REVISE
.wales

2.26 — Drawing quadratic graphs

Mark schemes for the 2.26 question pack

Spec 2.4.4 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 13 questions in the corresponding revise.wales question pack (54 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

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	

= 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.

1.(c)	Rhombus	B1	
2.(a)	−3	B1	
	Scale on y-axis '2cm square ≡ 5 units' OR '2cm square ≡ 4 units'.	B1	B0 for '2cm square ≡ 10 units'.
	At least 5 correct plots and no incorrect plot.	P1	F.T. 'their (−1, −3)' AND 'their uniform scale' if possible. Allow ± '½ a small square'.
	A smooth curve drawn through their plots.	C1	F.T. 'their 6 plots' OR a curve through the 5 given plots and (−1, −3). Allow for the intention to pass through their plots. (± 1 small square horizontal OR vertical).
2.(b)	$y = x^2 + 3$	B1	

3.(a) −5 11	B2	B1 for each. Table takes precedence if conflicting values given.
3.(b) At least 6 correct plots and no incorrect plot.	P1	F.T. 'their (−2,−5)' and 'their (2,11)' OR (−2,−5) and (2,11) plotted. Allow ± '½ a small square'. Ignore any plots that can not be shown e.g. (−2,−13).
A smooth curve drawn through their plots.	C1	F.T. 'their plots'. OR a curve through the 6 given points and (−2,–5) and (2,11). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
3.(c) Line y = 2 drawn	L1	Must be at least 2cm long.
−4·65 AND 0·65	B1	F.T. intersection of 'their curve' with 'their $y = 2$' only if exactly two points of intersection. Allow ± '1 small square'.

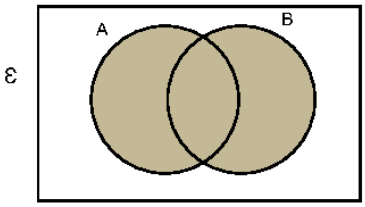
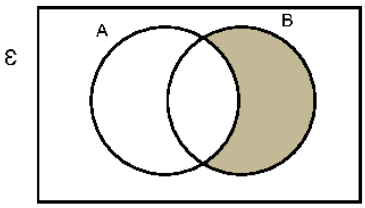
		(at least two common prime factors).
2. −13	B1	
Scale on y-axis '2cm square ≡ 10 units'.	B1	
At least 7 correct plots and no incorrect plots.	P1	FT 'their (−2, −13)' AND 'their uniform scale' if possible. Allow ± '½ a small square'.
A smooth curve drawn through their plots.	C1	FT 'their 8 plots'. (Only if an uniform scale used.) OR a curve through the 7 given plots and (−2, −13). Allow intention to pass through their plots (within 1 small square, either horizontally **or** vertically of the point).

14. *EBC* or *ECB* = (180 – 58) / 2 = 61(°)	 M1 A1	Check diagram. Angles in an isosceles triangle.
BAC = 61(°)	B1	Alternate segment theorem. FT 'their *EBC* or *ECB*'.
ABC (= 180 – 35 – 61) = 84(°)	B1	FT 180 – 35 – 'their *BAC*'.
Alternative method 1 *EBC or ECB = (180 – 58) / 2* *= 61(°)*	*Check diagram.* *M1* *A1*	*Angles in an isosceles triangle.*
DBA = 35(°)	*B1*	*Alternate segment theorem.*
ABC (= 180 – 35 – 61) = 84(°)	*B1*	*Angles on a straight line* *FT 180 – 'their EBC' – 'their DBA'.*
Alternative method 2 *EBC or ECB = (180 – 58) / 2* *= 61(°)*	*Check diagram.* *M1* *A1*	*Angles in an isosceles triangle.*
ACF (=180 – 35 – 61) = 84(°)	*B1*	*Angles on a straight line.* *FT 180 – 35 – 'their ECB'.*
ABC = 84(°)	*B1*	*Alternate segment theorem.* *FT 'their ACF'.*
Alternative method 3 *(using isosceles triangle BOC, where O is the centre of the circle)* *BOC = 360 – 90 – 90 – 58* *= 122*	*Check diagram.* *M1* *A1*	*Angles in kite BOCE*
BAC = 61	*B1*	*Use of angle in the centre* *FT 'their BOC' ÷ 2*
ABC (= 180 – 35 – 61) = 84(°	*B1*	*FT 180 – 35 – 'their BAC'*
15. *(a)* $3\sqrt{5}$	B1	
15. *(b)* $4 \times \sqrt{49} - 2\sqrt{7 \times 3} - 2\sqrt{7 \times 3} + \sqrt{9}$ or $4 \times 7 - 2\sqrt{21} - 2\sqrt{21} + 3$ or equivalent $31 - 4\sqrt{21}$	M1 A1	Allow one incorrect term. $\sqrt{7}\sqrt{7}$ is insufficient for $\sqrt{49}$. $\sqrt{3}\sqrt{3}$ is insufficient for $\sqrt{9}$. Allow $\sqrt{7}\sqrt{3}$ or $\sqrt{3}\sqrt{7}$ for $\sqrt{21}$. $\sqrt{7}\sqrt{3}$ or $\sqrt{3}\sqrt{7}$ is insufficient for $\sqrt{21}$.
16. $\frac{4\pi R^3}{3} = \frac{\pi r^3}{6}$ $24R^3 = 3r^3$ or $R = \sqrt[3]{(\pi r^3/6)/(4\pi/3)}$ or $R^3 = (\pi r^3/6)/(4\pi/3)$ or equivalent $R = \frac{r}{2}$	M2 m1 A1	Equating volumes Award M1 for sight of: (Volume of cylinder =) $\pi r^2 \times r/6$ or equivalent $\frac{4\pi r^3}{3} = \frac{\pi r^3}{6}$ is awarded M1. Award m1 for clearing fractions AND cancelling π or for isolating R or for isolating R^3. FT if M1 awarded and if equivalent difficulty CAO
17. *(a)* $y = f(x) + 2$	B1	
17. *(b)* $y = f(-x)$	B1	

