REVISE
.wales

2.04 — Fraction arithmetic & equivalence

Mark schemes for the 2.04 question pack

Spec 1.4.1, 1.4.2, 1.4.3 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 8 questions in the corresponding revise.wales question pack (19 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes.

6. e.g. 10x = 8·333… and 100x = 83·333… and attempt to subtract	M1	Or equivalent
75/90 or equivalent	A1	e.g. 825/990 or 5/6. Allow e.g. 7·5/9
(Fraction of pizza each of the 3 friends receive =) 5/18 (ISW)	A2	FT 'their 75/90' provided M1 awarded A1 for 75/270 or equivalent, e.g. 275/990, 7·5/27 *Alternative method:* *M1 for 0·2777… (showing that the 7 repeats; from 0·8333÷3)* *M1 for e.g. 10x=2·777… and 100x=27·777… and attempt to subtract* *A2 for 5/18* *A1 for e.g. 25/90 or 275/990 or 2·5/9*

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.*

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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(a) $\frac{2 \times 10^3}{2 \times 10^6}$ (× 100) or equivalent = 1 (%)	M1 A1	e.g. $\frac{2000}{200\,000}$ (× 100)
7(b) $(0.02 \times 10^6) + (3.98 \times 10^6)$ or 2000 + 398 000 OR $(0.2 \times 10^6) + (1.2 \times 10^6)$ or 200 000 + 1 200 000	M1	Or equivalents
= 400 000 AND 1 400 000	A2	Or equivalents e.g. (4×10^5) AND (1.4×10^6) Note: these do not need to be in correct standard form notation A1 for each
(Fraction that was electrified =) $\frac{400\,000}{1\,400\,000}$ or equivalent	B1	e.g. $\frac{4 \times 10^5}{1.4 \times 10^6}$ Must not involve sums within the numerator or denominator FT 'their 400 000' and 'their 1 400 000' provided not the USA figures *e.g. for use of the rest of the world's data* *B1 for* $\frac{3.98 \times 10^6}{1.2 \times 10^6}$ *or equivalent*
= $\frac{2}{7}$	B1	Mark final answer FT 'their 400 000' and 'their 1 400 000' provided equivalent level of difficulty *e.g. for use of the rest of the world's data* *B1 for* $\frac{199}{600}$ Ignore attempt to convert to a %

Unit 1: Intermediate Tier	Mark	Comments
1.(a)(i) 81000 ISW	B2	Accept $8{\cdot}1 \times 10^4$. B1 for sight of one of the following: • 81 • 1000.
1.(a)(ii) 0·2 or equivalent	B1	Mark final answer. Accept ·2 and 0·200…
1.(a)(iii) 10·44	B1	
1.(b) $\frac{1}{14}$	B2	Mark final answer. Award B1 for the appropriate sight of one of the following: • any fraction equivalent to $\frac{1}{14}$, e.g. $\frac{2}{28}$ • $\frac{1}{7} \times \frac{1}{2}$.

Unit 1: Higher Tier	Mark	Comments
6(a)(i) (Total volume =) $\frac{2}{3} \times \pi \times 6^3$ + $\pi \times 3^2 \times 9$ or equivalent (= 144π) (= 81π) $= 225\pi\ (mm^3)$	M2 A2	Allow values of π from 3.14 to 3.142 for M marks only M1 for $\frac{2}{3} \times \pi \times 6^3$ (+ ….) Allow M1 for $\frac{4}{3} \times \pi \times 6^3$ + $\pi \times 3^2 \times 9$ or equivalent CAO A1 for sight of 144π OR A1 for an answer of 369π (from use of $4/3 \times \pi \times 6^3$) OR A1 for a fully correct method but with an answer of 225 (omitting π) If no marks awarded, SC2 for an answer of 1476π from consistent use of diameters as their radii OR SC1 for $\frac{2}{3} \times \pi \times 12^3$ + $\pi \times 6^2 \times 9$ or equivalent OR SC1 for ($\frac{1}{3} \times \pi \times 6^3$ + $\pi \times 3^2 \times 9$ =) 153π
6(a)(ii) (Reduction in volume =) $9\pi\ (mm^3)$ (Fractional reduction =) $\frac{9(\pi)}{225(\pi)}$ or $\frac{1}{25}$ or equivalent	B1 B1	from $\pi \times 3^2 \times (9 - 8)$ OR $\pi \times 3^2 \times 9 - \pi \times 3^2 \times 8$ or $81\pi - 72\pi$ Implies previous B1 ISW FT 'their 225π' and 'their $\pi \times 3^2 \times 9 - \pi \times 3^2 \times 8$' and both are multiples of π If no marks awarded, SC1 for a numerator of 'their 225π' − 9π, which may be embedded in a final answer of e.g. 216/225 or 24/25 if correct work seen in part (a)(i) Must be from a reduction of 9π in their volume. ISW
6(b) Complete method e.g. 100x = 16.111…, 1000x = 161.111… AND an attempt to subtract both sides $\frac{145}{900}$ or $\frac{1595}{9900}$ or $\frac{16095}{99900}$ or equivalent $\frac{29}{180}$	M1 A1 A1	 Allow A1 for e.g. (10x – x =) 1.45/9, (100x – x =) 15.95/99 etc FT from M1A0 provided at least 1 stage of simplification required

