EDUQAS GCSE MATHEMATICS

SUMMER 2025 MARK SCHEME

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
1*. Radius of circle (= 15 – 5 =) 10 (cm)	B1	May be seen in further work or on diagram Diameter = 20 (cm) implies B1.
(Curved length =) (¼ ×) 2 × π × 10	M1	FT 'their 10' Allow 15·7(0…) or 15·71
= 5π	A1	FT 'their 10' provided ¼ × 2 × π × 'their 10' has been used .
(Perimeter =) 5π + 30 (cm)	B1	FT 'their 5π' + 30 provided from use of ¼ × 2πr Award B1 M1 A1 B0 for an answer of 45.7(0….)
	(4)	
2. A correct explanation e.g. "10% should have been taken off the sale price" "It will be 32·5% off the price" "The second reduction is not 10% off the original price (it is 10% off 75%)" "The discount should be compounded''	E1	If statement is incorrect, E0
	(1)	

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3*.(a) -4	B1	
3*.(b) 2c + 1.5d < 20 or 2c + 1.5d ≤ 19.50 or 20 - 2c -1.5d > 0 or 200c + 150d < 2000 oe or 3.5 ≤ 2c + 1.5d < 20 or 0 < 2c + 1.5d < 20	B2	Mark final answer B1 for one of the following: • 2c + kd < 20 (k≠1.5 and k≠ 0) • 20 – 2c – kd > 0 (k≠1.5 and k≠ 0) • kc + 1.5d < 20 (k≠2 and k≠ 0) • 20 – kc – 1.5d > 0 (k≠2 and k≠ 0) • 2c + 1.5d '> or ≥ or ≤' 20 (not = 20) • 2c + 1.5d ≤ 19(.99) • c and d reversed 2d + 1.5c < 20 • other letters rather than c and d in a correct inequality e.g. 2x + 1.5y < 20 • inclusion of 'x' signs e.g. cx2 + dx1.50 < 20 • c2 + d1.5 < 20 Penalise -1 if mixed units are used e.g. • 200c + 150d < 20 B2-1 (1 mark) • 200c + 1.5d < 2000 B2-1 (1 mark) • 2c + 150d > 20 B1-1 B1-1 (0 marks) Possible B1 if using double inequality but with similar errors in notation as mentioned from B1s above (e.g. 3.5 ≤ c2 + d1.5 < 20)
3.(c) 2:3	B1	
	(4)	

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4*. (BC =) $\sqrt{(10^2 – 6^2)}$ or $BC^2 = 10^2 - 6^2$ or better	M2	M2 for appropriate sight of 6, 8, 10 M1 for any one of the following: • $6^2 + (BC)^2 = 10^2$ • $10^2 - 6^2$ including $BC = 10^2 - 6^2$ • 64 including BC = 64
(BC =) 8 (cm)	A1	May be seen on diagram
(Surface area =) $(2 \times ½ \times) 8 \times 6 + 6 \times 7 + 8 \times 7 + 10 \times 7$ or $8 \times 6 + (6 + 8 + 10) \times 7$ oe (= 2x24 + 42 + 56 + 70)	M2	M1 for a sum including 3 different correct calculations for areas ie omitting or miscalculating just one/both triangles or one rectangle FT for M2 or M1 provided Pythagoras attempted. • If 'their BC' < 10, FT for a possible M2 or M1. • If 'their BC' $\geq$ 10, FT for a possible M1 only.
216 (cm^2)	A1	FT for 'their surface area' correctly evaluated, provided the second M2 awarded.
	(6)	