3.(a) –5	B1	
3.(b) At least 7 correct plots and no incorrect plot. A smooth curve drawn through their plots.	P1 **C1**	F.T. 'their (1,−5)' Allow ± '½ a small square'. F.T. 'their 8 plots'. OR a curve through the 7 given points and (1,−5) Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
3.(c)(i) Line y + x = 4 drawn.	B2	B1 for a straight line going through(0,4) or (4,0) BUT NOT line y = 4 nor line x = 4
3(c)(ii) −2·4 AND 3·4	B1	F.T. intersection of 'their curve' with 'their y + x = 4 ' (even for line y = 4) only if exactly two points of intersection. Must be seen to intersect their curve at two points.

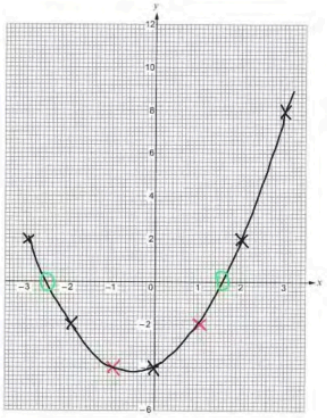
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE *Mathematics* Unit *1*: *Higher* Tier	Mark	Comments
1.(a) 5n − 3	B2	B1 for sight of 5n. Mark final answer.
1.(b) 17	B1	
1.(c) 2n + 2 OR 2(n + 1)	B2	If 2n + 2 is not their final answer allow B1 for sight of 2n + 2 in earlier work. B1 for a correct answer not simplified or incorrectly simplified e.g. n + n + 2.
2.(a)(i) 	B1	
2.(a)(ii) 	B1	
2.(b) A valid statement. e.g. 'all multiples of 6 are also multiples of 3' 'because 3 goes into 6', '6 is a multiple of 3'. '3 is a factor of 6'.	E1	Allow e.g. '(set) C is a subset of (set) A'. 'it is a multiple of 3' ' 6, 12, … are also multiples of 3'.
3.(a) 9 −7	B2	B1 for each.
3.(b) At least 6 correct plots and no incorrect plot. A smooth curve drawn through their plots.	P1 C1	FT 'their (−2,9)' and 'their (2,−7)' Allow ± '½ a small square'. FT 'their 8 plots'. OR a curve through the 6 given points and (−2,9) and (2,−7). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
3.(c) Line y = 1 drawn −0·8 AND 4·8	B1 B1	Must be at least 2cm long. FT intersection of 'their curve' with 'their y = 1' only if exactly two points of intersection and $y \neq 0$. If curve drawn, but no line drawn, allow a FT from intersection of 'their curve' with the line y = 1 only if exactly two points of intersection for B0 B1. Allow ± '1 small square'.

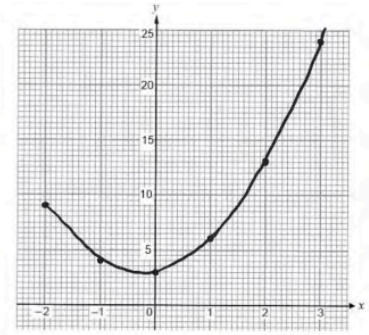
12. $6(2x+1)-4(3x-5)$ as a <u>numerator</u> within a single fraction $(3x-5)(2x+1)$ as a <u>denominator</u> $26 / (3x-5)(2x+1)$	M1 M1 A1	Allow intention of brackets, e.g. $6\times 2x+1-4\times 3x-5$ CAO. Allow $26/(6x^2-7x-5)$ (If expanded, the denominator must be correct.) If M1 M1 A1, penalise further 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.*