10.(a)	0·25	B1	

10.(b) $\frac{80}{40 \times 0.5}$ 4 $\frac{2}{0.5}$ 4 $\frac{80}{20}$ 4 $\frac{79}{40 \times 0.5}$ 3·95 or 4 or $3\frac{19}{20}$ $\frac{79}{20}$ 3·95 or 4 or $3\frac{19}{20}$ $\frac{79.3}{20}$ 3·965 or 3·97 or 4 $\frac{79.34}{20}$ 3·967 or 3·97 or 4		May be seen in stages. M1 Award M1 for appropriate calculation seen. A1 Award A1 for the correct estimate for the calculation seen. An unsupported answer is M0A0.
10.(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.

9(a)(i) Sight of $\frac{150}{360}\times 2\times\pi\times 3$ OR $\frac{300}{360}\times 2\times\pi\times 3$ $(= 2.5\pi)$ $(= 5\pi)$ (Length of wire =) $(2\times)\ \frac{150}{360}\times 2\times\pi\times 3 + (2\times)\ 24 + 38$ or equivalent $= 5\pi + 86$ (cm)	B1 M1 A2	Or equivalents CAO Mark final answer A1 for sight of any one of the following: • $\frac{1800}{360}\pi + 86$ or equivalent • $5\pi + \ldots$. • $2.5\pi + \ldots$. or $5\pi/2 + \ldots$. provided an attempt has been made to add the 3 straight pieces
9(a)(ii) e.g. $10x = 1.333\ldots$, $100x = 13.333\ldots$ AND an attempt to subtract both sides $= \frac{12}{90}$ or $\frac{132}{990}$ or $\frac{1332}{9990}$ or equivalent $= \frac{2}{15}$	M1 A1 A1	 Allow A1 for e.g. 1.2/9 FT from M1A0 provided of equivalent difficulty
9(a)(ii) Alternative method: $\frac{1}{10} + \frac{3}{90}$ *or equivalent* $= \frac{12}{90}$ *or equivalent* $= \frac{2}{15}$	*M1* *A1* *A1*	 *FT from M1A0 provided of equivalent difficulty*
9(b) Statements required: • Number the hangers from (0)1 to 80 • Consider successive 2-digit numbers • Do not use numbers outside the range e.g. Do not use 00 and 81 – 99, OR Use the numbers (0)1 to 80 • Ignore repeats (Clothes hangers chosen =) 29, (0)7, (0)1, 30, 55, 79, 26, ~~39~~, 12	E2 B1	All 4 needed for E2 E1 for any 2 or 3 correct statements Allow an equivalent numbering system e.g. (0)0 to 79 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 hangers (from 01) AND their use of 2-digit numbers in their answer OR 2-digit numbers used in their answer with 07 and 01 seen Do not allow 'Use numbers less than 81' if they have numbered the hangers from 01 to 80, without stating that 00 will not be used ISW Answer space takes precedence
9(c) (Scale factor =) $\sqrt{1.44}$ or 1.2 (Height of larger hanger =) $\sqrt{1.44}\times 9$ or 1.2×9 $= 10.8$ (cm)	B1 M1 A1	 FT 'their $\sqrt{1.44}$' CAO