REVISE
.wales

Area under a curve

Mark schemes for the Area under a curve question pack

WJEC Level 2 Additional Mathematics (9550) · Calculus

Official WJEC mark schemes for the 10 questions in the matching revise.wales question pack (56 marks total), from the 2011–2024 papers.

10	Intention to integrate	M1	Intention to integrate (manipulated given, hence not using given or differentiated expression). Sight of integration symbol alone is insufficient
	$18x^3/3 - 3x^2/2$ or $6x^3 - 3x^2/2$	A2	A1 for one term correct. Ignore 'c' included
	Use of correct limits 2 & 1 in correct order **and** intention to subtract	m1	
	37½ or 75/2	A1	CAO, do not accept 37½ + c. Answer only gets no marks. No marks for use of the trapezium rule
		5	

16	Curve intersections with x-axis 3 and 9 or appropriate sight of $x = 3$ and $x = 9$	B2	B1 for any of the following • either intersection correct • sight of ○ $-(x-3)(x-9)$ ○ $(x-3)(9-x)$ ○ $(3-x)(x-9)$ ○ $(x-3)(x-9)$ ○ $(-12 \pm \sqrt{36})/-2$ ○ $(12 \pm \sqrt{36})/2$ or equivalent
	Intention to integrate	M1	Intention to integrate, hence not using given or differentiated expression
	$-x^3/3 + 12x^2/2 - 27x$	A2	Ignore sight of '+c.' A1 one term correct
	Use of correct limits 9 & 3 in correct order **and** intention to subtract	m1	FT 'their stated value 9' > 0 and 'their stated value 3' > 0 in appropriate order provided 'their stated 9' ≠ 'their stated 3' There must be evidence of use of limits and subtraction
	36	A1	CAO Do not accept 36 + c *Correct answer only gets B2 M1 A0 m0 A0 (for intention to integrate)* *No marks for use of the trapezium rule*
		7	

16	Intention to integrate	M1	Intention to integrate, hence not using given or differentiated expression
	$-x^3/3 + 5x^2/2 + 6x$	A2	Ignore sight of '+c. A1 one term correct
	Use of correct limits 6 & 2 in correct order **and** intention to subtract	m1	
	104/3 or 34⅔ or 34.66(...) or 34.67 or 34.7 or equivalent	A1	CAO. Do not accept 34⅔ + c or 34.6 *Correct answer only gets M1 A0 m0 A0 (for intention to integrate)* *No marks for use of the trapezium rule*
		5	

15	Working to support that (7, 10) and (2, -5) both lie on the curve	B2 2	Working, e.g. • substituting the x-values and correctly finding y-values • substituting coordinates for the points and showing "=55" (Allow sight of -5^2 in working provided -25 is not seen) B1 for either correct working for either point
16	Intention to integrate $-x^3/3 + 8x^2/2 - 12x$ Use of correct limits 6 & 2 in the correct order **and** intention to subtract 32/3 or 10.66(6…) or 10.7	M1 A2 m1 A1 5	Intention to integrate (not using given or differentiated) A1 one term correct. The limits must be used in the correct order CAO. Only allow 10.6 from correct working seen *Answer only gets no marks* *No marks for use of the trapezium rule*

		4	
16	Intention to integrate	M1	Intention to integrate, manipulation given, hence not using given or differentiated
	$-x^3/3 + 2x^2/2 + 3x$	A2	Ignore sight of '+C. A1 one term correct.
	Use of correct limits 3 & -1 in correct order **and** intention to subtract	m1	
	$10\frac{2}{3}$ or equivalent	A1	CAO. Allow 10.66(…) or 10.7, do not allow 10.6 Do not accept $10\frac{2}{3}$ + C *Answer only gets no marks* *No marks for use of the trapezium rule*
		5	

		4	Do not accept trial & improvement
15	(a) Intention to substitute x=2 and x = 4 into $y = -x^2 + 6x - 8$	M1	OR substituting either value and showing y = 0 OR attempt to factorise as a pair of brackets ((-)x ..2)(x ..4) Do not accept $(-2)^2 + 6\times2 - 8$ and $(-4)^2 + 6\times4 - 8$ Accept $-2^2 + 6\times2 - 8$ and $-4^2 + 6\times4 - 8$
	Showing y = 0 for both values	A1	OR factorised as $(-)(x-2)(x-4)$ or equivalent
	(b) Intention to integrate	M1	Intention to integrate (manipulated given, hence not using given or differentiated)
	$-x^3/3 + 6x^2/2 - 8x$	A2	A1 one term correct.
	Use of correct limits 4 & 2 in the correct order **and** intention to subtract	m1	The limits must be used in the correct order
	4/3 or 1.33(3…)	A1	CAO. Only allow 1.3 from correct working and sight of 4/3 *Answer only gets no marks* *No marks for use of the trapezium rule*
		7	

			given and no others
15	(a) Intention to substitute x=2 and x = 5 into $y = -x^2 + 7x - 10$	M1	OR substituting either value and showing y = 0 OR attempt to factorise as a pair of brackets (x ..2)(x ..5) Do not accept $(-2)^2 + 7\times2 - 10$ and $(-5)^2 + 7\times2\times - 10$
	Showing y = 0 for both values	A1	Accept $-2^2 + 7\times2 - 10$ and $-5^2 + 7\times5 - 10$ OR factorised as $(-)(x - 2)(x - 5)$ or equivalent
	(b)	M1	Intention to integrate (manipulated given, hence not using given or differentiated)
	$= -x^3/3 + 7x^2/2 - 10x$	A2	A1 one term correct.
	Use of correct limits 5 & 2 in correct order **and** intention to subtract	m1	
	4.5	A1	
		7	CAO. *Answer only gets no marks* *No marks for use of the trapezium rule*

Level 2 in Additional Mathematics MS Summer 2014

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11	$\int(10x - x^2)dx$ $= 5x^2 - x^3/3$ Use of correct limits 10 & 0 in correct order 500/3 or equivalent	M1 A2 m1 A1 5	**Intention** to integrate A1 for each. Accept 10/2 as 5 CAO. Accept 166.6(66..) or 166.7 *Answer only gets no marks* *No marks for use of the trapezium rule.*

Q	Additional Mathematics Summer 2013	Marks	Final

	punctuation and grammar		
12	Intention to integrate $6x - x^2$	M1	
	$3x^2 - x^3/3$	A2	A1 for each. Accept 6/2 as 3
	Use of correct limits 6 & 0 in correct order with the intention to subtract	m1	Depends on previous M1, A1
	36	A1	CAO. *Answer only gets no marks*
		5	*No marks for use of the trapezium rule.*

	Additional Mathematics Summer 2012		Final Mark Scheme

			for ... + 2y˜˜/5
12	$\int (3x - x^2)dx$ $3x^2/2 - x^3/3$ Correct use of limits 4.5 or equivalent	M1 A2 m1 A1	Do not penalise dx omitted. Limits not required A1 for each CAO *No marks for use of trapezium rule*

End of solutions