REVISE
.wales

2.09 — Algebraic fractions

Mark schemes for the 2.09 question pack

Spec 2.1.9, 2.1.10 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 8 questions in the corresponding revise.wales question pack (22 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

12. $3x(2x + 7) - 2x(3x + 2)$ as a numerator within a single fraction		M1	Accept intention of brackets when working not shown e.g. $6x^2 + 21x - 6x^2 + 4x$.
$(3x + 2)(2x + 7)$ as a denominator.		M1	
$17x / (3x + 2)(2x + 7)$		A1	C.A.O. If M1M1A1 awarded penalise further incorrect work −1. If no marks awarded then SC1 for sight of $17x$.

			Must be convincing from $169/360 \times 2 \times \pi \times 3.1$.
15.	Sight of $22x - 26 - 21x + 35$ or equivalent. Denominator of $(3x - 5)(11x - 13)$ $\frac{x+9}{(3x-5)(11x-13)}$ or $\frac{x+9}{33x^2-94x+65}$	B2 B1 B1	Award B1 for sight of $2(11x - 13) - 7(3x - 5)$ OR three of the four terms correct. Must be seen or stated as the denominator. CAO. Mark final answer.

19. *(a)* $\frac{a}{x(x-a)}$ or $\frac{a}{x^2-ax}$	B2	B1 for correct numerator - not from incorrect work – use of brackets may be implied. B1 for correct denominator in a single fraction (accept equivalent) If B2, penalise -1 for incorrect subsequent work
19. *(b)* $x - 1 + 2x(4x + 3)$ [= 0] or $x - 1 + 8x^2 + 6x$ [= 0] or $x - 1 = -2x(4x + 3)$	M1	Clearing fraction Allow e. g. $\frac{x - 1 + 2x(4x + 3)}{x(4x + 3)} = 0$ Allow M1 for $x - 1 = 2x(4x + 3)$
$8x^2 + 7x - 1$ [= 0]	A1	Collecting terms and re-arranging quadratic equation Ignore presence of denominator (provided correct).
$(8x - 1)(x + 1)$ [= 0]	B2	B1 for $(8x \ldots . 1)(x \ldots . 1)$ FT their quadratic equation, provided of equivalent difficulty.
$x = \frac{1}{8}$ or $x = -1$	B1	Both answers required. Strict FT 'their derived brackets'. *Using quadratic formula FT their quadratic equation, provided of equivalent difficulty.* $(x =) \frac{-7 \pm \sqrt{[7^2 - 4(8)(-1)]}}{2(8)}$ *M1* *For M1, allow one error, in sign or substitution, but not in formula.* $x = \frac{-7 \pm \sqrt{81}}{16}$ *A1* $x = \frac{1}{8}$ *or* $x = -1$ *(both answers required) A1* *No marks for a trial and improvement method.*

