for a final answer of* • *74·6 (litres)* • *74·5 (litres)* • *74·58 (litres)* • *74·57 (litres)* • *75 (litres)* • *74 (litres) provided from correct workings.*

3(a)(i) 45 (years)	B1	
3(a)(ii) 2.06 (metres)	B1	Do not accept 2m 6cm
3(a) (iii) three million (and) one hundred (and) forty-two thousand (dollars)	B1	Ignore spelling and the units given
3(b) Sphere	B1	

3(c) 15 (metres)	B3	Answer space takes precedence Answers and/or workings may be seen on the diagram For B3, allow answers in the inclusive range 14.4 (metres) to 15.6 (metres) Award B2 for any one of the following: • Scale factor of 2 • Scale factor of ½ • (×) 2 • (×) 200 • (28 ÷ 14 =) 2 • 28 ÷ 2 = 14 (embedded scale factor of 2) • 14 × 2 = 28 (embedded scale factor of 2) • Implied scale factor of 2 e.g. double 'their 7.5' • 1(cm) is 2(m) or equivalent Do not award B2 if 28 × 2 = 56 alone is seen as this does not indicate a scale factor of 2 Award B1 for any one of the following: • One correct measurement seen or implied. • 7.5 (cm) ± 2 mm • 14 (cm) ± 2 mm • Allow 7.5 m • Allow 14 m
3(d)(i) No and a valid reason e.g. 'No, because the angle is more than 90(°)' 'No, as the angle is bigger than a right angle' No, acute is less than 90 (°)' 'No, angle is obtuse' 'No, it's obtuse'	E1	Reasons may be indicated on the diagram. Allow 'No, angle is too big to be an acute angle' 'No, angle is larger than an acute angle' No, angle is greater than an acute angle' 'No, an acute angle is smaller', Do not allow 'No, because an acute angle is 70(°)' 'No, because it's not an acute angle' 'No because an acute angle is not 157'
3(d)(ii) Correct line drawn from Bryn	B2	Use of overlay Award B1 for either • 157° (± 2°) drawn at Bryn • 7cm (± 2mm) line drawn from Bryn No marks awarded for a line drawn at Alex

4(a) (Volume of the small box) $10 \times 10 \times 10$ or (Volume of the large box) $2 \times 10 \times 10 \times 10$	M1	
(Volume of the small box) 1000 (cm^3) or (Volume of the large box) 2000 (cm^3)	A1	May be implied in further working
Height of large box $\times 12.5 \times 12.5 = 2 \times 1000$ or Height of large box $\times 12.5 \times 12.5 = 2000$	m1	FT incorrect evaluation of volume Allow for evidence of trial to find the height such that a clear attempt to get an answer of approximately 2000 provided 2000 seen, e.g. volume 2000 (cm^3) followed by $13 \times 12.5 \times 12.5 = 2031.25$. Not for sight of $12.5 \times 12.5 \times 12.5$ (= 1953.125)
(Height of large box =) $\frac{2 \times 1000}{12.5 \times 12.5}$ or equivalent	M1	FT from previous M1 m0, for omitted 2 or incorrect interpretation of 'twice' provided appropriate rearrangement is in the form $\frac{10 \times 10 \times 10}{12.5 \times 12.5}$ or $\frac{10 \times 10 \times 10}{2 \times 12.5 \times 12.5}$ or equivalent i.e. must include $(10 \times 10 \times 10) \div (12.5 \times 12.5)$ with incorrect interpretation of '2' or omitted '2'
(2000 ÷ 156.25 =) 12.8 (cm)	A1	CAO Allow final M1 A1 for an embedded correct answer if not contradicted, e.g. $12.5 \times 12.5 \times 12.8 = 2000$
4(b) (Surface area of the box) $6 \times 10 \times 10$ (= 600)	B1	
(Cost) $6 \times 10 \times 10 \div 240$	M1	FT 'their surface area' provided it is a multiple of 100 and $300 \leq$ 'their surface area' ≤ 600, i.e. only FT 300, 400 and 500
(£) 2.5(0)	A1	CAO. Answer space takes precedence

8(a) (Volume of the small box) $10 \times 10 \times 10$ or (Volume of the large box) $2 \times 10 \times 10 \times 10$	M1	
(Volume of the small box) 1000 (cm^3) or (Volume of the large box) 2000 (cm^3)	A1	May be implied in further working
Height of large box $\times 12.5 \times 12.5 = 2 \times 1000$ or Height of large box $\times 12.5 \times 12.5 = 2000$	m1	FT incorrect evaluation of volume Allow for evidence of trial to find the height such that a clear attempt to get an answer of approximately 2000 provided 2000 seen, e.g. volume 2000 (cm^3) followed by $13 \times 12.5 \times 12.5 = 2031.25$. Not for sight of $12.5 \times 12.5 \times 12.5$ (= 1953.125)
(Height of large box =) $\frac{2 \times 1000}{12.5 \times 12.5}$ or equivalent	M1	FT from previous M1 m0, for omitted 2 or incorrect interpretation of 'twice' provided appropriate rearrangement is in the form $\frac{10 \times 10 \times 10}{12.5 \times 12.5}$ or $\frac{10 \times 10 \times 10}{2 \times 12.5 \times 12.5}$ or equivalent i.e. must include $(10 \times 10 \times 10) \div (12.5 \times 12.5)$ with incorrect interpretation of '2' or omitted '2'
(2000 ÷ 156.25 =) 12.8 (cm)	A1	CAO Allow final M1 A1 for an embedded correct answer if not contradicted, e.g. $12.5 \times 12.5 \times 12.8 = 2000$
8(b) (Surface area of the box) $6 \times 10 \times 10$ (= 600)	B1	
(Cost) $6 \times 10 \times 10 \div 240$	M1	FT 'their surface area' provided it is a multiple of 100 and $300 \leq$ 'their surface area' ≤ 600, i.e. only FT 300, 400 and 500
(£) 2.5(0)	A1	CAO. Answer space takes precedence

17. (Area of top or bottom =) $\pi \times 10^2$ ($\times$ 2)	M1	May be seen or implied in later working. Award M1 for sight of an appropriate answer between either: • 314 and 314·2 (cm^2) inclusive • 628 and 628·4 (cm^2) inclusive.
(Curved surface area =) $2 \times \pi \times 10 \times$ height or equivalent (e.g.62·8(31...) **x h**)	M1	May be seen or implied in later working.
(Height =) $\frac{1570{\cdot}8 - \pi \times 10^2 \times 2}{2 \times \pi \times 10}$ (= $\frac{942{\cdot}48)}{62{\cdot}83}$ or $\frac{1570{\cdot}8}{2 \times \pi \times 10} - 10$ or equivalent	M2	Award M2 for isolating the height term. FT for M2 or M1 for 'their $\pi \times 10^2$' $\times$ 2 and 'their $\pi \times 20$', provided that: • π used when calculating the areas • 'their $\pi \times 10^2$' $\times$ 2 < 1570·8 (including using radius = 5cm and diameter = 10cm). Award M1 for equating the three **areas** to 1570·8 but not isolating the height term e.g. • $\pi \times 10^2 \times 2 + \pi \times 20 \times$ height = 1570·8 • $200\pi + 20\pi \times$ height = 1570·8 • 628·32 + 62·83 $\times$ height = 1570·8 • 62·83 $\times$ height = 942·48 • $20\pi \times$ height = 942·48 • $2\pi \times 10$(10 + height) = 1570·8
Answer between 14·99 and 15·02 (cm) inclusive	A1	CAO.