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5*.(a) 10x = 130	B2	B1 for either of the following: • 10x = k (k≠0) • 2x+9 + 3x + 5x-7 + 10 = 142 or better
(x =) 13	B1	FT 'their 2x+9 + 3x + 5x-7 + 10 = 142' provided only one error FT 'their 10x = k' Sight of $x = k / 10$ implies previous B1 for $10x = k$ Allow fraction or decimal on FT. Ignore any subsequent attempts of rounding a fraction or decimal to the nearest whole number. Award B2 B1 for a final answer of $x = 13$ provided not from incorrect workings. If no marks, award SC1 for two correct trials where x>1 with correct total for the expressions (with or without 10) e.g. x = 11, 31 + 33 + 48 + 10 = 122 or 31 + 33 + 48 = 112
5*.(b) 58/142 oe ISW	B2	FT 'their 13' provided ≤ 29, allow rounded or truncated on FT B1 for any one of the following: • (5 × 13 – 7) / 142 • (5x – 7) /142 • Appropriate sight of 58 • Appropriate sight of a correctly evaluated 5 x 'their 13' – 7' • 58 out of 142 or 58:142 • a decimal left on numerator (from FT)
	(5)	

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6.(a) $\frac{11}{5} - \frac{5}{3}$ oe OR $\frac{6}{5} - \frac{2}{3}$ oe OR $(2-1)+\frac{3}{15} - \frac{10}{15}$	M1	
$\frac{33-25}{15}$ oe OR $\frac{18-10}{15}$ oe OR $1 - \frac{7}{15}$	M1	FT if error in one numerator
$\frac{8}{15}$	A1	CAO Mark final answer. If no marks, award SC1 for sight of $\frac{33}{15}$ and $\frac{25}{15}$ or $\frac{18}{15}$ and $\frac{10}{15}$
Alternative method. $\frac{1}{3} + \frac{1}{5}$	*B1*	
$\frac{5+3}{15}$ oe	*M1*	
$\frac{8}{15}$	*A1*	Mark final answer
6*.(b) 2·5	B2	B1 for $2\frac{1}{2}$ or $\frac{10}{4}$ or $\frac{5}{2}$ or $\frac{1}{0{\cdot}4}$ or $\frac{1}{\left(\frac{4}{10}\right)}$ oe or -2.5
6*.(c) $\frac{27+6}{0.3}$	M2	May be seen in stages. Award M1 for any one of the following: • appropriate sight of 33 (from $27 + \sqrt{36}$ OR $3^3 + 6$ OR $3^3 + \sqrt{36}$) • sight of any TWO of 27, 6 (or 2 × 3), 0·3 correctly placed • $\frac{3^3+\sqrt{4\times9}}{0.3}$ oe Note: sight of 27, 6 and 0.3 not written within expression is awarded M0
110	A1	CAO Mark final answer Award a possible M2A0 for $\frac{30+6}{0.3}$ if 27 seen but then changed to 30.
	(8)	

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7*. (Area =) 6·2 ÷ 0·05 124 (cm^2) (Length of cuboid =) 124 ÷ 8 15·5 (cm)	 M2 A1 M1 A1	 M1 for 0·05 = 6·2 ÷ Area CAO FT 'their 124' provided at least M1 previously awarded FT
<u>Alternative method.</u> $0{\cdot}05 = \frac{6{\cdot}2}{8x}$ $0{\cdot}05 \times 8x = 6{\cdot}2$ $x = 6{\cdot}2 \div (0{\cdot}05 \times 8)$ $x = 15{\cdot}5$ (cm)	 *M2* *M1* *m1* *A1*	 *M1 for 0·05 = 6·2 ÷ 8x* *CAO*
	(5)	