12. $6(2x+1)-4(3x-5)$ as a <u>numerator</u> within a single fraction $(3x-5)(2x+1)$ as a <u>denominator</u> h26 / $(3x-5)(2x+1)$	M1 M1 A1	Allow intention of brackets, e.g. $6\times 2x+1-4\times 3x-5$ CAO. Allow $26/(6x^2-7x-5)$ (If expanded, the denominator must be correct.) If M1 M1 A1, penalise further incorrect work –1. If no marks awarded, then SC1 for sight of 26.
13. (Linear scale factor =) $\sqrt[3]{}(1280/20)$ (= 4) $\sqrt[3]{}(1280/20)\times 2{\cdot}3$ = 9·2 (cm)	B1 M1 A1	Or equivalent. Accept a method based on ratios e.g. 1 : 4 (from 20 : 1280 = 1 : 64 = 1 : 4^3) FT their derived scale factor (from $\sqrt[3]{}$). SC1 for an answer of 18.4 (using s.f. of 8, from $\sqrt{64}$).
<u>Alternative method</u> (using reciprocal scale factor) *(Linear scale factor =) $\sqrt[3]{}(20/1280)$ (= 1 / 4)* *2·3 ÷ $\sqrt[3]{}(20/1280)$ OR 1 / $\sqrt[3]{}(20/1280)\times 2{\cdot}3$* *= 9·2 (cm)*	*B1* *M1* *A1*	*Or equivalent.* *Accept a method based on ratios.* *FT their derived scale factor (from $\sqrt[3]{}$).*
14. (a) $10x = 8{\cdot}121212.....$ and $1000x = 812{\cdot}1212....$ <u>with</u> an attempt to subtract on both sides 804/990 (= 402/495 = 134/165)	M1 A1	Or x and $100x$, or equivalent. Or a <u>complete</u> alternative method. An answer of 80·4/99 gains M1 only. ISW
<u>Alternative method</u> *0·8 + 0·0121212..... = 8/10 + 12/990 or equivalent* *804/990 (= 402/495 = 134/165)*	*M1* *A1*	*ISW*
14. (b) $6\sqrt{2}$	B1	
14. (c) $7\times 3+7\sqrt{5}-3\times 2\sqrt{5}-2(\sqrt{5})^2$ or equivalent $= 11+\sqrt{5}$	M1 A1	 Mark final answer. Accept $11+1\sqrt{5}$. If no marks awarded, SC1 for 3 correctly simplified terms i.e. 21, $7\sqrt{5}$, $-6\sqrt{5}$, -10.
15. • *FG = HG* (since *G* is the midpoint of *FH*) • *EG* is a common side • Angle *EGF* = Angle *EGH* (since *EG* and *FH* are perpendicular) SAS (or two sides and the <u>included</u> angle) so that EFG and EHG are congruent triangles.	B1 B1 B1 B1	Do not accept indications on the diagram. FT from B2 previously awarded. Must be convincing. Do not allow 'two sides and an angle'.
<u>Allow alternative method</u> • *FG = HG (since G is the midpoint of FH)* • *EG is a common side* • *EF = EH using Pythagoras* *SSS (or all corresponding sides equal) so that EFG and EHG are congruent triangles.*	*B1* *B1* *B1* *B1*	*Do not accept indications on the diagram.* *Must be convincing. An unsupported statement that EF = EH, or that triangle is 'isosceles', is insufficient.* *FT from B2 previously awarded. Allow RHS.* *Must be convincing.*

8. Showing 4x + 3y = 19 or equivalent. Showing 6x − y = 12 or equivalent. A correct method to eliminate one variable e.g. 'equal coefficients AND appropriate addition or subtraction'. OR ' method of substitution'. First variable found , x = 2½ or y = 3. Second variable found	B1 B1 M1 A1 A1	2x + 2x + 3y = 19 is an equivalent answer. *Workings must be shown for M1A1A1.* FT to solve for simultaneous equations if of equivalent difficulty. Allow one error in one term (not the term with equal coefficients.) C.A.O. for 'their equations'. FT substitution of their '1st variable' if M1 gained. If NO (i.e. none of the five) marks gained, allow SC1 for <u>both</u> answers of x = 2½ AND y = 3
9. <u>Enlargement</u> with scale factor $-\frac{1}{2}$ and centre (<u>1, 0</u>)	B3	Award B2 for reference to any two of 'enlargement', '$-\frac{1}{2}$' and 'centre (1, 0)'. Award B1 for reference to any one of 'enlargement', '$-\frac{1}{2}$' and 'centre (1, 0)'. If B0, award 1 mark for reference to 'enlargement' within a multi-stage transformation.
10. Sight of $20x^2 + 15x - 8x^2 + 4x$ or equivalent. Sight of denominator of $(2x - 1)(4x + 3)$ $\frac{12x^2+19x}{(2x-1)(4x+3)}$ or $\frac{12x^2+19x}{8x^2+2x-3}$	B2 B1 B1	Award B1 for sight of $5x(4x + 3) - 4x(2x - 1)$ OR three of the four terms correct. Must be seen or stated as the denominator. FT from one error in numerator. Note the numerator may be factorised as $x(12x + 19)$ Mark final answer.
11. (Area scale factor =) Sight of $(\frac{7}{5})^2$ $(=\frac{49}{25})$ OR $1{\cdot}4^2$ (= 1·96) $\frac{49}{25}$ (< 2) or 1·96 (< 2) AND 'No (Mari is not correct)'	B1 B1	Or equivalent Accept a method based on ratios e.g. $5^2 : 7^2 = 25 : 49 = 1 : \frac{49}{25}$ Accept any equivalent statement. Accept $(\frac{7}{5})^2 < 2$ or $1{\cdot}4^2 < 2$ or equivalent. B0 if evaluation of $(\frac{7}{5})^2$ or $1{\cdot}4^2$ is incorrect.
<u>Alternative method</u> (using scale factor 2) *$5^2 \times 2$ (= 50)* *(7^2 =) 49 < 50 AND 'No (Mari is not correct)'*	*B1* *B1*	*Accept a method based on ratios* *e.g. $5^2 : 7^2 = 25 : 49 = \frac{25}{49} : 1$* *Accept any equivalent statement e.g. $\sqrt{49}<\sqrt{50}$* *B0 if evaluation of 5^2 or 7^2 is incorrect.*
12. $xw + 8w = 3y - 4$ or $4 - 3y = -xw - 8w$ $w(x + 8) = 3y - 4$ or $4 - 3y = w(-x - 8)$ $w = \frac{3y-4}{x+8}$ or $w = \frac{4-3y}{-x-8}$ or equivalent	B1 B1 B1	Collecting w terms. F.T. until 2nd error provided equivalent difficulty Factorising. Accept $4 - 3y = -w(x + 8)$ Dividing. Mark final answer. $\frac{4-3y}{x+8} = -w$ only gains B1B1B0

