REVISE
.wales

3.08 — Graphical solutions to quadratics

Mark schemes for the 3.08 question pack

Spec 2.4.10 — Unit 3

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 9 questions in the corresponding revise.wales question pack (18 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	

1320 ISW			
18. Sight of (0), 1, 4, 9, 16, 25 and 36. Split into 6 areas AND attempt to add derived areas	 ✓ ✓	 B1 M1	*Penalise -1 once only for a consistent misreading of one scale.* If using 6 separate areas, at least one area calculation (for a trapezium) should be potentially correct. 1st M1 may be implied by correct use of formula.
Correct substitution into trapezium rule. Area = ½ [0 + 36 + 2(1 + 4 + 9 + 16 + 25)]	✓	M1	Or equivalent (0·5+2·5+6·5+12·5+20·5+30·5) F.T. 'their values of y' provided at least 2 correct. Allow 1 slip e.g. in a y-value term, in h, or in an individual area.
= 73	✓	A1	C.A.O.

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	

16)

Graph A

$y = 7x^2$	
$y = -(x+7)^2$	
$y = (x-7)^2$	
$y = 7 - x^2$	✓
$y = x^2 + 7$	

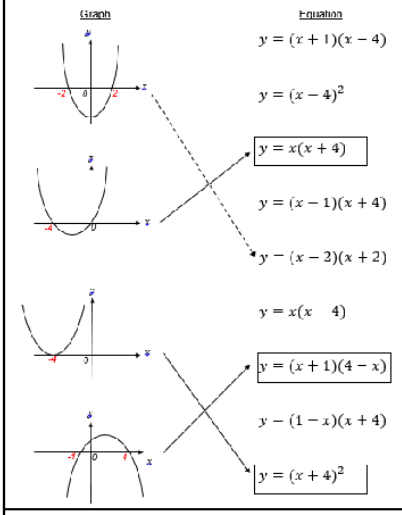
B1

Graph B

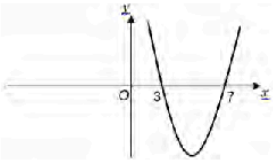
$y = x^2 + 1$	
$y = 2^x$	✓
$y + 1 = x^2$	
$y = \frac{1}{x}$	
$y = x^0$	

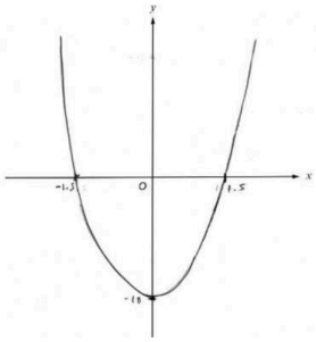
B1

18. Translation horizontally to the right (only) (4, 2) indicated correctly.	B1 B1	 Minimum point at (4, 2). SC1 for left shift with (-4, 2) indicated.

15.  	B2	B1 for any 1 or 2 correct.
16.(a) General sine curve with appropriate orientation and position. -1 and 1 indicated on the y-axis, curve passes through (-180°,0), (0°,0) and (180°,0) and approximately (-90°,-1) and (90°,1).	M1 A1	Ignore curve shown for values x< -180° or x> 180°.
16(b). -30(°) AND -150(°)	B2	Accept embedded answers. Penalise further incorrect answer(s) -1. Ignore further answer(s) outside of the range. Award B1 for sight of an answer -30(°) or -150(°) (but not for sight of -30 as part of working).
17.(a) $\frac{3}{100} \times \frac{1}{99}$ $= \frac{3}{9900}\left(= \frac{1}{3300}\right)$ ISW	M1 A1	Allow $3(.03\ldots)\times10^{-4}$ OR $0.0003(03\ldots)$ or equivalent. A0 for $0.0003(03\ldots)\%$. An unsupported $0.000303(\ldots)$ gains M1A1. An unsupported 3/10000 OR 0.0003 gains no marks.
17(b) $2 \times \frac{3}{100} \times \frac{1}{99}\left(= \frac{6}{9900} = \frac{1}{1650}\right)$ $+ \frac{3}{100} \times \frac{2}{99}\left(= \frac{6}{9900} = \frac{1}{1650}\right)$ OR $\frac{4}{100} \times \frac{3}{99}$ $= \frac{12}{9900}\left(= \frac{1}{825}\right)$ ISW	M2 A1	M1 for sight of $\left(\frac{3}{100} \times \frac{1}{99}\right) + \left(\frac{3}{100} \times \frac{1}{99}\right)$ OR $\left(\frac{3}{100} \times \frac{1}{99}\right) + \left(\frac{1}{100} \times \frac{3}{99}\right)$ OR $2 \times \frac{3}{100} \times \frac{1}{99}$ OR $\left(\frac{3}{100} \times \frac{1}{99}\right) + \left(\frac{3}{100} \times \frac{2}{99}\right)$ Allow $1(.21\ldots)\times10^{-3}$ OR $0.001(21\ldots)$ or equivalent. An unsupported answer of $0.00121(2\ldots)$ gains M2A1. A0 for $0.001(21\ldots)\%$. SC1 for working with replacement leading to an answer of 12/10000 (3/2500) OR 0.001(2) [may be unsupported].

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.

		$k(k^2p - p^3)$ OR $p(k^3 - kp^2)$ is B0
17.  Tick box ✓	B1	If more than one graph indicated, award B0.

12.(a) $2(2x+3)(2x-3)$	B3	Award B3−1 for a correct answer followed by further incorrect work. Award B2 for the sight of any one of the following: • $(4x+6)(2x-3)$ • $(4x-6)(2x+3)$ • $8(x+3/2)(x-3/2)$ • $(2x+3)(2x-3)$ • $2(2x+3)(2x+3)$ • $2(2x-3)(2x-3)$ Award B1 for the sight of any one of the following: • $2(4x^2-9)$ • $8(x^2-9/4)$ • $(4x+6)(2x+3)$ • $(4x-6)(2x-3)$ • $(x+3/2)(x-3/2)$ If no marks: Allow SC2 for $(2\sqrt{2}x+3\sqrt{2})(2\sqrt{2}x-3\sqrt{2})$ o.e. OR other valid, equivalent 'factorisation', e.g. $(8x-12)(x+1.5)$ o.e. Allow SC1 for $(\sqrt{8}x+\sqrt{18})(\sqrt{8}x-\sqrt{18})$ o.e.
12.(b) 3/2 AND -3/2	B1	Or equivalent for either roots. FT if possible, provided exactly 2 possible distinct solutions.
12.(c) A <u>positive</u> quadratic curve passing through (0,-18) as a minimum with -18 indicated on the y-axis AND passing through (–3/2,0) and (3/2,0) which are indicated on the x-axis.  	B2	FT for x-axis intersections, provided exactly 2 possible distinct solutions. Award B1 for any one of the following: A positive quadratic curve passing through (0, –18) as a minimum with –18 indicated on the y-axis OR A quadratic curve (either positive or negative) passing through (–3/2,0) and (3/2,0) which are indicated on the x-axis. If the conditions for B2 are met, then only allow B1 for concave and/or convex curvature above the *x*-axis.