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8*.(a) 125	B2	B1 for one of the following: • 5^3 • $\frac{1}{5^{-3}}$ • $\left(\frac{1}{5}\right)^{-3}$ If no marks, award SC1 for (5^{-3} =) $\frac{1}{125}$ or 0.008
8.(b) $1{\cdot}8 \times 10^7$	B3	B2 for one of the following: • A correct final answer not in standard form, e.g. 180×10^5 or 18 000 000 • Sight of $1{\cdot}8 \times 10^{10} \div 1000$ (a correct value including a correct standard form calculation) • $3 \times 10^5 \times 60$ (a correct value including a correct standard form calculation) B1 for one of the following: • $3 \times 10^8 \div 1000 \times 60$ - may be seen in stages • Sight of 3×10^5 • Sight of $1{\cdot}8 \times 10^{10}$ If no marks, award SC1 for one of the following: • 5×10^9 (from $3 \times 10^8 \times 1000 \div 60$) • $1{\cdot}8 \times 10^{13}$ (from $3 \times 10^8 \times 1000 \times 60$) • 5×10^3 (from $3 \times 10^8 \div 1000 \div 60$)
	(5)	

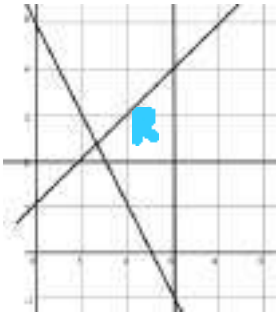
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9. $5x - 3y = 12.5$ AND $3x + 2y = 17$	B1	
Method to eliminate one variable e.g. equal coefficients with intention to appropriately add or subtract	M1	FT their equations provided one is correct and the other is linear in x and y Allow M1A0 for 1 error in one term, not one with equal coefficients.
First variable correct	A1	FT for 'their equations' $x = 4$ or $y = 2{\cdot}5$
Method to calculate second variable	m1	F.T. their '1st variable' provided M1 previously awarded.
Second variable found	A1	FT for 'their equations' $y = 2{\cdot}5$ or $x = 4$
$2\times(7\times4 - 6\times2.5) + 2\times17$	M1	FT 'their 2·5' and 'their 4' provided M1 previously awarded.
60 (cm)	A1	FT No marks for trial and improvement. No marks for an unsupported answer.
	(7)	

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10*.(a) 24 × 5 or (÷1.6) oe 8 × 300 or × 5 or (÷ 0.6) oe 180 3 = 25 (hours)	M1 M1 A1	A table method altering all 3 values in the same ratio at the same time is M0 M marks may be seen in either order e.g. Workers Length Time 8 180 15 **FT from M0 previously awarded** Must be from use of 24 e.g. if this calculation is performed first e.g. Workers Length Time 5 300 40 CAO
Alternative method *(Number of metres per worker per hour =)* *(180 ÷ 5) ÷ 24 (= 1·5)* *(Number of hours needed =)* *300 ÷ (((180 ÷ 5) ÷ 24) × 8)* *(= 300 ÷ (1·5 × 8) = 300 ÷ 12)* *= 25 (hours)*	*M1* *M1* *A1*	*May be seen in stages* *CAO*
10*.(b)(i) Reference to all workers working at the same rate (as before). Examples for E1: Working as hard (as the original 5) etc Work at constant/same pace or speed	E1	Do not allow: Examples for E0: 'each worker does the same amount of work' 'any reference to breaks cost/availability of materials and/or tools' 'all workers built the same amount of wall' 'that they will work continuously' 'the 8 workers will work in the same amount of time as the 5 workers'
10*.b(ii) Time or answer will change / increase / decrease dependent on (b)(i)	E1	If no valid assumption is made, then this mark cannot be awarded. Cannot award E0 E1.
	(5)	