		gradians (62·2896...)
12. $4(2x+9)+5(3x-7)$ $[=8x+36+15x-35]$ as a <u>numerator</u> within a single fraction	M1	Accept intention of brackets. e.g. $4 \times 2x+9+5 \times 3x-7$
$(3x-7)(2x+9)$ as a <u>denominator</u>	M1	
$= \frac{23x+1}{(3x-7)(2x+9)}$ or $\frac{23x+1}{6x^2+13x-63}$	A1	CAO. Mark final answer. (If expanded, the denominator must be correct.) If no marks awarded, then SC1 for sight of $23x+1$.

10.(a) $10h^2 - 14ht + 15ht - 21t^2$ $10h^2 + (1)ht - 21t^2$	B2 B1	Penalise alternative notation, such as tt for t^2, -1, once only. B1 for any three terms correct. $mh^2 + (1)ht + nt^2$, where m and n are integers (and provided not from incorrect working) implies the middle two terms correct. Mark final answer. Implies previous B2. FT their expression, provided it is a quadratic with 4 terms to consider and there are like terms to collect.
10.(b) $7(d+5)^{10}$	B1	Mark final answer.

		• use appropriate terminology, units, etc.
9.(a) $\frac{48}{400}$ (× 100) or equivalent = 12(%)	M1 A1	M1 for sight of 0·12. Note: other complete valid methods to look out for include: • 48 ÷ 4 • 10% + 1% + 1% (= 40 + 4 + 4) • (48 out of 400 =) 12 out of 100 = 12(%)
9.(b) Use of $\frac{45}{9}$ or equivalent (£)40 AND (£)5	M1 A1	Sight of an appropriate 5 (or 40) implies M1. Accept in either order.
9.(c) $(1 -)\ \frac{1}{8}$ $= \frac{7}{8}$	B1 B1	Award B1 for sight of $\frac{1}{8}$ or 0·125 or 1 ÷ 8. FT from $1 - \frac{m}{n}$ where $\frac{m}{n}$ clearly shown as 'their $\frac{1}{8}$' provided it is written as a fraction and not $\frac{1}{2}$ Mark final answer. A final answer of 0·875 is awarded B1B0.
9(c) Alternative method $\frac{8-1}{8}$ or $\frac{2^3-1}{2^3}$ $= \frac{7}{8}$	*B1* *B1*	*For consistent correct use of $2^3 = 8$* *FT for 'their consistent value of 2^3'* *e.g. $\frac{6-1}{6} = \frac{5}{6}$ gains B0B1.* *Mark final answer.* *A final answer of 0·875 is awarded B1B0*

End of solutions