3. 6 −2 At least 5 correct plots and no incorrect plot. A smooth curve drawn through their plots.	B2 P1 C1	B1 for each. F.T. 'their (−1,6)' AND 'their (3,−2)'. Allow ±'$\frac{1}{2}$ a small square'. F.T. 'their 7 plots' OR a curve through the 5 given plots AND (−1,6) AND (3,−2). Allow for the intention to pass through their plots (within 1 small square, either horizontally **or** vertically of the point).
4. (Curved length =) 3·14 × 4 or equivalent = 12·56 (cm) (Perimeter =) 20·56 (cm)	M1 A1 B1	Do not allow M1 if subsequently divided by 2. Allow 4π for M1A1. Allow SC1 for an answer of 25·12 (whole circle). (If 12·56 shown, but then doubled, only award the SC1.) FT 'their derived 12·56' + 8 (even 'an area' + 8). Allow 4π + 8.
5.(a) $3k = p - 2$ or $p - 2 = 3k$ or $-3k = -p + 2$ $k = \frac{p-2}{3}$ or $\frac{p-2}{3} = k$ or $k = \frac{-p+2}{-3}$	B1 B1	F.T. only from $\pm 3k = \pm p \pm 2$, stated or implied. ($3k = p - 2$ will have already gained the previous B1.) B1B0 for $-k = \frac{-p+2}{3}$ or equivalent. Mark final answer. *Note* *Allow B1B0 for k = (p − 2) ÷ 3 with or without brackets.* *Allow B1B0 for* $\frac{p-2}{3}$ *('k' missing)*
5.(b) (Midpoint =) (5, 17) Showing that 17 = 3 × 5 + 2 (convincing) AND 'Yes'	B2 B1	B1 for each coordinate. May be given as $x = 5$ and $y = 17$. Accept use of $x = 5$ and $y = 17$ in $y = 3x + 2$. Allow B1 for sight of $\frac{3+7}{2}$ or $\frac{7-3}{2} + 3$ OR $\frac{15+19}{2}$ or $\frac{19-15}{2} + 15$ Allow SC1 for unsupported (17, 5). FT 'their stated midpoint', but not (3,15) nor (7,19), with consequent calculation AND decision.
6.(a) $5{\cdot}8 \times 10^{-3}$	B1	
6.(b) 7×10^{5}	B2	B1 for sight of correct value not in standard form e.g. $0{\cdot}7 \times 10^{6}$ or 700000. Mark final answer.
7.(a) P(South Wales =) 1 − 0·3 − 0·25 = 0·45 AND shown on relevant branch. 0·2 and 0·8 shown on all relevant branches.	M1 A1 B1	
7.(b) 0·45 × 0·2 or equivalent = 0·09 or equivalent	M1 A1	FT 'their completed tree diagram' for values 0<p<1.

2. (a) –4 –2	B2	B1 for each
2. (b) At least 5 correct plots and no incorrect plot. A smooth curve drawn through their plots. 	P1 C1	FT 'their (–1,–4)' and 'their (1,–2)' Allow ± '½ a small square'. FT 'their 7 plots' OR a curve through the 5 given points **AND** (–1,–4) and (1,–2). Allow the intention to pass through their plots (within 1 small square, either horizontally or vertically of the point).
2.(c) –2·6 AND 1·6	B1	Strict FT 'their curve' only if exactly two points of intersection with the x-axis. Answers must be written to one decimal place. Allow ± 'up to but not including 1 small square'.

1.(a) 1 10	B2	B1 for each. Table takes precedence if conflicting values given.
1.(b) At least 4 correct plots and no incorrect plot.	P1	FT 'their (−2,1)' and 'their (1,10)' OR (−2,1) and (1,10) plotted. Allow ± '½ a small square'.
A smooth curve drawn through their plots.	C1	FT 'their 6 plots'. OR a curve through the 4 given points **AND** (−2,1) and (1,10) Allow intention to pass through their plots. (± 1 small square horizontally or vertically.)

2.(a) 4	B1	Answer in table takes precedence.
2.(b) At least 6 correct plots and no incorrect plot	P1	FT 'their (1,4)'. Allow ± '½ a small square'. Ignore any additional points plotted on the curve.
A smooth curve drawn through their plots	C1	FT 'their 7 plots' OR a curve through the 6 given points **AND** (1,4). Allow intention to pass through their plots (± '1 small square horizontally **or** vertically)'.
2.(c) −3·7 AND 1·2	B2	Answer line takes precedence. May be seen in any order. Allow ± '1 small square' i.e. ± 0.1. FT intersection of 'their curve' with $y = 6$ only if exactly two points of intersection. Award B1 for one of the following: • line $y = 6$ drawn (must be at least 5 small squares long) • −3·7 • 1·2 • one correct intersection of 'their curve' with $y = 6$ two correct intersections of 'their curve' with 'their $y = 6$' only if exactly two points of intersection.

Unit 1: Higher Tier		
1.(a) 9 13	B2	Answers in table take precedence. B1 for each
1.(b) At least 4 correct plots and no incorrect plot.	P1	FT 'their (–2,9)' and 'their (2,13)' OR (–2,9) and (2,13) plotted (even when not shown in the table or contradicted). Allow ± '½ a small square'.
A smooth curve drawn through their plots.	C1	FT 'their 6 plots' OR a curve through the 4 given points **AND** (–2,9) and (2,13). Clear intention to draw a curve through 'their plotted points' (± 1 small square horizontally or vertically). 

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