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11.(a) $\sqrt{40{\cdot}5}$ is not a whole number oe OR $(2(6^2) + 9 =)$ 81 AND $(2(7^2) + 9 =)$ 107 OR 40·5 not a square number 40.5 is not an integer $n^2 = 40.5$ is not possible $2n^2$ is even, 9 is odd. Even + odd = odd	B2	B1 for one of the following: • sight of $\sqrt{40.5}$ oe and no comment • $\sqrt{((90 - 9) \div 2)} = k$ (where $k \neq 40{\cdot}5$) and an appropriate comment • $2(6^2) + 9 = c$ AND $2(7^2) + 9 = d$ where $c = 81$ and $d > 90$, or $c < 90$ and $d = 107$ • $2n^2 + 9$ is always odd • At least 4 trials showing correct calculations and stating all odd
11.(b) $64a^7b^{96}$	B2	If not B2 then award B1 for one of the following: • (Fifth term =) $32a^9b^{48}$ • (Seventh term =) $128a^5b^{192}$ • Two parts correct from 64, a^7, b^{96} with term in the form pa^qb^r, where p, q, r $\neq 0$
11.(c) $n^2 + 4n$ or $n(n+4)$ or $(n+2)^2 - 4$ or $n(n+2)+2n$ oe	B2	Mark final answer for B2 B1 for one of the following: • white = n^2 AND grey = 4n • an answer that simplifies to $n^2 + kn$ (+m) oe where $k \neq 0$ e.g. $(n+1)^2 - 4$ (= $n^2 + 2n - 3$) • a correct answer then spoiled • $n = n^2 + 4n$ Award B1 for correct answer but with incorrect notation e.g. $nx(n+2) + 2n$ or $n^2 + n \times 4$
	(6)	
12. 	B1 B1 B1 B1	B1 for x = 3 and y = 2 drawn correctly B1 for y = x + 1 B1 for y = 5 – 2x FT from 'their' 4 lines provided at least B2 awarded and region enclosed by 'their' 4 lines and inequalities preserved. Accept 'shading out' Accept consistent use of dotted lines Penalise -1 if **all lines correct** but inconsistent
	(4)	

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13. $f^2 + 4g = e(g+5)$ or $f^2 + 4g = eg + 5e$ oe $4g - eg = 5e - f^2$ or $-4g + eg = -5e + f^2$ oe $g(4 - e) = 5e - f^2$ or $g(e - 4) = -5e + f^2$ oe $g = \frac{5e - f^2}{4 - e}$ or $g = \frac{-5e + f^2}{-4 + e}$ oe	 B1 B1 B1 B1	FT if of equivalent difficulty until 2nd error Clear the fraction Isolating terms with 'g' Factorise, allow omission of closing bracket Divide. Mark final answer
	(4)	
14.(a) An explanation relating to calculating incorrect frequency densities e.g. It should be frequency divided by width of bar for heights of bars not the other way around She has calculated width divided by frequency	 E1	 Allow e.g. 'journey time' rather than 'width of bar' Do not allow e.g. 'Journey time x frequency density is not equal to the number of pupils' The areas of the bars do not give the frequencies
14.(b)(i) A correct uniform scale with intervals of 0·5 Minimum of fd labels 1 and 2, any other labels must be correct	 B2	 If not B2, award B1 for 1 label correct and none incorrect e.g. • 0·8 marked correctly • 0·5 or 1 marked correctly OR a correct uniform scale, with intervals of 0.5 to the top of the histogram with errors above OR • 4/5 or 0·8 seen in calculations.
14.(b)(ii) 5×0·8 + 5×1 + 2·5x2 + 5×1·6 + 2·5×0·8 + 5×0·6 + 5×0·2 (=4+5+5+8+2+3+1) =28 (median =) 12·5 (minutes)	 M1 A1 B1	STRICT FT their labelling for a uniform scale only, provided uniform to at least the top of the histogram, for possible M1A1B1 May be seen on the histogram M1 for all 7 area calculations with maximum of one slip using incorrect height CAO for their labelling May be implied by an answer of 12·5 provided M1 awarded FT 'their 28' provided M1 awarded An unsupported 12·5 gains M0A0B1

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14.(c)(i) (24-21=) 3 3/24 (× 100) 12·5(%)	 B1 M1 A1	 May be implied in further working FT 'their 3' / 24, including use of 21 FT An answer of 87·5(%) is awarded B0M1A1 If no marks, award SC1 for 4 ÷ 25 (x 100) = 16(%)
14.(c)(ii) Median: 28 | LQ: 21 | UQ: 35 | IQ range: 14	 B1 B1 B1	 Median = 28 LQ = 21 and UQ = 35 IQR = 14 FT 'their UQ' – 'their LQ', provided one is correct
14.(c)(iii) The median will not change.	E1	STRICT FT their table in c(ii) if 'their median' is outside the interval 6 - 40
	(13)	
15. (3x + 2)(x - 5) (=0) (x=) -2/3, (x=) 5	B2 B1	B1 for one of the following: • (3x-2)(x+5), • two brackets that expand to give $3x^2$ AND -13x OR $3x^2$ AND -10 **STRICT FT** from 'their brackets provided of equivalent level of difficulty, with at least one answer a fraction. For fraction allow decimal form correct to at least 2 dp No marks awarded for use of the quadratic formula without showing the correct factorised form
	(3)	

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16.(a) (x_4 =) 13	B2	Answer line takes precedence B1 for one of the following • a final answer of (x =) 9 • a final answer of (x =) 21 • Correct FT to x_4 from one slip in the value of x_2 or x_3 or x_4 e.g. 7,10,15 or 7, 9, 11
16. (b) (x_3 =) 18	B2	Answer line takes precedence B1 for one of the following: • use of $x_{n-1} = (3/2)x_n$ oe • appropriate sight of (x_4 =) 12
	(4)	
17.(a) ($144^{0·5}$ =) 12 (6^{-2} =) $\frac{1}{36}$ $\frac{1}{3}$	B1 B1 B1	 Provided B1 awarded, FT 'their values' that will lead to a fully correct simplified fraction as a final answer. Do not award if this simplifies to a whole number. An unsupported answer of $0 \cdot \dot{3}$ or 0·33… is awarded B1B1B0 An unsupported answer of answer of $0 \cdot 3$ is awarded B0B0B0
17.(b) $13{\cdot}0\dot{3}$	B1	Accept 13.0303…. or better Accept $13.0\dot{3}\dot{0}$ or $13.03\dot{0}\dot{3}$ Do not accept $13.0\dot{3}$
17.(c) $6 - 19\sqrt{5}$	B2	Mark final answer If not B2, award B1 for at least 3 out of 4 terms, from $36 - 27\sqrt{5} + 8\sqrt{5} - 30$
17.(d) $20\sqrt{3}$ $12\sqrt{3}$ $16\sqrt{3}$	B1 B1 B1	 FT provided 'their $20\sqrt{3}$' and 'their $12\sqrt{3}$' are both multiples of $\sqrt{3}$ and one is correct
	(9)	

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18.(a) Sight or use of **XH** = 6**j** or **FH** = 15**j**	B1	May be seen in later work 6**j** or 15**j** alone on the diagram without a correct arrow is not sufficient for this B1
FY = ½(9**j** + 6**j** – 8**k**) oe	M1	FT 'their **XH**' or 'their **FH**' provided ≠ 9**j**
7.5**j** – 4**k** **or** $\frac{15}{2}$j – 4k	A1	If only B1/B0 awarded award a further SC1 for –7.5j + 4k
18.(b)		Accept candidate working with **CA** instead of **AC** etc throughout
Two of the following: **AC** = -2**p**+5**q** + 6.5**p**+4**q** (=4.5**p** + 9**q**) **BC** = -5**p**-**q** + 6.5**p**+4**q** (=1.5**p** + 3**q**) **AB** = -2**p**+5**q** + 5**p**+**q** (3**p** + 6**q**) Also **OB** – **OA** could represent **AB** etc	M2	Ignore the third vector if found If not M2 award M1 for one of the following: • one correctly labelled vector • two correct vectors without labelling
Two of the following: **AC** = 4.5**p** + 9**q** **BC** = 1.5**p** + 3**q** **AB** = 3**p** + 6**q** Also **OB** – **OA** could represent **AB** etc	A1	FT from M2 only
Appropriate statement e.g. AC = 3BC or AC = -3CB (C is common) or AC = 1.5AB (and A is common) or AB = 2BC (and B is common) or AB is parallel to BC (and B is common)	E1	FT from any two correctly evaluated **AC, AB, BC**
	(7)	

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19.(a) P(PPP) $\frac{3}{8} \times \frac{2}{9} \times \frac{1}{10}$ A valid further step which would lead to $\frac{1}{120}$ e.g $\frac{6}{720}$ or full or partial simplifying on product	 M2 A1	 M1 for either: $\frac{3}{8} \times \frac{2}{9} \times \frac{1}{a}$ or $\frac{3}{8} \times \frac{2}{b} \times \frac{1}{b+1}$ Must be from M2 and convincing – not from wrong working If no marks, award SC1 for 3/8, 2/9, 1/10 seen *for PPP* but done nothing with or even added
19.(b) P(PPG) P(GGP) $\frac{3}{8} \times \frac{2}{9} \times \frac{9}{10}$ + $\frac{5}{8} \times \frac{4}{9} \times \frac{7}{10}$ $\frac{194}{720}$ or $\frac{97}{360}$ ISW	 M3 A1	 FT 'their 8x9x10'evaluated from (a) as the denominator M2 for P(PPG) P(GGP) $\frac{3}{8} \times \frac{2}{9} \times \frac{9}{10}$ and $\frac{5}{8} \times \frac{4}{9} \times \frac{7}{10}$ P(PPG) P(GGP) M1 for $\frac{3}{8} \times \frac{2}{9} \times \frac{9}{10}$ or $\frac{5}{8} \times \frac{4}{9} \times \frac{7}{10}$ FT if M3 awarded
	(7)	
20. Gradient of PQ = -1/2 y – 4 = - $\frac{1}{2}$(x – 3) or 4 = - $\frac{1}{2}$ x 3 + c oe 2y – 8 = -x + 3 or y = - $\frac{1}{2}$x + 5·5 oe x + 2y – 11 = 0 or $\frac{1}{2}$x + y - 5.5 = 0	B2 M1 A1 A1	B1 for gradient of tangent = 2 Correct use of - $\frac{1}{2}$ implies B2 e.g. y + $\frac{1}{2}$x …. = 0 or y = - $\frac{1}{2}$x …. FT from one slip provided M1 awarded Mark final answer
	(5)	

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21.(a)(i) $(f^{-1}(x) =)\ \frac{x+2}{5}$	B2	Allow $y = \frac{x+2}{5}$ B1 for one of the following: • $f(x) = \frac{x+2}{5}$ or $x = \frac{x+2}{5}$ • $x = \frac{y+2}{5}$ • $f^{-1}(x) = \frac{y+2}{5}$ • $(x+2) \div 5$
21.(a)(ii) $(ff(x)) = 5(5x-2)-2$ $25x - 12$	M1 A1	 Mark final answer
21.(b) $5(4k + 3) -2 = 73$ or $5(kx^2 + 3) -2 = 73$ or better $5kx^2 = 60$ or $20k = 60$ or $kx^2 + 3 = 15$ or $4k + 3 = 15$ $(k=)\ 3$	M2 m1 A1	M1 for sight of one of the following: • $5(kx^2 + 3) -2$ • $5(4k + 3) -2$ • $5((-2)^2k + 3) -2$ • $5kx^2 + 13$ FT from M2 only CAO
Alternative Method *$g(-2) = f^{-1}(73)$* *$(= \frac{73+2}{5}) = 15$* *$4k + 3 = 15$* *$(k=)\ 3$*	*M1* *A1* *m1* *A1*	*FT 'their f^{-1} from (a(i))* *FT 'their $f^{-1}(73)$'* *CAO*
	(8)	

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